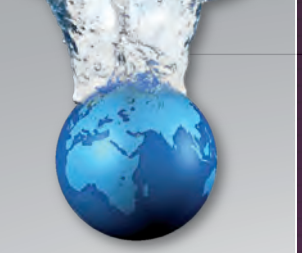

Karl H. Asenbaum

ELECTRICALLY ACTIVATED WATER

An invention with extraordinary potential

euro multi media

LEGAL INFORMATION AND IMPRINT

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INHALT

INTRODUCTION TO PART I

Up until 200 years ago water was a drink for the lower classes. It had to be boiled to be drunk without risk.

Nowadays mostly good water that has been treated flows out of the tap.

It is seldom doubted that drinking water providers treat this "best controlled nourishment" following the established rules. The doubt is applicable to the rules which they follow. Whoever applies stricter limits to the rules will not avoid getting a water filter. Besides, procedures have, in the meantime, been developed to vitalize tap water to give it a more attractive flavor.

There are a fascinating amount of water treatment methods and devices that physically, chemically or electrically elevate drinking to a new dimension.

In addition there is still a lot of mysticism in the water market. Here I would like to give you a detailed overview for you to know what is best suited to your purpose.

When I decided in 2004 to move to Lower Bavarias' Bad Füssing, in order to develop modern methods of therapy and health maintenance with Dr. Walter Irlacher, who was already known for de-acidification concepts, and to present with him in the book "Service Handbuch Mensch" (Service Manual for Humans), I had not known that 70 years ago, in my home town Munich, the first factory was built by engineer Alfons Natterer for the production of electrically activated water, an invention which formed the basis of our book.

The technology of water ionizing, developed by Natterer, vanished without a trace in the Far East after his death in 1981 and finally returned to Germany in 2004.

In 2008, engineer Dietmar Ferger, Dr. Irlacher and I wrote together another book which deals with this subject exclusively: "Drink Yourself Alkaline! A guide to alkaline activated water."

After 8 years of further research I can present today a comprehensive argument as to why this invention is so important and why you should invest your time in it. We need a drinking revolution.

Munich, 12.04.2016

Your

Karl Heinz Asenbaum

Drinking water treatment 1

Natural water	Chemical activation		Electrolytical activation	
Rain, standing waters, groundwater, well, spring, meltwater	alkaline minerals	Fumigation with H_2	Enrichment with H_2 and O_2 at a ratio of 2:1 in a 1-compartment-cell	In special designs of 2-compartment-PEM-cells: Enrichment of outflowing water with H_2 & O_2 at a ratio of 2:0
Service water, sea, bathwater	Hydrogen-producing reagents especially metallic magnesium	„H_2-bubbled“, „Hydrogen-rich water (HRW)	H_2 solves faster in water than O_2. That is why ORP decreases first, creating a so-called „hydrogen-rich-water“	H2FX-Cell, „Aqua-Volta Booster
Potable water, mineral water, natural medicinal water, table water, Nordenau, Hita, Tracote etc.	low concentrated lyes up to pH 8 - pH 12	Never achieves full H_2-saturation or oversaturation for more than some minutes, if dissolved oxygen will not be removed.	On the other hand after a few minutes also O_2 is enriched, increasing ORP again. So with this methode a maximum of hydrogen saturation (1,6 ppm) cannot be achieved.	Normal decrease of ORP (Nernst)
Water filters, reverse osmosis	ORP corresponding to pH value according to Nernst equation	ORP corresponding to pH value according to Nernst equation	The ion balance does not change. But CO_2 gas bubbles out and increases pH-value slightly.	Ion balance does not change. No enrichment or fall-out of Calcium.
Water vortex, oxygen enrichment				
Treatment without scientific background, magic	No excess of OH^--Ions	No excess of OH^--Ions		No excess of OH^--Ions

Content

Drinking water treatment 2

Water ionizer (electrical activation with diaphragm electrolysis)

Alkaline activated water with maximum dissolved H_2 in cathode compartment >1,6 ppm	Acidic activated water with maximum dissolved O_2. in anode compartment.
„Alkaline ionized“, „alkaline reduced“, „electrolyzed reduced“, antioxidant, „living water“	Oxidant water, „acidic ionized water“, „death water“, (not potable)
Trademarks: „Kangenwater“, „Aquavolta“, „Tyentwater“	By-product of a water ionizer for cleaning purposes, skin care, plant watering
Removing of anions and O_2 . ORP negative. pH-value 8,5 - 10	Removal of cations and H_2. ORP positive, pH-value 3,5 - 6,5
Increase of cations, especially Ca^{2+}, Mg^{2+} passing through the diaphragm from anodic compartment	Increase of anions passing through the diaphragm from cathodic compartment

ECA (electro-chemically activated) water

Diaphragm-elektrolysis with addition of salt

Fat dissolving, non caustic strong alkaline functional water (Catholyte) with extremly low ORP down to -800 mV (CSE) and pH-value > 11,4	Astringent, disinfecting acidic, but not corrosive functional water (anolyte) with extremely high ORP upt to +1200 mV (CSE) and pH-value 1,5 - 3
selectively germ-killing by decomposition of the cell membrane	strong germicide from high content of hypochlorous acid

Neutral Anolyte is also applied in farming and cattle-breeding

Useful for all hygienic purposes and also for some medical therapies.

Content

WATER - LIFE & HEALTH

WATER - THE FACTS

- If the absolute majority of our body mass did not consist of water, then we would soon be dead.
- Water has to be continuously replaced. For no water molecule stays longer than 2 weeks in the body.
- Therefore, a daily water replacement demand is calculated at 0.34 liters per 10 kg of body weight.
- If someone weighs 70 kg, for example, then 2.38 L of water has to be replaced in the body. How we decide to do this tremendously influences our health.

WATER - IN WHICH FORM?

- Even living foods, especially fruit and vegetables, consist predominantly of water. Yet we can never eat enough to replace the water we need. Above all, we should not eat so much since our sedentary lifestyle does not require a calorie rich diet. Obesity is one of the biggest health risks of our time.
- Solid foods are especially needed to gain energy. It is gained by metabolizing carbohydrates.
- Carbohydrates are made up of carbon and hydrogen. What we need especially is hydrogen. That is why carbon is disposed of as quickly as possible by exhaling about 1 kilogram of carbon dioxide.
- Carbon dioxide is a deadly gas because in high quantities it over-acidifies the body. This occurs constantly when we burn carbohydrates from our food with inhaled oxygen. To exhale this, your lungs need 0,5 liters of water daily.
- So, if we consume fizzy drinks, we burden our organism further. This is the case with fizzy water, especially with sweet lemonades which are very rich in carbohydrates.

A SHORT HISTORY OF DRINKING WATER

Certainly no water for drinking - and if then only boiled: Since the beginning of civilization this was a clear message to everybody. For even in this day and age humanity has not managed to provide drinking water everywhere in the world, which just seems unthinkable when concerning health. Most infectious diseases are still transmitted through water.

Nowadays even rain water is not recommended for drinking: Poisonous chemicals and other contaminants swarm through the air and when washed down with rain, this polluted and acidified water even endangers oceans, eats away at coral reefs and kills forests.

Alongside boiled water, tea and beer was one of the first drinks to be accepted by early advanced civilizations in Babylonia and Egypt. It was drunk by everyone daily.

The ancient Greeks discovered **that unboiled water can also be drunk when mixed with wine**, since wine disinfects it. It was considered barbaric to drink pure wine.

Also the Romans followed this custom. Beer and wine were also the preferred drinks in the Middle Ages and in Renaissance times.

In the Orient a coffee culture was developed, in Asia a tea culture.

Only in the 19th century did the beneficial effects of drinking water come into fashion. The pharmacist Struve sold artificial healing water all over Europe.

In the 20th century modern technology allowed the development, treatment and bottling of drinking water.

Water drinking, culturally, is no older than 200 years.

WATER IS NOT AN ELEMENT

Shortly before the French Revolution **Antoine de Lavoisier** turned upside down the knowledge which science previously had. Water was not a classical element, something previously believed: it is combusted hydrogen thanks to the oxygen. H2O is a formula where two gases have released energy and bonded as a molecule which, depending on the temperature, exists in a solid, liquid or gas state. The importance of Lavoisier's discovery was that water can be split back to its two basic components with a large supply of thermal energy. This is called thermolysis. Nowadays we know of the research done by Gerald Pollack, which is that small amounts of infrared thermal energy in water creates specific structures, so called exclusion zones, in which water can cleanse itself from foreign substances.

Before Lavoisier, **Alessandro Volta** developed the first battery. In the year 1800 **Johann-Wilhelm Ritter** showed how water can be broken down to its gases with the low current of this battery through water electrolysis.

Consequently, he also produced water with these two gases through ignition. Alessandro Volta noted that: even **the pH level of the water has changed because of electrolysis.** Yet he did not pursue this.

WATER STORES ELECTRICITY

Vasily Petrov developed in 1802 diaphragm electrolysis. A membrane placed in between the two poles allowed for two types of water to be produced: alkaline at the negative pole and acidic at the positive pole.

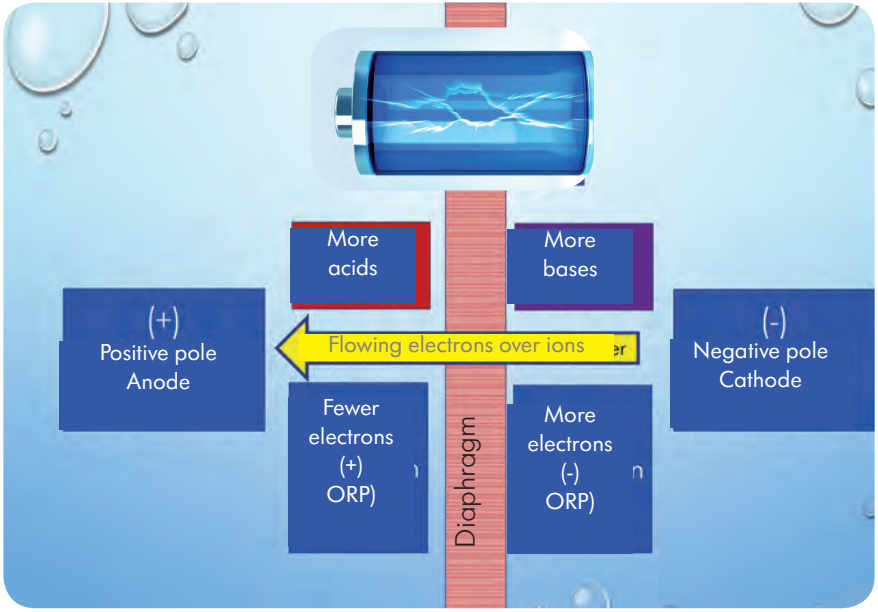
Indicator: pH 7 (green), pH 5 (yellow), pH 9 (purple)

The electrochemists were astonished with the possibilities of this easy technology. Yet no one saw this creation as drinking water.

Only since the 1930's did the Munich engineer **Alfons Natterer** produce electrolyte water for the "treatment of metabolic diseases". In the following years many operational purposes of alkaline as well as acidic water were investigated.

In 1966 in Japan the **first "domestic water ionizer"** was developed by Yoshimi Sano, in particular to make alkaline water yourself. As it was later discovered, this stores energy in the form of dissolved hydrogen gas and has an antioxidant effect.

WATER ELECTROLYSIS



Diaphragm electrolysis takes place in a water ionizer. A direct current flows from the negative pole to the positive pole, whereby the electrons flow over the ions dissolved in water. Water in the cathode chamber becomes **alkaline and electron rich (H2 saturated)** because of different electrochemical processes that occur. In the opposite anode chamber it becomes acidic and electron poor (O2 saturated), which is noted in the **change of the Oxidation Reduction Potential (ORP).**

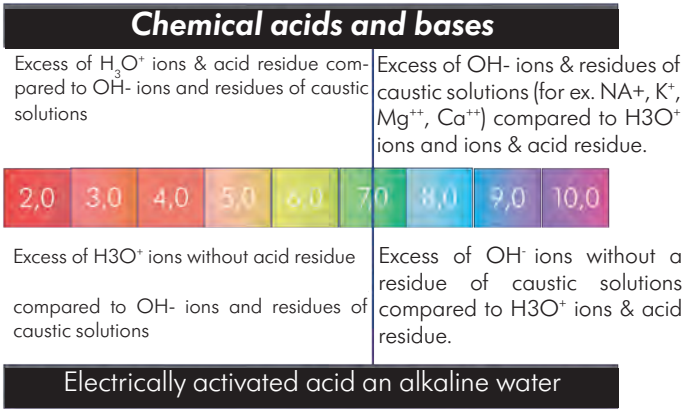
The negative ORP supplies the alkaline activated water with antioxidant properties in the cathode chamber. The reason for this is dissolved hydrogen gas.

The pH value of pH neutral water can be raised with electrolysis up to ca. pH 12.9. For example, in Germany a maximum value of pH 9.5 is approved. Therefore each ionizer can be set so that the maximum drinking pH value is not exceeded.

Even if the 9.5 pH limit is inadvertently exceeded, alkaline water is not a harmful substance, nor is it caustic like a chemical lye with the same pH value.

Even extremely acidic activated water with a pH value of 2.5 does not attack the body, for compared to stomach acid with a pH value of 2.5 it is only weakly buffered. [6)]

PH-VALUES



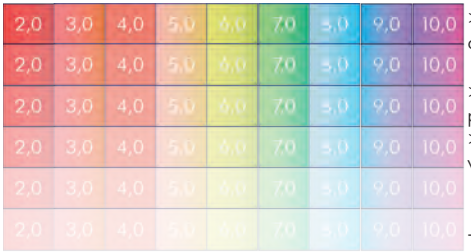
All aqueous solutions, including chemical lyes and acids, have a specific pH value. The pH value is a logarithm scale of 1 to 14, the amount of H_3O^+ ions in proportion to the OH^- ions. At pH 7 the ratio is 1:1.

At pH 6 the ratio is 10:1, at pH 8 it is 1:10. Every pH level is a multiple of 10. At pH 14 a ratio is 1:10 million. By pH 1 it is 10 million : 1.

So the pH value of an aqueous solution depends on a ratio and is not an absolute value. The character and strength of an acid or base (lye) is defined by the so called acid or base residue. For example, if hydrochloric acid has many Cl^- ions at its disposal, then it would be corrosive. Or if a caustic soda has many Na^+ ions.

With electrolytically gained alkaline and acidic activated water, those acids and caustic sodas are only available if they were already in the source water. That would be very limited amounts, a few milligrams/liter. Therefore electro activated tap water cannot cause any external or internal damage to your body.

The chart below shows strong and weak aqueous solutions. The same pH value can mean very different effects.



> Stomach acid to weak caustic soda.

>Coca Cola to baking powder

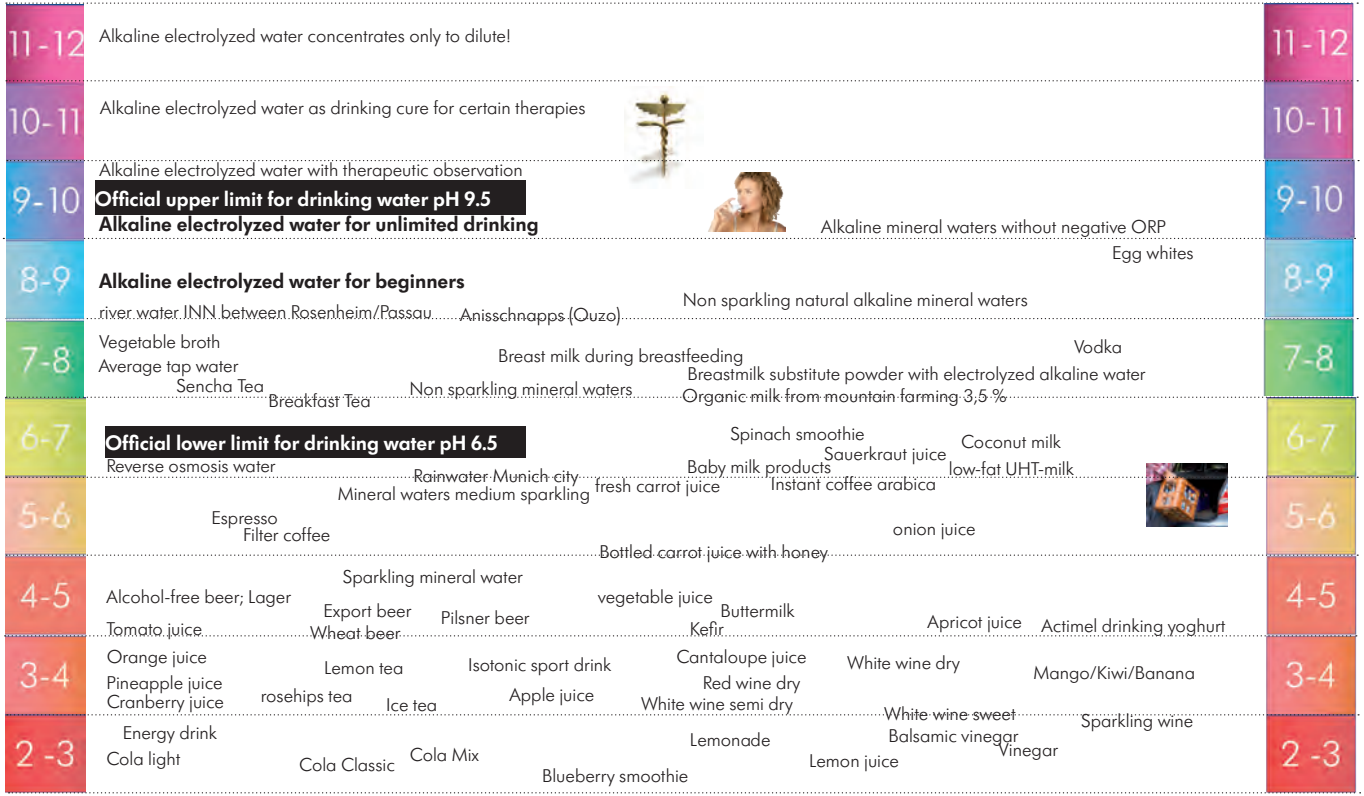
>Acidic to alkaline activated water from:

- Hard tap water
- Soft tap water
- - De-ionized water

From top to bottom you see very strongly buffered and weakly buffered aqueous solutions in each case with the same pH value, symbolized with the color intensity. The fewer the minerals available, the weaker the buffering.

Content

AVERAGE PH VALUES OF CUSTOMARY DRINKS



Content

DRINKING ALKALINE

Excessive and unhealthy diets are an important reason for acidification related problems. According to Dr. Walter Irlacher, **drinks are much underrated as hyperacidity factors**.

Often, more than half of the calorie intake consists of sugar - or alcoholic drinks. To replace some of these with alkaline activated water doesn't only spare the body of a too high calorie intake, but also of the acid load.

Different acidic everyday drinks with a similarly low pH value are very varied concerning their acidic buffering. The German Federal Institute for Risk Assessment (BfR) has reported this. Swiss scientists have determined how much caustic soda is needed (titratable acidity), to neutralize these drinks to pH 7.

Drink	**pH**	**Titration amount**
Apple juice	3.44	**4.10**
Orangina	3.20	3.50
Rivella blue	3.75	2.30
Sinalco	2.91	2.83
Fanta orange	2.86	4.18
Sprite	2.79	2.82
Orange juice	**3.77**	**5.95**
Isostar orange	3.58	1.57

Surprisingly, the titrate chart below on the left shows that natural beverages like apple or orange juice require a significant amount of bases to neutralize their acidity. One apple a day might be considered healthy - 10 apples in a liter of apple juice are probably not.

In our test a Coca Cola® (pH 2,7) could be neutralized with Munich tap water at pH 7 with 32 times the same quantity. With alkaline activated water from the same source we only needed 16 times that amount.

In the well known acidic cola drink there is also a considerable difference with the ORP.

Average measured values (ORP in mV/CSE):

Brand	pH	ORP
Coca-Cola® Classic	2,7	+263
Coca-Cola® Zero	3,3	+214
Bionade® Cola	3,6	+081

Content

DRINKING ACIDIC

DRINKING AND STRESS

Cross your heart: If you are again in a very stressful situation, if work becomes too out of control, **what do you do to calm down?**

Do you get another coffee from the vending machine?

Do you prefer to quench your thirst with a coke or an energy drink to last through the day?

Do you drink a strong cup of tea?

Do you take a swig of a small beer?

And if you think about water: Which one would you choose at this time? Fizzy or not?

Carbonic acid is formed with carbon dioxide in water. The death in the fermenting cellar is based on the effect of carbon dioxide. It is an **unaesthetic gas** and is used, for example, in slaughter houses.

Its calming effect is failsafe. **Fizz is a sure relaxer.**

Carbon dioxide (CO_2) also calms the mineral water industry. They press this waste gas by the ton into their products.

For poisonous CO_2 keeps mineral water germ free for longer. Like this it can be stored longer and transported further. During transportation more CO_2 is produced. Yet global brands have to sell globally, so that it is worth the advertising expense.

MINERAL WATER

MINERAL WATER

Do mineral waters really have a higher value than tap water?

The Drinking Water Ordinance is significantly stricter than the mineral water regulations.

Only **few mineral waters on the market would meet the standards of drinking water**.

Even still waters and many medicinal waters would not.

Due to the weight during transportation mineral water is bottled in plastic bottles. Plastic waste drifts in practically all seas - the consequences of the impact on the food chain is not even foreseeable.

Consumers with a conscience opt for mineral water in glass bottles. **Dragging these water crates around must give the orthopedic profession a lot of business.**

CURATIVE MEDICINAL WATER

In the 19th century, as drinking cures came into fashion, people were more generous than today if dealing with packaging and shipping of a costly healing water. Bottles made of fired clay were mostly used.

Foto: Sigismund v. Dobschütz

Ceramic is still inserted nowadays into high quality filters because it gives pathogenic germs little chance to survive. Ceramic emits infra-red heat which allows water to have greater hexagonal exclusion zone structures. This we know thanks to the research done by Gerald Pollack. This seems to give the water a better taste. Furthermore, ceramic water stays "fresh" longer.

Another method during the 19th century was invented by the pharmacist Friedrich A. Struve. He reconstructed the famous curative water with its mineral composition and served it in drinking cure institutions from London to St. Petersburg with enormous economic success.

Yet in the 20th century it was established **that not only the minerals are responsible for the healing effect,** but also the partly very volatile dissolved gases. These gases escape, in particular from our modern plastic bottles very quickly after being filled. The bottles shrink, and we know today, that above all valuable hydrogen escapes, which is very typical in fresh curative waters.

Ueber

die Nachbildung

der

natürlichen Heilquellen

von

Friedrich Adolph August Struve,

Doctor der Medicin, Ritter des Königlich Sächsischen Civilordens für Verdienst und Treue; Mitglied mehrerer gelehrten Gesellschaften,

nebst

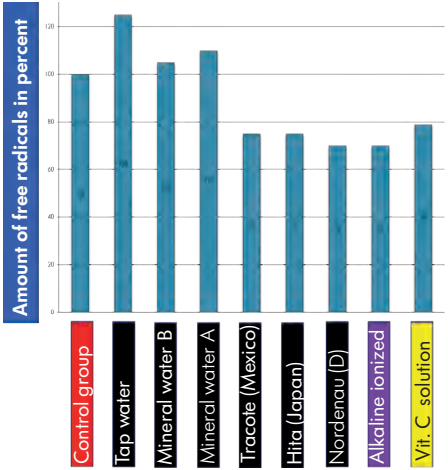
praktischen Beobachtungen mehrerer Aerzte über die Wirksamkeit der in der Struveschen Anstalt künstlich dargestellten Mineralwässer.

Content

HYDROGEN AS A HEALING GAS

In the 1970's Vitold Bakhir discovered apparent abnormal properties of electrolyzed water. This lead to a gigantic water research project in the former Soviet Union. It was found out that some natural waters which were considered to be extraordinarily healthy had the same properties. The ORP. An electric parameter which usually had not been observed in water before that time. In former times the change in pH and mineral content was the only thing discussed. This extraordinary ORP could not be calculated with the chemical formulas known to this time because the relationship between pH and ORP was different.

But Bakhir did not open up a new field in chemistry, as he claimed. He hadn't calculated that hydrogen with an ORP of 0 mV (E^0) has a remarkable influence on the ORP of the leftover water if dissolved in it. Dissolved hydrogen simultaneously plays the same role, especially if the normal balance between hydrogen and oxygen is changed by diaphragm electrolysis in one way or the other.



In the late 1990's a Japanese group of scientists, lead by Sanetaka Shirata, discovered that **dissolved hydrogen is especially responsible for the healing effect of water in general.** [10] They compared natural curative-medical waters with artificially produced alkaline electrolyzed water with vitamin C. Both of them have an antioxidant effect on free radicals that cause diseases.

The proof that free radicals were scavenged by atomic hydrogen (H) was obtained in 1997.

In 2008 Shigeo Ohta added the proof that molecular- that means gaseous-hydrogen (H_2) possesses a selective function for scavenging the most dangerous free radical, which is the hydroxyl radical. [11]. Additionally H_2 is **able to reload naturally occurring antioxidants** in the body, like Glutathione, vitamin C, Q 10, Catechin and vitamin E.

Since that time hydrogen therapy as a medical gas is one of the top medical researching hotspots worldwide.

Chart according to Dieter Männl, Hydrogen - A topic for new medicine, Hamburg 2014

EASY DRINKING-WATER FILTERING AT HOME

Before we start: **You don't have to treat all of your cold water,** just what you wish to drink and use for cooking. So this is not more than 10 - 30 Liters a day. The basis for optimizing drinking water is filtration.

There are different filters for drinking water. But it is always necessary to divert it from the water pipeline.

PITCHER FILTERS

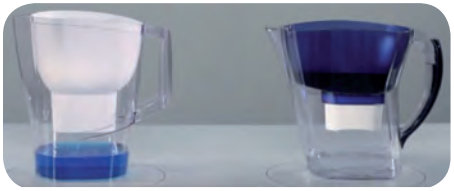
The easiest method is to fill your water pitcher with cold tap water and wait for it to be filtered.

Pitcher filters reduce a lot of inorganic and organic water pollution with activated carbon and other filtering materials placed in a disposable cartridge.

The disadvantage is the unsealed, open design of the whole system. As time goes by the possibility of pollutants and germs found in the air and from direct contamination from handling the pitcher can invade the system easily. There is no protection. The possibility of being infected is much greater with these water pitchers because it is not a safe method.

Foto: Aquaphor® - Prestige, 2,8 Liter

Pitcher filters tend to look similar, so you should enquire about the exact filtration rate before you decide to buy one. Because there are great differences in the filtering materials used. In the picture, above right, you can see the different filtering efficiency of the chemical substance methylene blue. On the left you see a Brita® filter, on the right you see a filter with Aqualen® filter media made by Aquaphor®. Filtration time 7 minutes.



COUNTERTOP FILTERS

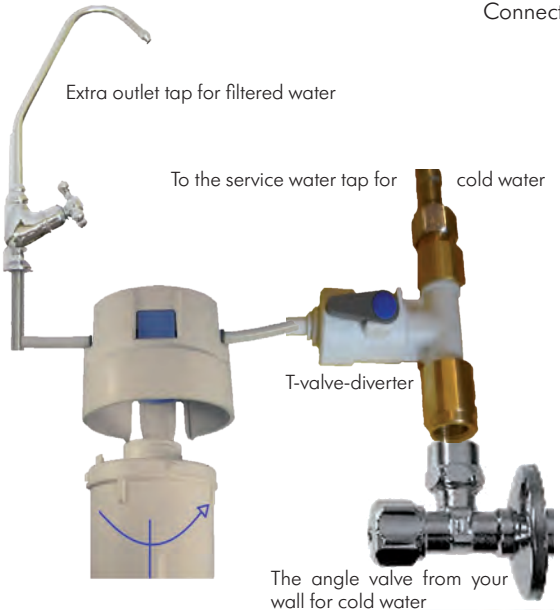
A flow through water filter is the more elegant way. Also it is much faster and more hygienic. For example, there are countertop devices that can be mounted to the water tap. To fix it you simply unscrew the aerator and replace it with the tap diverter valve.

Picture: Aquaphor® Modern Countertop Filter with 2 Aqualen® filter cartridges.

UNDER THE COUNTER FILTERS

These well distributed types of filters stop the filter cartridge from coming into contact with air. This prevents the development of bacterial growth and is the huge advantage over pitcher filters.

Under the counter filters are not to be confused with domestic filter systems. These clean all of the water in the house and usually only remove the sediment. These types of filter systems can be cleaned mechanically by backwashing at certain intervals. An under the counter filter only cleans the water used for drinking and cooking, but much more thoroughly.



Connection example: Aquaphor® K107 Filter cartridge with quick-release system.

Disposable filter cartridge and cross section

With a filter system, above you see the mounted tap that would have to be installed. Even a three-way-valve tap is possible. Like that you can choose from cold and hot water or filtered drinking water.

The actual filter with one or more disposable cartridges is connected to the water system under the sink with a T piece connector at the angle valve. The filter head has a very practical quick-release system which allows the cartridge to be exchanged without the need of a filter key. When you turn on the tap, water starts to flow through the filter.

Pictured below is a triple filter head from Aquaphor®, where different special filters can be combined.

REVERSE OSMOSIS FILTERS

Reverse osmosis makes it possible to filter water almost completely, like a distillation. You end up with practically nothing else except water molecules.

Foto: Reverse Osmosis devic AQUAPHOR® MORION RO

The issue is: is this still considered drinking water? Legislators and the WHO[13] refute this.

The Russian water researchers and Bakhir[14] report:

"Drinking this de-ionized water, reverse osmosis water, melt water or very soft water long term leads to disorders of the adrenal cortex which, in turn, causes heart disease, high blood pressure, feeling of joint pain, a tendency of developing arthritis and arthrosis. With cattle it leads to cramping syndrome and with lab rats to cardiac arrhythmia."

Dr. Walter Irlacher warns: "Distilled water absorbs like a sponge vital minerals, such as calcium, potassium and magnesium from your cells."[15]

Dr. Norman Walker (1886-1985) drank distilled water for decades. It is concealed though, that throughout the day he would alternate drinking this water with fruit and vegetable juices. It is obvious that thereby he compensated for the mineral deficiency of the water successfully.

Reverse osmosis is a filtering procedure that works with water pressure. The series of filters are ordered from broad to narrower pores.

Even Aristotle reported over Greek sailors that sunk amphorae deep below sea level. The high water pressure flushed the through the pores, yet did not let the salt pass through.

In the 20th Century reverse osmosis was developed for astronauts. They were able to gain drinking water from their urine. Such a demand is not required for normal drinking water. Normal, high performance filters are preferable because they leave the important minerals in the water.

In Israel, due to water shortages one is often forced to gain water from reverse osmosis. The government issues that this water has to be enriched with at least 50mg calcium carbonate so that public health is not jeopardized.

I also recommend urgently to mineralize reverse osmosis water.

WATER IONIZERS

Electrolytic water ionizers (with built in filters) are one step ahead of water filters when dealing with water treatment: They activate tap water by enriching it with alkalinity and selectively antioxidant hydrogen that neutralizes especially Hydroxyl-Radicals. In Far East like Japan, water ionizers are part of a healthy lifestyle since 1985. When luxury apartments are sold there, it is not unusual for a water ionizer to be a buying incentive, for a third of all Japanese drink alkaline activated water.

The most technical know-how of how to make a domestic water ionizer comes from Japan. Yet the Japanese industry today has been pushed back in the global market by competitors in South Korea, Taiwan, Malaysia, Thailand and China.

Water ionizers developed on the Soviet side hardly made a break through worldwide and are mostly made for professional use in the food and hygiene industry.

The picture shows only a few models developed since 2008. Since all devices were made in the Far East and designed for extremely soft water, European and American importers only focused on very strong devices which adapt to the requirements of hard water.

The author of this publication has contributed to this crucial development.

BATCH WATER IONIZERS

Abbildungen: AQUAVOLTA® BTM 3000

Batch ionizers have been known since 1931. They are the initial and easiest way to gain electrolytically activated water. The producers have not yet received a design prize. Functionality lies at the forefront. These devices cost a third of what a decent flow through ionizer would cost you.

They consist of an electrolysis cell with a cathode chamber (1) and an anode chamber (2), which are separated by a diaphragm membrane. The chambers are filled manually with filtered water (4). A DC power supply feeds electricity for electrolysis which is controlled with operating buttons and a timer.

The pictured AQUAVOLTA® BTM 3000 has a capacity of 2 x 2 liters. In one operation (30 - 90 minutes depending on the water hardness) 2 liters of alkaline activated water can be produced. This is then filled automatically into the 2 liter storage container (5). At the same time 2 liters of acidic residual water are produced.

When operating the device one has to determine the timing for the desired pH value of 9 - 9,5. This is specific to the source water and cannot be predicted exactly.

As a rule of thumb one can specify:

soft water with a hardness up to dH 9: ca. 30 minutes

medium hard water with hardness dH 10 - 15: ca. 45 minutes

hard water dH 16 - 20: ca. 60 minutes

very hard water dH 21 - 25: ca. 75 minutes

extremely hard over dH 25: 90 minutes or more

These hardness measurements (°dH) are the German hardness degrees which you are able to get from your local water supplier. 1o dH corresponds to 0.1783 mmol/l. and 1.78 °fH (French hardness degree).

BATCH IONIZERS AS ECA DEVICES

Batch water ionizers are very popular in the CIS states. However, these do not meet the demands of electro-technical or hygienic European standards.

The reason for the high acceptance in the CIS states and the Baltic States are due to the research of the so called "Taschkent Team" under **Stanislaw Alechin**. He geared the medical discipline of the major research project toward electro activated water in 1978.

He published in 1998 the extensive **"Guidelines for the use of electro activated aqueous solutions for prophylaxis and treatment of the most common diseases of humans."**

These medical guidelines were only partly translated into German. They are based on the use of a batch ionizer to produce electro chemically activated functional water for the most diverse medical uses.

This is how it works: One mixes certain minerals into a defined water (usually reverse osmosis water) and starts the electrolysis process.

The production of "anolyte" is the most known, a very effective and environmentally friendly disinfectant, which is used in practically all Russian hospitals. It is produced with a saline solution. This only takes 30 minutes with the Aquavolta BTM 3000. Hypochlorous acid (HClO) is produced in the anode chamber during electrolysis. This is one of the most effective disinfectants that exists. The "catholyte" (NaOH) is produced simultaneously in the cathode chamber as a minimally buffered solution.

Catholyte is an environmentally and skin friendly fat emulsifier. Even with a very high pH value of 12 and a low ORP from (-)800 mV (CSE) and 1600 micrograms/l dissolved hydrogen, is it very skin friendly and not at all corrosive like a caustic soda with the same pH value. For each liter of reverse osmosis water, de-ionized water, 1 - 5 grams of salt are added so the result is a solution with almost no buffer. The effect takes place because of the huge surplus of OH- ions which occurs during the 30 minute electrolysis. Catholyte is also used in alternative medicine, for example for cancer treatment.

Low salt dosage with the included measuring spoon

After 30 minutes 2 types of electro chemically activated (ECA) water are produced.

Already with 2.5 g salt CATHOLYTE forms, with a pH 12 and an ORP of (-)790 mV (CSE) by 1.6mg dissolved hydrogen (dH_2)

ANOLYTE is created in parallel and has a pH value of 2.7 and an ORP of (+) 1000 mV (CSE)

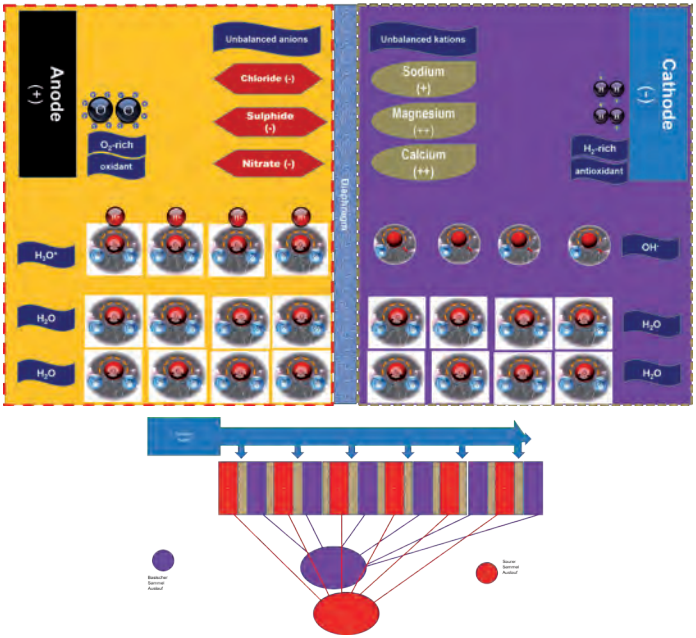
FLOW THROUGH WATER IONIZERS

Flow through water ionizers were developed in the Soviet Union and Japan. Yet only the Japanese design pushed itself through internationally, most recently being very successful with the help of Korean designers and engineers. They travel around the world to study other water types and fulfil new consumer demands.

Particularly in Europe is there a high demand on design and technology. A perfect kitchen is not bought daily. Health awareness may have grown strongly in Germany. Yet as the first devices where on the market in 2004 in Germany, did the importers only receive ridicule and mockery for their playful design: "That might be good for you but such a device is not coming into my kitchen!"

This was luckily changed with patient negotiation and a growing demand. The presently available devices rarely have the info-graphs of cooking pots, steaming rice bowls and teacups on the operating panel. In the meantime especially fine water ionizers exist with modest and noble designs that do not have to be hidden in a high grade kitchen.

TECHNOLOGY OF FLOW THROUGH IONIZERS



You see on the left a simplified picture of what happens in the chamber of a simple diaphragm electrolysis cell to the dissolved anions and cations: depending on the charge they will separately distribute themselves to the chambers.

The laid out decomposition voltage of the direct current breaks down the water molecules, so that on the right hydrogen and OH- ions occur. On the left oxygen and H+ ions form and bond with H2O molecules to immediately make H3O+ ions.

With the 2 chamber system stagnant water is treated.

Warning: Depending on the necessary duration can water reach its boiling point.

With a **flow through ionizer** (left) is flowing water electrolyzed. So that the flow of 1-2 liters/minute is reached successfully, is the water jet from the pre filter system dispersed onto various cells. Nowadays you typically get 3 cells with 2 chambers each. Subsequently the alkaline, as well as the acidic water is brought together and flows out of the device from both of the outlets.

The advantages of having **multiple cells** in a flow through ionizer is, first of all, the much faster gain of activated water and, secondly, compared to batch ionizers, they are under pressure. The **hydrogen** and oxygen gained from electrolysis cannot escape. The solubility of these gases increases when under higher pressure.

Also the water temperature hardly increases with the flow rate of less than 1 minute/liter which further improves the solubility. Also, chilled drinking water is generally preferred. There are also flow through ionizers with a built-in cooling compressor.

Content

COUNTER TOP WATER IONIZERS

Aquavolta M1 counter top device with 1 built in exchangeable filter and 7 electrodes

Counter top water ionizers usually look quite similar. In the housing you have the **exchangeable pre filter units**, the direct current supply from a transformer or switching power supplies and the electrolysis cell. On the top is usually a rotating, flexible hose used as a filling aid for the **alkaline** activated water.

Sometimes the devices resemble each other a lot like the ones below, yet they have very significant differences in the inner workings and the device's software.

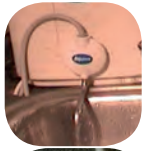
Aquion® Premium 3000 (left)

HydroPlus® Premium 9960 (right)

The connection for electricity and the tap water supply are on the bottom of the device. There you also find the **outlet hose for acidic water,** which usually flows into the sink.

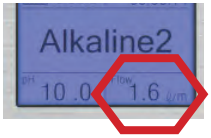
Opposed to what many producers claim, **acidic water**, for example with hard water conditions in Europe, is **not suitable for disinfecting.** The desired pH value is seldom lower than 5,5. It can be used for skin and hair care, as well as for watering plants.

Bottom side with tap water inflow



Outlet variants for **acidic water**

Bottom side with acidic water outlet



It is very important that the display is provided with a flow through indicator in Liters/Minute. For the **rate of flow influences the ionizing performance** of almost all devices in a decisive way. If the optimally determined amount is not correct, then the pH value displayed is also wrong.

Content

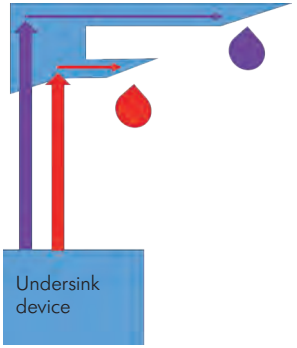
UNDERSINK WATER IONIZERS

Pictured above: Aquavolta® Revelation II Undersink-water ionizer with double faucet and remote control panel for the ionizer under the counter..

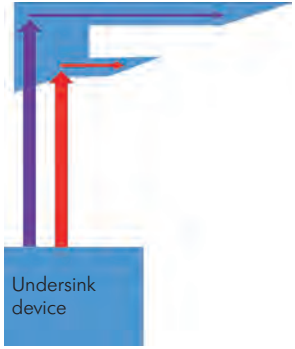
Many people wanting to acquire a water ionizer for their well-designed kitchen have their eye on an under the counter model because of the visibly disturbing hoses from counter top models. Like this the device disappears under the sink. With this type, activated water is drawn off with a neat outlet hose and flows out of a separate tap with an integrated control panel. The acidic water flows out of a swivel tap below into the sink without having anything annoying hanging into it.

This can be costlier and more of an elaborate installation, yet sometimes effectively inexpensive compared to counter top models with dated designs. The Leveluk SD 501 (bottom right) is a good example, which when purchased is about 1000 € more expensive than a modern under the counter ionizer. In addition, it can only be connected to the water tap with a bulky diverter valve.

UNDERSINK WATER IONIZERS: TECHNOLOGY

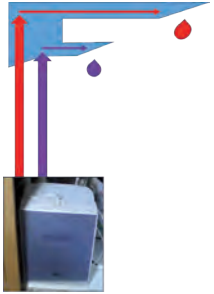


Double outlet with integrated control panel



Under the counter water ionizers have to deal with a fundamental problem: alkaline water usually flows out of the upper faucet (purple) and acidic water flows out of the swivel tap below (red). Once you finish drawing water, both water types stay in the pipes, whereas with good counter top ionizers all of the activated water is drained through the acidic water hose.

Since alkaline activated water secretes surplus minerals during the relaxation period (1 - 30 hours), a narrowing of the ascending water pipes is very likely to happen, especially because of the deposited limestone. This can be avoided by letting acidic water flow out of the alkaline faucet for a few seconds after having used the ionizer. Just press the acidic button. This is something that can be easily forgotten by inexperienced users or children and is also awkward. Sadly, up until 2016, only one producer of under the counter water ionizers has decided to integrate a fully automatic self-cleaning system demanded by me since 2013. How it functions is described in the right column.



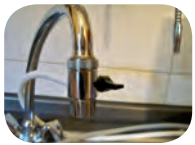
Shortly after use the device rinses both water pipes for a few seconds with reverse polarity acidic/alkaline. The water remains there.

During the relaxation time until the next use, both waters neutralize in the pipes (green). Both waters dissolve deposits of the other type.

After 3 seconds the residual water is removed and you can drink your water normally.

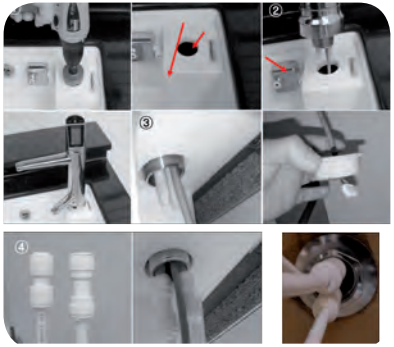
Content

FLOW THROUGH IONIZERS: CONNECTION





Every counter top ionizer is delivered with a **diverter valve** (aerator valve) and with a few easy maneuverers it is connected to the water tap, like a table top water filter. This is the minimum equipment, even with older models. By turning the swivel you switch the tap from its normal cold/hot function over to water from the ionizer. Warning: When using the ionizer you should **only use cold water**. Also, the diverter valve should not be connected to a tap that is fed with water from an unpressurized boiler.



Almost all modern flow-through ionizers have a control for the water supply, either with a solenoid valve (magnetic valve) at the push of a button or with a mechanical dial. They can be under constant pressure from the cold water supply.

An alternative would be, like with an under sink filter already described on page 19, to **connect to the cold water angle valve** with the help of an angle shut off valve. The connecting hose is lead to the water ionizer and connected to the water inlet.

An **undersink** ionizer, like the Aquavolta® Revelation II, has the device under the sink and the control faucet above. This means drilling a relatively large hole into the counter or into the rim of the sink.

FLOW THROUGH IONIZERS: INTERNAL FILTERS

Often there is limited space in a kitchen so smaller counter top devices are preferred, like the above left pictured KYK® Hisha (AquaVolta® Basic) with only one filter cartridge. Yet since the Fukushima nuclear disaster, sensitivity has risen and **the range of devices with two filters has increased**. In some places in central Europe the tap water quality is so good that a second filter cartridge is not really needed. The device pictured on the right is the Tyent® Elite 999 Turbo and due to the two integrated filters is slightly **wider than a device with one filter.**

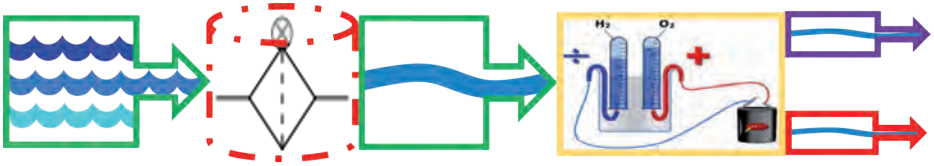
The disposable filters of water ionizers, like good household filters, remove practically all existing contaminants, such as **heavy metals, remnants from agriculture like hormones, pesticides, antibiotics** and natural germs of all kinds. It is very important to change the filters according to the producer's instructions. The filter cartridges are usually found behind the back panel inside the device.

Leveluk® SD 501 (Kangen water) counter top device with 1 internal exchange filter

Aquavolta® Revelation II under the counter device with 2 internal exchange filters

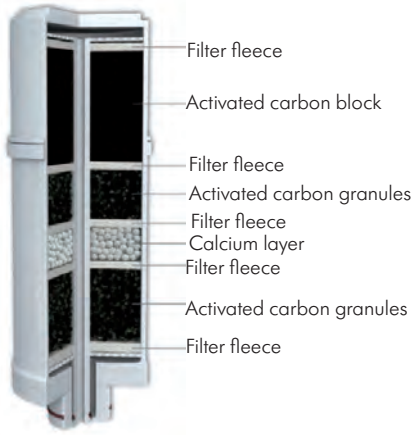
Content

FLOW THROUGH IONIZERS: INNER STRUCTURE



Supply of water | Filter cartridge (s) | Flow to electrolysis cell | Multiple chamber electrolytic cell: ion separation and gas formation | Water outlet for alkaline water and acidic water

In the flowchart above you see the individual stages of water treatment of a flow-through water ionizer. In the first step tap water is **elevated from drinking water quality to ionizing quality** with the exchangeable pre filter cartridges. 50 to 99% of existing residual contaminants are removed.



This can be achieved with a single, multi-layer filter depending on the specifications of the output water. The Aquion Premium Filters, left, show how water passes through diverse filter media. The pores of the filter media become narrower.

The **main material is activated carbon.** Other filter media is sometimes used, such as antibacterial ceramic, heavy metal filters with special materials like KDF filter media, activated aluminum which is a fluoride catcher, as well as the silver steamed activated carbon filters to remove germs. Many devices offer enough space for two filters.

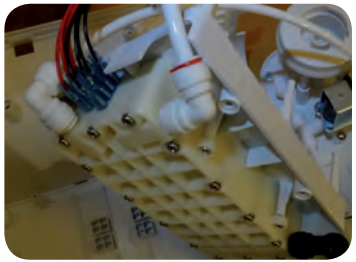
If the filters can be bridged, then the process is also possible with an external pre filter. Also with a reverse osmosis system, as long as this distilled water is then enriched with a calcium cartridge which gives the water enough minerals to make it conductive, this allows for effective electrolysis. (Pure reverse osmosis water is not conductive enough).

To have activated carbon steamed with silver is pretty much standard. Since the silver quantity is so low, there is no risk of having a too high silver intake. **The germ danger of filters without silver steaming is assessed much more reliably.**

Some producers nevertheless offer filters without this. They have to be reliably changed every six months.

Content

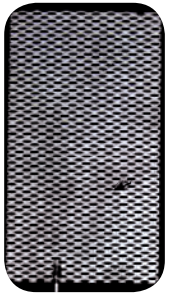
FLOW THROUGH ELECTROLYSIS CELLS

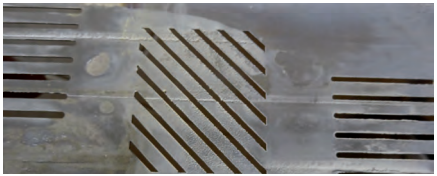


After the filtering process, water flows through parallel chambers consisting of up to 3 - 11 electrodes. They are separated by a diaphragm and depending on the setting can be used as an anode or a cathode.

There are also electrolytic cells with serial chambers or with a circular "disc" design. These don't have much of a chance on the market that isn't the East Asian soft water area due to poor performance.

The electrodes are usually made of titanium which are coated with platinum. **The durability of the electrodes depends on the galvanizing quality.**

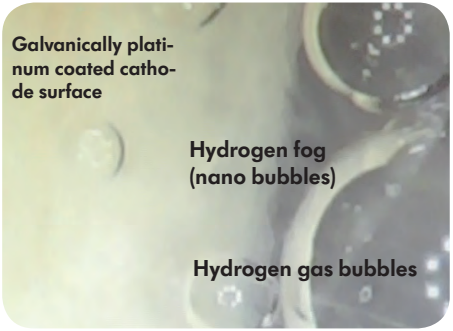




The bigger the total electrode surface is, the bigger the contact surface for the water to be processed. Below you see the formation of hydrogen bubbles on the inside of a smooth platinum cathode, 100 times magnified.

On the outside, which is averted by the anode, almost no hydrogen formation takes place because the electric field is not that great.

Nowadays predominantly grid pattern electrodes are used, or ones with slits or holes to be able to use the backside for **H_2 production.**



FLOW THROUGH IONIZERS: ELECTRICITY SUPPLY

Every water ionizer has a unit to treat water electrolytically. The alternate 220 V current from the socket is converted to a direct current with a voltage of mostly 20 - 30 V. The theoretical minimum decomposition voltage of water (1.23 V) is not sufficient for flow- through ionizers.

There are various philosophies: Some producers use a classic transformer power supply, others use a SMTS switch mode power supply which are popular with computers nowadays. Which is better?

Electric and magnetic fields from power supplies have been given the catchphrase "electro smog". This is a term which has a ubiquitous presence today. The question is: can negative effects occur on us or on water with this way of producing a direct current? Water molecules are, nevertheless, a dipole which can align themselves to this field.

A transformer works with a low frequency current of 50 Hz. These kinds of electric fields cannot intrude into our bodies since our skin protects us like a "Faraday cage". Yet the magnetic fields produced simultaneously do penetrate the skin. I have measured magnetic flux densities with water ionizers that have transformers with up to 150 Milligauss.

A switch mode power supply uses a significantly smaller transformer which chops up the voltage (50 Hz) into a high frequency. Therefore, outside the ionizer in its flux density, a high frequency magnetic field is hardly measurable. Electric high frequency fields can certainly penetrate the body. What the lesser of the two evils is, is debated. Electro smog is ever present and certainly problematic if under prolonged exposure. On the other hand, a flow-through ionizer that is used for a few minutes is not considered prolonged exposure.

The water itself is not influenced by the power supply. The prevalent fields in the electrolysis cell from the electrodes are much stronger than the fields from any power supply. The high frequency from switching power supplies does not reach over 100 KHz which is a nondescript frequency for water. The lowest resonance frequency of flowing water lies at 22 Gigahertz.

A disadvantage is the heating up of the transformer power supply. Inside the ionizer this can form condensed water and in the long term can lead to rusting, something found in older transformers. Also, the much higher electricity consumption.

FLOW THROUGH IONIZERES: OPERATION

AquaVolta® EOS Touch. Counter top device with 2 built in exchangeable filters

It is intuitive with a touchscreen, a multiple language voice prompt and a retrievable help menu. The current communications technology has, like with water ionizers, kept with the times: like with the Aquavolta ® EOS Touch above.

Other devices function with sensors or with classic buttons. Reading the book of instructions will not only inform you about the installation and service instructions; often you will find great tips on how to use activated water.

AquaVolta® Revelation II undersink water ionizer. Control faucet with a multi-color display.

The Aquavolta® Revelation II can also be made to talk under the sink when you operate the touch screen on the faucet.

You will see the different pH values with the changing colors of the screen and it will inform you of the set water type. Here you see 4 alkaline types, 4 acidic types and 1 neutral type. That is when only filtered water flows out, it is not ionized.

A good water ionizer should display the water flow/minute and alongside that the electrolytic setting as well as the remaining capacity of the filters.

Color displays, pictures, pH or ORP values are dispensable. They tend to display misleading symbols and values which are only accurate in soft water areas. Value displays have to always be calibrated to the source water.

Misleading symbols made in East Asia

Left: Leveluk® SD 501

Right: Ionquell ® Standard (Venus)

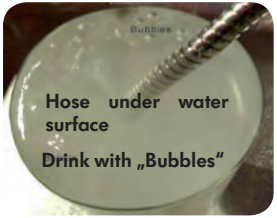
Content

ALKALINE ACTIVATED WATER: STORAGE

Alkaline activated water is drunk cold, best straight after filling your glass. If you realize that warm **stagnant water** comes out of the tap and the filters, do not hesitate to wait until it flows out cold. It can store more hydrogen like that!

Do not fill you glass or bottle from a height, as if to produce bubbles! Place the outlet hose close to the glass.

Ideally you should place it under the water surface. You will then clearly see more hydrogen inside with the visible **hydrogen bubbles**. If you drink this



milky water you will consume the maximum that the ionizer can produce. With the correct filling method you can gain one third more hydrogen. Alkaline water flows out of the ionizer with such a high hydrogen partial pressure that part of the hydrogen escapes immediately.

Small visible sparks can be seen if you hold a flame from a lighter to the output water.

Hydrogen also escapes from PET bottles easily. I. M. Piskarev has demonstrated this in the trial pictured on the left-hand side. The left PET bottle contained hydrogen rich water, the right PET bottle contained tap water. After twenty days the hydrogen water bottle shrunk dramatically because of the hydrogen that escaped.

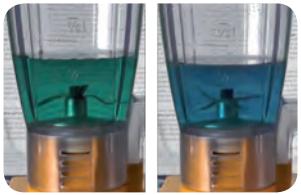
Alkaline activated water **can be kept for weeks** in bottles made of thick, dark glass. You fill them to the brim and store them horizontally in the fridge.

Also double wall thermos flasks made of **stainless steel** offer very good outgassing protection, especially when travelling. You also keep the water cooler for longer. The ORP is also maintained. **The previous opinion that metal is not good for activated water is only valid for acidic activated water.**

WATER SWIRLERS: THE PROS AND CONS

If you were to compare wonderful, naturally flowing water from the countryside to water flowing through the pipelines to your tap, you cannot help thinking that water tastes much better in its natural environment.

So many inventors, especially in the 20th century, developed swirling devices with the aim of getting closer to creating a natural structure with the use of centrifugal or centripetal forces and a better tasting water. This goal is reached by most of these devices. How does this work?



Let's observe the effect of strong swirling, created by a household mixer when mixing water. To illustrate this point clearly I have colored the water with pH indicator drops. Green shows a neutral pH value at pH 7, blue is in the pH 8 level. **The mixer makes the water more alkaline** than before. It is obvious that this occurs because of a gas exchange, since no minerals were added to the mix. Carbon dioxide in the water is displaced by oxygen, since the air mixed in contains much more oxygen than CO_2.

3 Minuten

Yet an electro chemical change takes place simultaneously: If we swirl hydrogen rich alkaline activated water with a negative ORP (-)204 mV (CSE) for 3 minutes in a **swirler named Twister®**, the ORP rises to +14 mV. **Oxygen displaces hydrogen** and it gasses out, also with the "levitation" resulting from the maelstrom.

A water ionizer releases a strong swirling force on water in the electrolytic cell which then bubbles over in the form of hydrogen to the cathode. Previously the hydrogen was bonded in water molecules. An additional swirler, for example in the form of a vortex nozzle, **destroys the antioxidant properties of alkaline activated water.** At the same time swirling also leads to the precipitation of calcium and magnesium, to softer water. This should not always be seen positively.

Left: UMH® Live swirling nozzle

Right: Vitavortex® Vita Titanium swirling nozzle.

Content

MINERAL (CHEMICAL) WATER IONIZERS

- Since 2008 Shigeo Ohta clearly showed that the hydrogen gas content and not the negative ORP of alkaline activated water is responsible for the antioxidant effect. The term "water ionizer", formerly used for electrolytic devices, was broadened to "chemical water treatment devices".

- The function of all of the pictured devices of this type rely on a chemical reaction. By adding metals to water OH^- ions and hydrogen arise.

- Dietmar Ferger has coined the phrase "mineral water ionizer" and writes that similar effects, as from electrolyzed water, are attainable. Yet, this is inaccurate, (cf. p 6-7).

- Alkali and alkaline earth metals increase the pH value when added to water and sink the ORP by simultaneously releasing hydrogen.

Example:

Mineral / ceramic mix (Aschbach precious ceramic) in the tea strainer: The pH value rises 3 pH. The ORP sinks slightly to -80mV (CSE). To compare, below the same water electrolytically treated -222mV (CSE).

- Magnesium sticks by Hidemitsu Hayashi: The hydrogen saturation (1490 mg/l) is not even reached by Hayashi's own measurements, even with 3 sticks in 12 hours. Electrolytic water ionizers can achieve that in 60 seconds.

	Tap water	H_2 saturated water	1 HRW-Stick 12 hrs.	2 HRW-Sticks 12 hrs.	3 HRW-Sticks 12 hrs.
Dissolved H_2 mg/l	0,032	1,490	0,470	0,676	1,203
Water-temperature °C	23	21	19	18	18
Source:	Dr. Hayashi's	Hydrogen-Rich-Water	Guidebook		

- Conclusion:
  No free OH- ions are produced by inserting reactive material. The oxygen quickly deactivates the small amount of produced hydrogen. The water is also not filtered or filtered enough.

Certainly not an alternative to electrolytic water ionizers.

Content

ALKALINE ACTIVATED WATER - MORE THAN A DRINK

Let's be honest: If you just want to have alkaline water with a slightly reduced ORP, buy yourself a small packet of potash (potassium carbonate).

If you prefer something a bit pricier: you can always buy concentrated drops, like Alkalife, H2O3 or something similar on the internet. But before you try to do it yourself, just do an animal test. Animals are less susceptible to placebo effects. If your pet drinks it, even though it is not dehydrated, it would mean that it loves you - not the water. Yet you will also notice that you don't enjoy the taste much of such a drop-made alkaline water.

Maximum hydrogen content doesn't only make alkaline activated water smoother and softer to the taste. It just virtually slides into the body. For a hydrogen gain is the goal of our whole metabolism.

Sprouts laid in alkaline activated water **germinate much faster.**

A teabag steeps very quickly, even in cold alkaline activated water.

A **wilted lettuce** regains its freshness.

Fruit, vegetables, fish and meat, even raw eggs still wholly refreshen themselves with a hydrogen surplus.

Baby milk powder is much closer to natural breast milk when mixed with this water instead of normal tap water.

QUOTATIONS IN CHANGING TIMES

"We drink 90% of our illnesses."

Louis Pasteur (French microbiologist)

"Might be, there is a lot of goods in water, which is wet,

Especially when pouring it in our thirsty head.

It's drinkable, for sure! But some prefer avoiding that."

Heinz Erhardt (German Comedian, 1909 - 1979)

"Each sip of electrically activated water makes the organism younger on a cellular basis.

And it is not unimportant for our nice, young women that use such water,

to maintain their charm and beauty for many years."

Benjamin Kurtov

Author of the Ukrainian book:

The astonishing qualities of electrically activated water, Kiev 2009

THE TRANSFER OF HYDROGEN ONTO AGED FOOD

Water drinking. Yet it can also be avoided if you were to share Heinz Erhardt's opinion. **One should also have a water ionizer.** An important characteristic of alkaline activated water is its high content of hydrogen gas dH_2. With a good flow-through water ionizer this lies at a pH value of 9 and at room temperature between 1200 and 1300 micrograms/l. **You should drink this water with a pH value of up to 9.5**, which means, depending on which ionizer, 1250 to 1450 micrograms/l. If the water ionizer can reach higher pH values, for example pH 11, which should not be drunk long term, is a dH**2** value of 1800 micrograms (1,8 mg) also possible. This can only be used for the transfer of hydrogen to other foods. Since hydrogen is very willing to give off its electrons, **a reduction of the ORP occurs, which signals an increase in electron availability**.

The nutrition researcher **Prof. Manfred Hoffmann** claims in his book "From Life in Foods", that a sinking ORP of respectively 18 mV means a doubling of the electron offer and that the **difference in quality of a certain type of food is best measured objectively by measuring the ORP**: The lower - the better!

A lower ORP is mostly seen in organic food. Yet it highly depends on the freshness. For the ORP, and with that is meant the hydrogen content in the cell tissue of our nourishment, is very volatile. **Hydrogen is the smallest of all elements** and as a volatile gas can escape from organic structures virtually without any hindrance.

The decisive factor is that, by **soaking foods in alkaline activated water**, the hydrogen content is increased and is therefore "refreshed".

“WE LOVE FRESHNESS”

The **apple freshly picked from the tree**, the gherkin freshly picked from the field - that is how we most enjoy the taste. Yet the apple from Australia and the gherkin from Spain have lost a lot of their vital energy on their long journey before we can take a bite. A lot of water loss can be avoided by cooling and vacuum packaging. Like that the produce still looks fresh and not wilted when we buy them. But the loss of hydrogen cannot be stopped so easily this way. **What we see is apparent freshness**. Most people can certainly taste and smell the difference of freshly picked fruit from the tree or field and food that has had a long journey.

But **freshness can be objectively measured**: The Oxidation Reduction Potential (ORP)

Left an example:

Half an apple (Braeburn variety) is laid for 1 hour in alkaline activated water pH 9.5 and an ORP of (-) 395 mV (CSE). The other half is not, only measured.

Output measurement of the apple:	(+) 328 mV (CSE)
Final ORP of the apple	(+) 232 mV (CSE)
Absolute ORP difference	**96 mV**

The electron range of the apple doubled almost five times by soaking it for 60 minutes in alkaline activated water!

The reason is the **dH_2 which permeates the apple and allows the ORP to sink.**

HOW MUCH ORP GAIN IS POSSIBLE?

Mostly a short immersion in electro activated water is sufficient, especially if the food has a soft skin or shell, like red currants or apricots.

An example of **red currants immersed for 30 minutes** in alkaline activated water pH 9.8 with ORP (-) 413 mV (CSE)

ORP of red currants:	(+) 068 mV (CSE)
Final ORP:	(-) 250 mV (CSE)
Absolute ORP difference:	**318 mV**

Half an **apricot** is immersed for 20 minutes in alkaline activated water pH 9.9 with ORP (-) 429 mV (CSE). The other half is only measured.

Untreated half:	(+) 348 mV (CSE)
Treated half:	(-) 209 mV (CSE)
Absolute ORP difference:	**557 mV**

With skinless foods, such as raw meat or fish, is an immersion of just 2-3 minutes enough for a substantial effect to take place.

THE SO CALLED „CONTACTLESS“ ACTIVATION

When it was not known that migrating hydrogen gas was responsible for the redox potential's waste in neighboring fluid systems, all sorts of theories were discussed about a "contactless" activation. One cause of the "contactless" discussion was a trial that showed how a latex condom filled with electrically activated alkaline water was able to, inexplicably, transfer its negative ORP to the water that it was immersed in. Later it was realized that a condom is maybe not as watertight as one had thought.

The intestine is known to be porous. I have shown **how well alkaline activated water transports hydrogen as well as the additional minerals in the body.** To illustrate this I filled a sheep's intestine, usually used for Weisswurst, a Munich sausage, and filled it with alkaline activated water pH 9.5 and ORP (-) 349 mV and laid it for 10 minutes in a physiological saline solution (blood substitute) pH 7.03 and ORP (+) 194 mV.

The absolute ORP gain was 480 mV, almost 0.5 Volts.

Since it is again and again falsely claimed that inorganic calcium from hard water is not absorbed by the intestine, I decided to measure the hardness of the 3 liquids:

Physiological saline solution:	0 mg/l $CaCO_3$
Alkaline activated water in the intestine	445 mg/l $CaCO_3$
Saline solution after 10 minutes:	225 mg/l $CaCO_3$

It shows that **calcium has migrated** effortlessly, like hydrogen. **Minerals in water can be wonderfully absorbed.**

HYDROGEN TRANSFER THROUGH PACKAGING

The **quick mobility of dissolved hydrogen in alkaline activated water** has its limits when in packaging made of thick glass and stainless steel. These are ideal for storing hydrogen rich water. Plastic wrapping is especially permeable, so it can be used to "activate" liquid contents like juices.

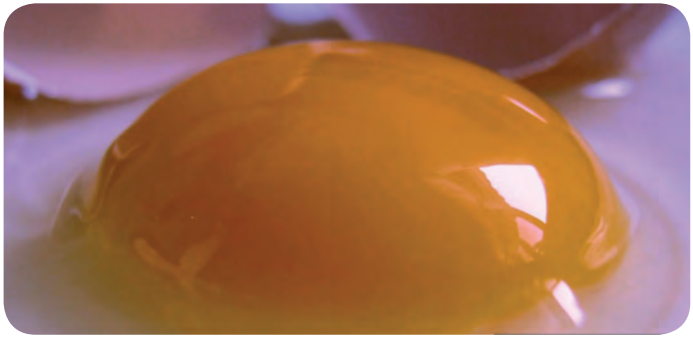
A high quality carrot juice was improved by **pouring it into a freezer bag** and immersing that for 20 minutes into alkaline activated water (pH 9.9 ORP (-) 423 mV (CSE). **The ORP improved by 241 mV.**

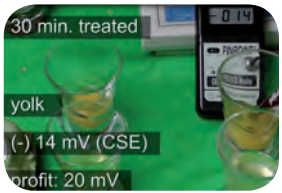
This corresponds to a **13 times doubling of the electron range.**

Probably the most surprising results came from 0.5 l fresh, full cream milk in its carton, immersed for 30 minutes:

The ORP improved by **97 mV.** I like to describe this procedure in my presentations as: "the cow in the fridge".

The **pH value**, with all these examples, **only changes positively by a tenth of the value**. OH^- ions are slightly inhibited by many barriers.





EGGS IN ALKALINE WATER

Almost anyone can see, taste or smell if a cracked open chicken egg is fresh. But should eggs be thrown away or fed to the Easter bunny if they are slightly out of date?

If you place raw eggs 30 minutes in alkaline activated water, you will see it, taste it and smell it. Rotten eggs, where bacteria has already made its way in, cannot be saved. Even very fresh eggs gain a lot from this procedure.

Two fresh, organic eggs from the same carton were separated into egg white and egg yolk and evaluated according to their ORP:

Untreated egg:

Egg white ORP: (+) 59 mV (CSE)

Egg yolk ORP: (+) 34 mV (CSE)

Egg immersed for 30 minutes in alkaline activated water:

Egg white ORP: (-) 56 mV (CSE)

Egg yolk ORP: (+) 14 mV (CSE)

Absolute ORP gain: egg white 115 mV - egg yolk 20 mV

AN END TO JUICE SHOPS!

With the distribution of water ionizers are the end of high cost and environmental damage from the bottled water industry already foreseeable. But do we still need chain stores for fruit and vegetable juices, even for lemonades?

From coke to orange juice: **looking at it more closely, most local beverage manufacturers are not producers, instead they are bottlers for concentrates produced somewhere in the world to which they just add water and, if necessary, sugar or carbonic acid.** Environmental politicians have long demanded to decentralize the mixing of concentrates with water and other additives and leave it up to the consumer. Almost all professional chefs use their own mixing device in their restaurants.

Initial approaches to reduce expensive hauling of bottles on the motorways were already instigated. Yet it is not that easy to get, for example, an apple or orange juice concentrate for the household to mix oneself. Surprising, since you find apple and orange juice "made with concentrate" in abundance in the supermarkets.

Are "syrup" times a forgotten bygone, where a fresh juice was not even affordable? Or is it fear of frowning upon tap water, which is trusted less than the water used by the bottling enterprises to dilute the imported concentrates?

With a water ionizer and its first class, built in pre filters, you can produce a purer and higher quality water than the beverage industry. I will now demonstrate to you that even the result from mixing juice concentrates is measurably better, a huge improvement.

IN SEARCH OF THE OPTIMUM ORANGE JUICE

Freshly squeezed, directly pressed, made from concentrate - or a mixed by yourself with concentrate?

Freshly pressed "LaSarte" oranges: pH 3.82; ORP (-) 104; dH_2: 0

"Bio Bio" juice from concentrate: pH 3.72; ORP (+) 158; dH_2: 0

"Fruchtstern" concentrated juice:pH 3.82; ORP (+) 117; dH_2: 0

"Wolfra" directly pressed juice: pH 3.92; ORP (+) 113; dH_2: 0

"Valensina" (chilled juice): pH 3.88; ORP (+) 157; dH_2: 0

"Ratiodrink" organic orange juice concentrate:
Tap water parameter: pH 7.49; ORP (+) 238; dH_2: 0
Activated water parameter: pH 9.52; ORP (-) 632; dH_2: 1255
"Ratiodrink" parameter (pure): pH 3.47; ORP (+) 042; dH_2: 0

"Ratiodrink" mixed myself, ratio 1 : 2,5
This ratio resulted in the most similar, optimal taste experience compared to a freshly squeezed juice.

With tap water: pH 3.68; **ORP (+) 190; dH2: 0**

With activated water: pH 3.79; **ORP (-) 349; dH2: 622**

The last results were better than expected compared to the freshly squeezed "LaSarte" orange juice. By the way: **The results are almost the same with apple juice concentrates!**

Content

TOMATOES AND ACTIVATED WATER

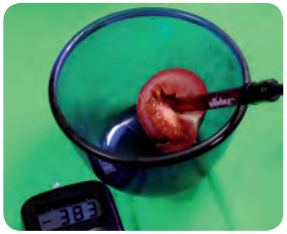
The tomato, the love apple, in Austria the Paradeiser, in Italy the pomodoro (golden apple) - engages the activated water scene more than any other fruit. For it belongs to a sales concept in which water ionizers are distributed, and if salt is added prior to the electrolytic process, **can an alkaline, functional water be produced with a pH value above 11.** This is a chemical which emulsifies fat, makes fat soluble in water. This water should not be drunk, for it is harmful to health, like a lye: It can attack the membrane of our body cells which are made of fat layers. As well as the tomato skin, which contains a very important antioxidant active substance and makes the tomato turn red:

T**he fat soluble carotenoid lycopene.** It releases itself from the tomato skin in high alkaline water and stains the water a reddish yellow color. The sales people of these devices claim falsely that the dissolved plant protection products (pesticides) and other harmful substances can be recognized by this coloring in the water and this alkaline function water is claimed to be ideal for rinsing fruit and vegetables.

In reality, the best from the tomato is removed! The main active substance, lycopene, one of the few boil proof antioxidants. (So tinned tomatoes, tomato paste and even ketchup are very valuable). At the same time **a conventionally cultivated apple was also immersed into the functional water which did not cause any "harmful" coloring.**

Respectively, the tomato on the right hand side came from an uncontaminated, controlled, organic farm. Yet the same amount of red coloring was released from it. **There really are no contaminants!** Nevertheless, after 12 hours in functional water the organic tomato showed a much better ORP value!

BETTER TOMATOES WITH ACTIVATED WATER

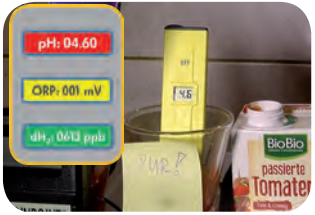


As it is known, there are **super tomatoes and supermarket tomatoes**. The first taste better and are much more expensive, the second are varieties that are bred as eye candy for the consumer.

The nice tomatoes from greenhouses from the supply industry for the discounters are always available, the good ones only at certain times of the year. Only tinned tomatoes have the same quality all year round because they are made from fully ripe fruits whose visual appearance plays no role.

We are easily able to give a more measurable food quality to tomatoes in the form of a negative ORP by laying them in alkaline activated water and allowing a transfer of hydrogen to take place. In order **to protect the sensitive lycopene should this water not surpass a pH of 10.5**. Within 30 minutes ORP values up to (-) 383 mV (CSE) are achievable. It works best with halved tomatoes. The pH value of a tomato is not affected and its taste and acidity is maintained. Also a noodle sauce made with activated tomatoes stands out because of its negative redox potential.

The **lycopene content** of a raw tomato per 100 g lies at ca. 9 mg, tomato juice has 11, with tomato puree and ketchup 17, with tomato paste 55.5 mg/100 g. Of course no one will eat 100 g of tomato paste. Rather, eat a pound of tomatoes and you will have almost the same amount of lycopene.



BETTER TOMATO JUICE

Already seasoned and salted tomato juices are favorable because of low ORP measurements in the positive millivolt range. The organic juice is slightly less acidic and has a considerably good redox potential. Both juices have an excellent taste, which could also be because of the seasoning. To compare the taste with a "freshly" homemade tomato puree from the discounter would be unfair since the puree can always be seasoned. The ORP results (CSE) from our tests with a blender can be seen from left to right:

+ 72 mV: vine tomatoes; + 82 mV: organic vine tomatoes and + 62 mV: Costolutto (4 x more expensive). A tight win.

None of the tests showed any dissolved hydrogen. On the other hand, the **3 times concentrated tomato paste** "Oro di Parma" does overtrump these results with its **680 microgram/l of hydrogen content** and an ORP of (-) 352 mV. Yet when diluted with water it does taste a bit "metallic".

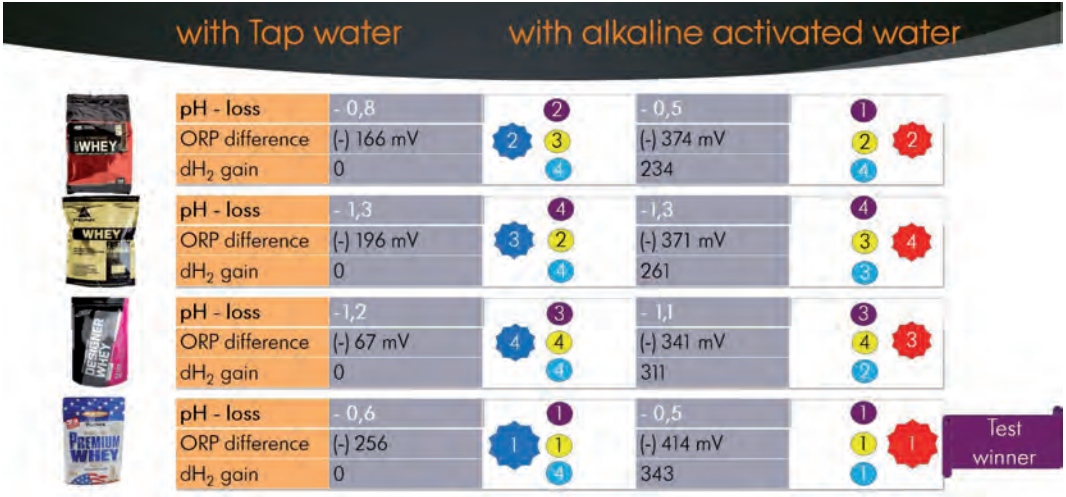
The best flavourful and electrochemical end results after diluting 1 : 1 with alkaline activated water pH 9.5, ORP (-) 620 mV (CSE) were from the **organic tomato puree** from a discounter. Before diluting, **this puree contained already 613 micrograms/l dH_2.** After diluting, it contained 708 micrograms/l. The ORP sank to (-) 104 mV. After seasoning it was a very tasty outcome. So this is the best way to drink tomato juice.

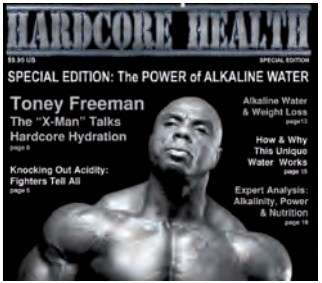
PROTEIN POWDERS

Concentrated proteins are consumed for muscle building as a dietary supplement by competitive athletes, such as body builders. Yet they are not a food supplement, instead a type of nourishment in its most concentrated and defined form.

The most popular are **"whey"** mixtures made of pulverized milk protein, supplemented with vitamins, minerals, enzymes, etc. Because of the drying, these absolutely "dead" powders can regain some of their original vitality by being prepared with alkaline activated water.

When comparing some of the popular brands of these powders, it was seen that the test winner's results were only just in the lead. Yet compared to mixing with normal tap water, **it brings many considerable advantages if mixed with alkaline activated water.** Left: tap water pH 7.5, ORP (+) 267 (CSE); dH_2 0 micrograms/l. Right: activated water pH 9.9; ORP (-) 683 (CSE); dH_2 1313 micrograms/l. The chart shows the gain/loss comparison with tap water after mixing the powders.





Activated water trend in a U.S. bodybuilding magazine

DIET POWDERS

The information on the previous page about "Protein powders" can certainly be taken into account for using alkaline activated water to mix with weight loss powders, however effective they may be. In this case it is not a food supplement, but a complete food substitute. Food, which led to weight gain, is renounced and replaced during the diet phase with a low calorie intake to make weight loss more manageable. Such diet shakes and powders are as plentiful as grains of sand on a beach. I have therefore only tested the very advertised **Almased®** to clarify the main **advantage of mixing with alkaline activated water.** Basic values of the mixed water are the same as with protein powders.

Tap water

Activated water

BREAST MILK

Milk powders are nowadays hardly used as a replacement for fresh milk in the private sector, since in developed countries there is a good supply of fresh milk. How this can be improved I have already mentioned in the chapter: "Hydrogen transfer through packaging". As formula feed for newborns who are not breastfed, are these widely distributed and their electrochemical quality parameters should be observed closely. For cow milk, of which baby milk powder is made from, **shows other measured values to that of a nursing mother.** It is striking that the electrochemical normal values of breast milk are within the **fluctuation range of human blood**. Obviously nature has made it easy for the newborn to absorb the milk nutrients into the bloodstream.

The fundamental question is: How can baby milk powder reach the greatest possible similarity to the natural master model? Or can the baby be better fed with the formula feed? For over 100 years scientists in the service of baby milk producers have thought about these questions. Is the use of alkaline activated water an additional advantage?

BABY MILK POWDERS

A few producers of baby milk powders have already started to question which role the water used for mixing with their powders plays. So they sell their own brands of "baby water". Based on such a **baby water brand "Humana"** have I tested the electrochemical effect of different brands. The end product, what lands in the bottle. I did not find the results very convincing.

Product	pH-value	ORP
Alete Initial milk	6,37	44,00
Humana Pre-Intial milk	5,98	66,00
Humana Initial milk 1	6,54	37,00
Humana Follow on milk 2	6,53	39,00
Humana Follow on millk 3	6,20	52,00
Hipp Pre-Initial mil	6,33	47,00
Hipp HA2 Combiotic	5,88	69,00
Hipp HA3 Combiotic	6,02	62,00
Milupa milumil Initial milk	6,64	30,00

CONVENTIONAL ALTERNATIVES FOR BABY MILK?

The baby mix powders mixed with Humana Baby Water did indeed score better with all of the electrochemical (ORP values) than a readily mixed bottled product, something given to mothers in some maternity clinics shortly after giving birth if they have breastfeeding difficulties. A redox potential of + 73 mV (CSE) means that **the newborn has to overcome a tension of at least 75 mV to transport the nutrients of the milk in its organism.** Nevertheless, the pH value of this product, at 6.92, is still much better than the best values obtained with the "Baby Water" at 6.64.

Is the pH value more important than the redox value? This question is, in this case, scientifically new and has not been touched upon. I think: no.

Using mineral water to mix with the product seldom produces results that are better than the offered baby waters. As the owner of probably the biggest collection of electrochemically analyzed mineral water in the world, you can really believe me: The mineral water from St. Leonhard's Well in Upper Bavaria's Leonhardspfunzen delivered the best values when mixed with baby milk powder, compared to 120 different varieties.

But these results are not only **far from the original breast milk**, yet with regard to the price also more expensive than the powder itself.

The pH value is still around 0.7 pH below target, the ORP value at +24 mV (CSE) is from 26 to 86 mV under the master model of breast milk. **With alkaline activated water you get much closer to the ideal values.**

ACTIVATED WATER AND BREAST MILK

I hope that this book will inspire producers of baby nourishment to research more deeply and for a recommendation to be voiced. I would merely like to point out that if alkaline activated water is used, for example, to mix with the milk powder "Bebivita® Initial Milk 1" you are **much closer to the measured electrochemical parameters of natural breast milk than with previous popular methods**. Activated water, at a temperature of 14° C, was used for mixing with the following parameters: pH 9.8; ORP (-) 609 mV (CSE); dissolved hydrogen 1353 micrograms/l The result: pH 7.3; ORP - 053 mV (CSE), dissolved hydrogen136 micrograms/l.

A further scientific study should address the question, does the drinking of alkaline activated water during the nursing period of the mother improve the quality of the breast milk? A pilot trial with a test person certainly suggests this:

Breast milk test 1: 08.05.2012 without drinking activated water pH 7.55 ORP (-) 27 mV.

Breast milk test 2: 23.05.2012 Previously drinking activated water daily -pH 9.5, ORP -220 mV (CSE) - at will. Result of breast milk testing: pH 7.54 ORP: - 56 mV (CSE).

The doubling of the negative redox potential in 15 days means **a strong increase of the electron range.**

ACIDIC WATER - MORE THAN JUST CLEANING

Alkaline activated water tastes subjectively softer than normal water, even though it is objectively rich in minerals and therefore harder, acidic activated water is objectively softer and therefore suitable for cleaning. After cleaning with it you will notice **fewer lime scale streaks** on tiles, mirrors, windows and floors and will use fewer cleaning products.

Our skin is slightly acidic, just like the acidic water from a water ionizer. **It tightens the skin** and regulates the pH balance after bathing, showering or shaving. Wrinkles are smoothed out and your skin will feel notably softer.

Very acidic water from a batch ionizer **(anolyte with a salt addition)** has a pH value under 3 and is a highly effective and environmentally friendly disinfectant. With this water you can rinse already cleaned baby bottles and make them sterile.

Anolyte water in a spray bottle works very well as a deodorant and can be applied for intimate hygiene.

As a **disinfectant** for livestock housing for farm animals like fowl, pigs and cattle anolyte is increasingly used because of its biocompatible attributes.

You can wash and sterilize meat products with anolyte water after opening the packaging.

Yet activated acidic water is not only suitable for that: do you still fry your cutlet in fat?

We fry our meat in fat because the fatty acids ensure that the pores of the meat, poultry or fish close and the meat stays nice and juicy. **Also hot, acidic activated water closes the pores** and you will be surprised at how many roast aromas arise, even though you only fried with water. As an encore a tasty sauce is made at the same time.

Further uses of acidic, as well as alkaline activated water you will find in Part 2 of this book. Especially in the digital version there are constantly new ideas flowing in for uses of this kind of wonderful water.

CONCLUSION: DRINKING WATER TREATMENT

Stress and insufficient leisure affects almost everyone whilst eating. Instead of thoroughly and lovingly choosing and preparing our food, instead of at least balancing our inactivity with small portions, we eat far too much and the wrong things.

So that the many empty calories in the long term do not make us ill, we increasingly opt for pills as a food supplement, which is supposed to help balance the nourishment deficit.

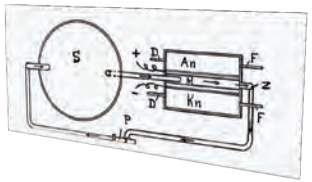
Electrolytic water ionizers offer a new possibility of compensating a too acidic lifestyle. For alkaline activated water creates alkali with the energy of hydrogen in the body. Besides, it is a "perpetuum mobile for de-acidification" and works as a "fountain of youth" because of its effects against free radicals.

Already by renouncing acidic drinks we can reach a lot, if we drink tap water instead. But it should at least be filtered. The ideal drink in the habitat of our environment is brought to us by a water ionizer.

Tap water filters and water ionizers are perfect ecological and economical solutions, since beverages would fall out of the transport chain. The low expense per liter is substantially more economical than the outmoded beverage industry, with its expensive packaging, long transport routes and storage time.

HISTORICAL DOCUMENTS

The historical development of the effects of electro activated water (EAW) first were discovered and marketed - then understood in the 21. Century.



- Electro osmosis (1921 - 1930) In Berlin, the Elektro-Osmose AG of Botho Graf von Schwerin files a patent for producing, amongst other things, "artificial mineral water from electrolysis".

- 1931 - 1981. Electrolyte water from Alfons Natterer, with the help of Dr. Manfred Curry Fuss among others, encompasses medicine, agriculture and hygiene. The successor company NAWA still produce today an ointment essentially developed by Natterer, Elektrolytsalbe S®, with huge success in Europe.

- The development of household ionizers in Japan since 1951. Emphasis: Alkaline EAW.

- Soviet Union and CIS countries: Since 1972 the long, secret, state research in the Russian speaking world. Emphasis: Oxidizing Reduction Potential (ORP). The precursor Vitold Bakhir is today one of the leading researchers and entrepreneurs in the field of application of acidic activated water, acidic electrolyzed water, (anolyte). The terms "living water" and "dead water" start to spread in Russian speaking folk medicine.

- From 1990: Water ionizers provide an "Alkalize or Die" boom in the USA, thanks to the book: "Reverse Aging" by Sang Whang. The renaissance of EAW in Germany begins in 2004 with the translation of the Whang book and the publishing of the German book: "Service Handbuch Mensch" (Service Manual for People) by Dr. Walter Irlacher, a spa doctor from Bad Füssing.

- Unravelling the abnormal ORP of EAW from hydrogen research since Albert Szent György (1937 - present) is encouraged by Japanese researchers Hidemitsu Hayashi and Sanetaka Shirahata.

- Since Shigeo Ohta proved the therapeutic, applicable effect of dissolved oxygen in 2007, a unique field of research "medical gas" is developed primarily in the USA. Alkaline activated water contains a lot of hydrogen, therefore becoming very interesting to a wider audience. More and more Far Eastern companies start to produce water ionizers also in the West.

- From a drink to a food supplement: The new role of alkaline activated water as a correction factor for an unhealthy lifestyle. Karl Heinz Asenbaum since 2012 calls for a "Redox Revolution" in his lectures: alkaline activated water should not only be drunk, but also be used for the processing, refreshment and preparation of electron poor foods. The ageing process can be stopped and reversed with the ingestion of food. That is the main thesis.

Natterers legacy

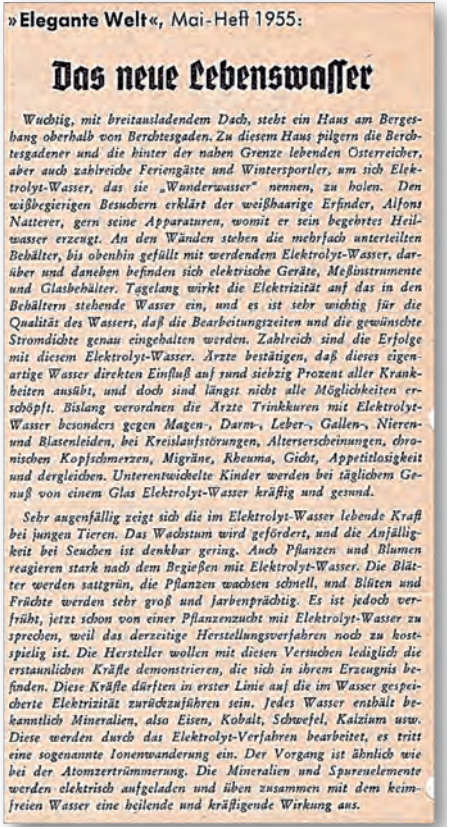
Engineer Alfons Natterer, born 23. 01. 1893, died 05.05.1981

Invented in 1930 in Munich the electrolyte water "Hydropuryl" (3 varieties) and registered it as specialty medicine.

It was like "Columbus's egg".

All knew how it works, yet only he did it. The Munich Engineer Alfons Natterer wanted to standardize beer brewing with optimized water. Since no one showed an interest, he gave his electrolyzed water to doctors to test it in 1931.

Natterer diligently collected reports and assessments, and was not put off by the destruction of his water factory during World War II. He distributed the "healing water from the plug" at high prices to pharmacies and license holders.



»Elegante Welt«, Mai-Heft 1955:

Das neue Lebenswasser

Wuchtig, mit breitausladendem Dach, steht ein Haus am Berges-hang oberhalb von Berchtesgaden. Zu diesem Haus pilgern die Berch-tesgadener und die hinter der nahen Grenze lebenden Österreicher, aber auch zahlreiche Feriengäste und Wintersportler, um sich Elek-trolyt-Wasser, das sie „Wunderwasser" nennen, zu holen. Den weißbegierigen Besuchern erklärt der weißhaarige Erfinder, Alfons Natterer, gern seine Apparaturen, womit er sein begehrtes Heil-wasser erzeugt. An den Wänden stehen die mehrfach unterteilten Behälter, bis obenhin gefüllt mit werdendem Elektrolyt-Wasser, dar-über und daneben befinden sich elektrische Geräte, Meßinstrumente und Glasbehälter. Tagelang wirkt die Elektrizität auf das in den Behältern stehende Wasser ein, und es ist sehr wichtig für die Qualität des Wassers, daß die Bearbeitungszeiten und die gewünschte Stromdichte genau eingehalten werden. Zahlreich sind die Erfolge mit diesem Elektrolyt-Wasser. Ärzte bestätigen, daß dieses eigen-artige Wasser direkten Einfluß auf rund siebzig Prozent aller Krank-heiten ausübt, und doch sind längst nicht alle Möglichkeiten er-schöpft. Bislang verordnen die Ärzte Trinkkuren mit Elektrolyt-Wasser besonders gegen Magen-, Darm-, Leber-, Gallen-, Nieren- und Blasenleiden, bei Kreislaufstörungen, Alterserscheinungen, chro-nischen Kopfschmerzen, Migräne, Rheuma, Gicht, Appetitlosigkeit und dergleichen. Unterentwickelte Kinder werden bei täglichem Ge-nuß von einem Glas Elektrolyt-Wasser kräftig und gesund.

Sehr augenfällig zeigt sich die im Elektrolyt-Wasser lebende Kraft bei jungen Tieren. Das Wachstum wird gefördert, und die Anfällig-keit bei Seuchen ist denkbar gering. Auch Pflanzen und Blumen reagieren stark nach dem Begießen mit Elektrolyt-Wasser. Die Blät-ter werden sattgrün, die Pflanzen wachsen schnell, und Blüten und Früchte werden sehr groß und farbenprächtig. Es ist jedoch ver-früht, jetzt schon von einer Pflanzenzucht mit Elektrolyt-Wasser zu sprechen, weil das derzeitige Herstellungsverfahren noch zu kost-spielig ist. Die Hersteller wollen mit diesen Versuchen lediglich die erstaunlichen Kräfte demonstrieren, die sich in ihrem Erzeugnis be-finden. Diese Kräfte dürften in erster Linie auf die im Wasser gespei-cherte Elektrizität zurückzuführen sein. Jedes Wasser enthält be-kanntlich Mineralien, also Eisen, Kobalt, Schwefel, Kalzium usw. Diese werden durch das Elektrolyt-Verfahren bearbeitet, es tritt eine sogenannte Ionenwanderung ein. Der Vorgang ist ähnlich wie bei der Atomzertrümmerung. Die Mineralien und Spurenelemente werden elektrisch aufgeladen und üben zusammen mit dem keim-freien Wasser eine heilende und kräftigende Wirkung aus.

"Elegant World", May edition 1955:

The new Water of Life

Massive, with a wide roof, stands a house on the mountainside above Berchtesgaden. Many locals and Austrians close to the border, also countless numbers of holiday makers and winter athletes go on a pilgrimage to this house to get electrolyte water, which they call "wonder water". The white haired inventor, Alfons Natterer, gladly shows inquisitive visitors his inventions, with which he produces his popular healing water. On the walls stand the divided containers, filled to the brim with potential electrolyte water, above and next to them there are electric devices, measuring instruments and glass containers. The electricity flows through the water in the container for days, and it is very important for the quality of the water, that the processing time and the desired current density is maintained. The success of this electrolyte water is very frequent. Doctors confirm that this unique water has a direct influence on about seventy percent of all illnesses, and all possibilities have not been exhausted. So far doctors prescribe drinking cures with electrolyte water especially for stomach, bowel, liver,

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gall, kidney and bladder problems, for circulatory disturbances, signs of ageing, chronic headaches, migraines, rheumatism, gout, loss of appetite and similar symptoms. Underdeveloped children will become strong and healthy when enjoying a daily glass of electrolyte water.

It is very striking to see how the vital force in electrolyte water works on young animals. Growth is promoted and the susceptibility to epidemics is noticeably low. Also plants with flowers react strongly after being watered with electrolyte water. The leaves become a luscious green, the plants grow quickly, and blossoms and fruit become very big and very colorful. Yet it is too early to now talk about plant cultivation with electrolyte water, because the present production process is still too costly. The producers would like to merely demonstrate with this attempt the astonishing power which is found in their creation. These powers can be primarily traced back to the electricity stored in the water. As is known, water contains minerals, like iron, cobalt, sulphur, calcium, and so on. These are processed with the electrolysis method, a so called ion migration takes place. The procedure is similar to smashing an atom. The minerals and trace elements are charged electrically and together with the germ free water contribute to the healing and strengthening effect.

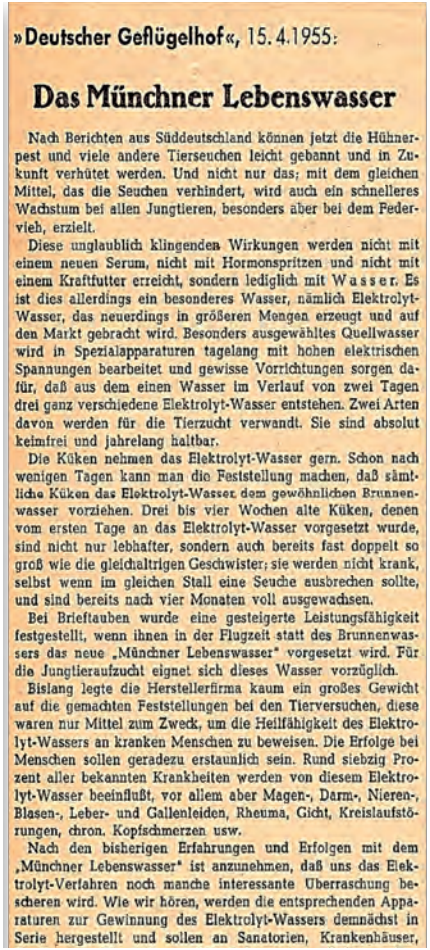
Agricultural journal on the right side:

"German Poultry Farm", 15.04.1955:

„The Munich Water of Life"

„After reports from south Germany can fowl pest and many other animal diseases be averted and in the future also prevented. And not only that; with the same means that prevents the diseases, can a faster growth also be achieved in all suckling animals, especially with poultry.

These unbelievably sounding effects are not reached with a new serum, nor with hormone injections and not with concentrated feed, simply with water. It



»Deutscher Geflügelhof«, 15. 4. 1955:

Das Münchner Lebenswasser

Nach Berichten aus Süddeutschland können jetzt die Hühnerpest und viele andere Tierseuchen leicht gebannt und in Zukunft verhütet werden. Und nicht nur das; mit dem gleichen Mittel, das die Seuchen verhindert, wird auch ein schnelleres Wachstum bei allen Jungtieren, besonders aber bei dem Federvieh, erzielt.

Diese unglaublich klingenden Wirkungen werden nicht mit einem neuen Serum, nicht mit Hormonspritzen und nicht mit einem Kraftfutter erreicht, sondern lediglich mit Wasser. Es ist dies allerdings ein besonderes Wasser, nämlich Elektrolyt-Wasser, das neuerdings in größeren Mengen erzeugt und auf den Markt gebracht wird. Besonders ausgewähltes Quellwasser wird in Spezialapparaturen tagelang mit hohen elektrischen Spannungen bearbeitet und gewisse Vorrichtungen sorgen dafür, daß aus dem einen Wasser im Verlauf von zwei Tagen drei ganz verschiedene Elektrolyt-Wasser entstehen. Zwei Arten davon werden für die Tierzucht verwandt. Sie sind absolut keimfrei und jahrelang haltbar.

Die Küken nehmen das Elektrolyt-Wasser gern. Schon nach wenigen Tagen kann man die Feststellung machen, daß sämtliche Küken das Elektrolyt-Wasser dem gewöhnlichen Brunnenwasser vorziehen. Drei bis vier Wochen alte Küken, denen vom ersten Tage an das Elektrolyt-Wasser vorgesetzt wurde, sind nicht nur lebhafter, sondern auch bereits fast doppelt so groß wie die gleichaltrigen Geschwister; sie werden nicht krank, selbst wenn im gleichen Stall eine Seuche ausbrechen sollte, und sind bereits nach vier Monaten voll ausgewachsen.

Bei Brieftauben wurde eine gesteigerte Leistungsfähigkeit festgestellt, wenn ihnen in der Flugzeit statt des Brunnenwassers das neue „Münchner Lebenswasser" vorgesetzt wird. Für die Jungtieraufzucht eignet sich dieses Wasser vorzüglich.

Bislang legte die Herstellerfirma kaum ein großes Gewicht auf die gemachten Feststellungen bei den Tierversuchen, diese waren nur Mittel zum Zweck, um die Heilfähigkeit des Elektrolyt-Wassers an kranken Menschen zu beweisen. Die Erfolge bei Menschen sollen geradezu erstaunlich sein. Rund siebzig Prozent aller bekannten Krankheiten werden von diesem Elektrolyt-Wasser beeinflußt, vor allem aber Magen-, Darm-, Nieren-, Blasen-, Leber- und Gallenleiden, Rheuma, Gicht, Kreislaufstörungen, chron. Kopfschmerzen usw.

Nach den bisherigen Erfahrungen und Erfolgen mit dem „Münchner Lebenswasser" ist anzunehmen, daß uns das Elektrolyt-Verfahren noch manche interessante Überraschung bescheren wird. Wie wir hören, werden die entsprechenden Apparaturen zur Gewinnung des Elektrolyt-Wassers demnächst in Serie hergestellt und sollen an Sanatorien, Krankenhäuser,

is however, a special water, namely electrolyte water, which is recently produced in large quantities and on the market. Specially chosen spring water is worked on for days in special apparatus with a high electric current. A certain device ensures that from one water during two days three completely different electrolyte waters are produced. Two types are used for animal breeding. They are absolutely germ free and can be stored for years.

The chicks like to drink electrolyte water. After a few days it can be established that the chicks have a preference for the electrolyte water over the usual well water. Three to four week old chicks which were given from the beginning electrolyte water are not only livelier, but almost twice as big as the siblings of the same age; they don't get ill, even if an epidemic breaks out in the same hen house, and after four months are fully grown.

With carrier pigeons an enhanced performance was determined, if during their flying time the well water was replaced with the new "Munich Water of Life". This water is excellent for the rearing of young stock. Up until now the company did not lay much weight on the discoveries with animal tests, these were just the means to a cause, to prove the healing capability of electrolyte water on people who are ill. The results with people are astounding. Around seventy percent of all known diseases are influenced by this electrolyte water, especially stomach, bowel, liver, gall, kidney and bladder problems, migraines, rheumatism, gout, circulatory disturbances, chronic headaches and so on.

After previous experiences and successes with the "Munich Water of Life" it can be assumed that this electrolysis procedure will bring us a few interesting surprises. As we hear, these apparatus for making electrolyte water will be produced in series and should be delivered to sanatoriums, hospitals, large companies, animal breeders and large garden centers."

NATTERER'S ERA IN PRESS DOCUMENTATION

Der große Fortsetzungsbericht in BILD:
Außenseiter der Medizin — Methoden, Preise, Erfolge

Wie „elektrisches" Wasser bei Krankheiten hilft

Die Heilpraktikerin Erika Röttger* aus Kiel kann mit Hilfe von drei Glas Wasser die Ursachen der meisten Krankheiten feststellen. Ihre Heilmethoden sind verblüffend, aber erfolgreich.

Die Diagnose steht fest

Jede Zeile ist elektrisch geladen

In the 70's two articles appeared in the popular German "BILD" newspaper. Natterer was then an elderly man, yet still successful and respected by alternative naturopaths and doctors. Hidden behind the portrayal of "Erika Röttger" is the Hamburg naturopath Edith Krebs, the inventor of low current therapy. She worked into our millennium with the Diagnostic Method developed by Natterer and Dr. Manfred Curry.

Translation: How electric water can help with illnesses.

By Horst Wolf.

The naturopath Erika Röttger from Kiel can establish the cause of most illnesses with three glasses of water. Her healing methods are intriguing, yet successful. The 44 year old housewife Anna Harms complained about sleeplessness, exhaustion, anxiety and a skin rash. In six months she lost twelve pounds. Three doctors were not able to find anything wrong with Anna Harms. Yet every day it becomes more difficult to do the household chores. Now she sits in the consultation lounge of naturopath Erika Röttger in Kiel, Germany. A slim woman, 46 years of age, resolute and affectionate. In front of Anna Harms on the small table are three glasses filled to the brim with a clear liquid. Anna Harms has to drink a sip from each glass. The naturopath observes her. After two minutes everything is repeated. This time Anna Harms has to drink in small sips, as if savoring a sauce.

"What does it taste like?" asks Erika Röttger. The patient hesitates, then she says slowly, as if doubting her judgement: "It tastes of...well...fish." Erika Röttger takes this down on sheeted paper. The diagnosis is conclusive.

With the second glass comes the same question. This time is the answer: "It tastes like musty drinking water." With the third glass she finally says: "It tastes like lemon with a small pinch of sugar."

The naturopath leans back in satisfaction. Her diagnosis is conclusive. "You suffer from a malfunction of the liver and your hormone balance is disrupted. Your organism is acidotic. This is the cause of your complaints. Please avoid fruit juices due to their acidity

and too much fresh fruit. Drink a lot of milk. To detoxify you must start drinking immediately electrolyte water - daily three times ten milliliter."

Two months later the patient was indeed healed. What the naturopath did is the so called "Schmidt'sche Test to detect the electrolysis balance in the body".

Every cell is charged electrically.

"It sounds confusing, but it's easy to explain", says Erika Röttger. It has already been scientifically proven that each cell is electrically charged. Pathological changes of the organs are caused by a displacement in the electric field of the organism. One knows this as acidosis or alkalosis of the body.

What the patient Anna Harms drunk during the test was a specially treated, electrically charged spring water from the Upper Palatinate. Depending on what the patients can taste after trying the three types of water; acidic water, neutral water and alkaline water, this gives an indication of the different internal ailments.

With the same water used for the test the detoxification cure is also done. The electrolyte water brings the muddled up tension field in the body back into balance, the illnesses disappear.

With this method most organic illnesses can be cured. With external ailments, such as furuncles, acne, hematoma, bruises, varicose veins, ulcerated legs, arthritis, "Electrolyte-cream" is applied - it contains electrolyte water with an ointment additive.

For ten years naturopath Erika Röttger has treated her patients on this basis. She has healed thousands like this. Many mothers with infants that suffer from mysterious bouts of fever go to her. "It's always the same", says Erika Röttger. "The children are overfed with fruit. The fruit acidity displaces the electric balance, the cells begin to suffer due to an oxygen deficiency and what follows are malignant illnesses."

A very tragic case illuminates how important it is to keep the electrolyte balance in the body intact: A 41 year old master bricklayer suffered from brain cramps, signs of paralysis and amnesia. The doctors never discovered the cause. When this man finally came to Erika Röttger, he was at his end. "The best thing is, I got into my car and raced down the motorway straight into a bridge pillar", he explains.

The naturopath noticed the bad state his teeth were in. She took a blood count. The result: He had metal poisoning. He had two amalgam fillings in his mouth (mercury with silver fillings) and a steel bridge. "These three metals in the mouth work like a small power station. They had completely jumbled the tension field in the body", explains Erika Röttger.

I sent him to the dentist, to have various teeth pulled out and have the metal bridge removed and prescribed an electrolyte water cure. Five months later was he completely healthy."

ELECTROLYTIC WATER THERAPY

Beginning in the 1950s, Natterer was in an intensive communication with Dr. Albert Richard Riedel, a specialist for spagyric medicine. In Natterers legacy I found an interesting manuscript about electrolytic water therapy in German language, written by Albert R. Riedel. I suppose, it was written in the early 60's, but the origin and the timing could not be determined, because it was a bad photocopy. But this manuscript was later republished in English language in the journal ESSENTIA, Vol I (1980). This is the only trace of Natterers ideas I could find outside of Germany.

The subtitle of this manuscript is:

„The biological basic treatment for re-establishing order of the electrolytic household of the body."

And here is the text in translation:

„What disadvantages have been caused to mankind the so-called civilized achievements of the last 50 years can possibly only be determined in the next century. The pollution of the air has risen to an unexpected extent. Cancerigenous matter, like soot, sulfur dioxide, carbon monoxide, as well as burned hydrocarbons from motor vehicles, is summoning up its noxious effects with those coming from detergents, polluted and chlorinated water food-stuffs which have been irradiated by radioactive rays and „enriched" by insecticides. All, without exception, damage the respiration and thus the cellular metabolism. Through the breathed air, stomach and intestinal canal or the skin. They reach via blood and lymph cells of the organs and connective-tissue.

Here now represented is the Electrolytic-Water Therapy, a healing method which does not heal by administration of remedies but by changing the isoelectric potential, enabling the sick organism to again fulfill its physiological functions. The isoelectric potential is measured by determining the concentration of the hydrogen ions. The measured value is indicated by the signs pH (p: potential. H= hydrogen). Thus, the pH value represents the measurable indication of the dissociation of acid, alkaline and salt molecules, triggered by the hydrogen ions set free by the dissociation and which becomes measurable in the form of isoelectric tensions. The scale shows the values 0 (acid) to 14 (alkaline). In the middle there is the neutral point 7.0.

It is known that nearly all enzyme and ferment reactions can only take place within certain pH values. Hence the following deduction can be made: Every normal metabolism can only take place within limits of a physiological pH value, which is subjected to certain fluctuations and is influenced by this value direct or indirectly.

When the pH value moves extremely to the acid or alkaline side respectively, disturbances are noted which can become perilous.

With electrolytic water a therapy to balance and regulate the electrolytic household of the human body has been developed. The electrolytic water is produced from a pure and excellent spring water and separated according to a patented method by electrolysis. This separation gives three classes of water with very different pH values.

Electrolytic-Water „S" pH 2.8 to 3.0

Electrolytic-Water „N" pH 6.8 to 7.2

Electrolytic-Water „A" pH 10.5 to 11.0

These waters are recognized as medical specialty by the German Board of Public Health and registered under number H 636, H 637, H 638."

(I tried to get a confirmation for this from the German Ministry of Health, but they had passed the files long ago to the European Archives, where no one was responsible to find them...)

Riedel continues: „What are the biological effects of this Electrolytic Water?

The quality of these waters lies in its electro physical activity which can be measured as value of the pH. Thus, this ionized water can act through the skin as well as through the mucous membrane and take part in the metabolism of the most different tissues and organs. It can be assumed that an acid metabolism, a so-called over acidification, will be influenced by a neutral or even more by an alkaline Electrolytic-Water.

An alkaline metabolism will be balanced by an acid Electrolytic-Water. Depending on the required treatment effect, the Electrolytic-Water is to be taken by drinking it, or also in form of a poultice or ointment respectively.

Treating so-called inner diseases is realized by drinking Electrolytic-Water, normally 3 times a day before meals, about 100 to 200 ccm.

It is, however, possible to prescribe, if necessary, at the beginning of the treatment 500 ccm and more because the Electrolytic-Water in its three forms is completely harmless.

External diseases can be treated with Electrolytic-Waters by means of poultices on the skin through which they penetrate and reach deeper tissues.

Electrolytic-Ointments have similar effects. The active substance, viz. Electrolytic-Water is slowly released to the skin and penetrates in a more slow manner in deeper layers.

For what disorders can Electrolytic-Water be applied?

Basically, it can be used for treating any abnormal alteration of the metabolism. A regulating influence, however, can only be expected in those cases where the Electrolytic-Water is able to act directly. This can only be the case by means of the skin or mucous membrane and also through the stomach or the intestines which are transporting it by means of the blood.

Up to now the proved healings for the external application through the skin and the mucous membrane (poultices and ointments) are mostly inflammatory processes which are often accom-

panied by inflammation, swelling, heat and pain.

That is:

1. All inflammations of cellular tissues, furuncles, stings of insects, suppurative injuries, scratches of the skin, etc. But also bloodshots coming from contusions, strains, sprains, inflammation of the sheath covering tendon and arthritis, even articular rheumatism as well as inflammations of the mucous membrane, arthrosis or phlebitis and thrombosis and overcharged varix.

2. Varicose vein ulcers, but also other ulcers, burns and inflammated injuries caused by corrosives have been healed.

3. Among positively influenced skin diseases can be mentioned fungus disease of feet or between the shanks and in the armpit. Psoriasis is treated depending on the state of the metabolism with acid or alkaline Electrolytic-Water.

4. Inflammation of the mucous membrane of the vagina or glans penis have been treated with good results with Electrolytic-Water „S" (acid) or the Electrolytic Ointment „S".

Inflammation causes in the befallen tissue a setting free of alkaline albuminous substance which is neutralized by the hydrogen ions and free electrons of the Electrolytic Water „S", making it inactive so that the inflammatory state is slowed down and healing can start. This explains why all local inflammatory processes mentioned under 1, 2, and 4 are treated with Electrolytic-Water „S" or Electrolytic-Ointment „S" respectively. For diseases mentioned under 3, fungus diseases, the Electrolytic-Water ‚A' and the Electrolytic Ointment ‚A' has given good results, because fungi are very sensible to an alkaline surrounding and easily decay and die under such conditions.

The treatment of the so-called inner diseases is based on the conception that the vegetative nervous system commands the phenomenon of life by means of his reins, i.e., the sympathetic nerves and parasympathicus. Effects of the sympathicus are the pouring of adrenalin by the adrenal ductless glands, the thyroxine of the thyroid gland, the conditions of fever rising the acidosis of the body. Parasympathetically influenced are the insulin of the pancreas, the luteum hormone of the ovaries, the conditions sinking fever and the alkalization of the body = alkalosis. From the overbalance of one part of the sympathetic nervous system over the other are resulting the different working conditions which can be denominated as sympatheticotonia or vagotonia (parasympathecotonia) respectively. These are always connected with very special and characteristic conditions of the metabolism. In the blood these differences are only insignificant because it always tries to maintain its best working condition, the isotonia, as far as possible. In the different tissues of the body, however, it is not the same. Here, acidosis and alkalosis can appear, which can be manifest or hidden (latent). The acid-bases mechanism of the body tends to a balance which is regulated by means of the vegetative nervous system. But how easily this

balance can be disturbed by external influences on this nervous system or by internal disorders of the metabolism. Acids and bases are present in determined deposits in the body, e.g. in the colloidal connective tissue.

When a balance of acids and bases reigns, these cells are flushed several times a day by acid and basic material. In the urine the corresponding acid and basic tides exist. When we have an acidosis of the colloidal connective tissue organ, the urine, too, turns unilaterally acid and there is no basic tide. A lot of status of disease are accompanied by disorders of the acid and bases mechanism of the body.

Being able to influence the acid-bases relations has been the aim of the therapy for a long time already, having in mind above all a purification of the blood. It is also spoken of a returning of the vegetative nervous system. Both mean the same thing. All forms of the therapy work by means of the sympathetic nervous system, be it a treatment at a watering-place, taking the waters at a health resort, sweating (vapor-baths) or a diet. The more the regulating conditions of this system can be influenced, the greater are the healing results. Because the Electrolytic Water can influence the condition of the metabolism regulated by the vegetative nervous system as well as the deposits of dross in connective tissue, it is a healing factor, even more so because it works at the basis of the phenomenon of life. In this manner Electrolytic-Water could become a basic therapy for a lot of chronic diseases. As well, it can alleviate constitutional one-sidedness of the sympathetic nervous system. This basic therapy has to be guided by the conditions of acids and bases in the body. In the case of metabolic disorders, as for instance gout, lymphalism, kidney or gall-stones, the rheumatic diathesis, the obesity, eczema or diabetes, the acid or alkaline condition of the metabolism has to be alleviated. An acidosis requires the taking of alkaline or neutral Electrolytic-Water; an alkalosis the treatment with Electrolytic-Water „S" or „N" respectively.

If the choice of the correct water is not to be made by the time consuming experiment, it can easily be determined by the Electrolytic-Water Test. The prescription for this test can be obtained from the medical practitioner.

Resume

Electrolytic-Water should not be compared with a medicine which is given for healing a specific disease, but it brings the body again to a normal reaction condition by balancing its electrolytic household. It recreates anew the elementary supposition of life where it has been lost. By means of this central regulatory action, there is prepared at the same time the ground for an eventually necessary supplementary therapy in a very positive manner. Professor Baur, Munich. said to this topic in his great lecture on occasion of the Medical Congress 1964 at Karlsruhe: „Even the best therapy cannot help when the water-electrolytic household of the sick is disturbed."

It has been recognized already for a long time that the balance of the electrolytic household is the main condi-

tion for the real success of the therapy and that many symptoms of a disease disappear when this balance is again established, eliminating, too, complications in a very short time.

Dosage: 3 times a day 100 to 200 ccm (at room temperature) to drink before meals, if not otherwise prescribed by the doctor.

A whole cure comprises generally 24 bottles of 1 liter."

[Mr. Alfons Natterer, the originator of Nawa Water by simple osmosis and Dr. Albert. R. Riedel of the Paracelsus Laboratories. Inc. in U.S.A. in one of their many friendly discussions about the improved method of separation at Mr. Natterer's place in upper Bavaria. Germany.]

So far the manuscript of Richard A. Riedel about the electrolytic water therapy of Alfons Natterer in Germany.

Das Elektrolyt-Wasser hilft beinahe immer und überall

(us) Bei welchen Erkrankungszuständen kann Elektrolyt-Wasser verwendet werden? Es kann im gesunden oder kranken Zustand getrunken werden! Bei den ersten Versuchen, die sich hauptsächlich auf die Trinkkuren mit Hydropuryl bezogen, konnten beinahe immer Erfolge bei Gallenwegserkrankungen, Gallenwegsentzündungen, Gallensteinen, katarrhalischer Gelbsucht, akuten und chronischen Nierenentzündungen, Urämie, echter Arteriosklerose, echter essentieller Hypertrophie, Gichtablagerungen, rheumatischen Leiden, Asthma, Zucker, Magenleiden, Affektionen der Zunge, Meniérischer Krankheit, gewissen Nervenleiden usw. erzielt werden.

● Prophylaktisch sind, selbst wenn keine äußeren Merkmale von Krankheitserscheinungen vorhanden sind, Hydropuryl-Trinkkuren allen denjenigen zu empfehlen, die nur wenig Bewegung haben, einseitige Kost essen, unter dauernder Stuhlverstopfung leiden usw. Grundsätzlich kann bei allen abnormen Veränderungen des Stoffwechsels Elektrolyt-Wasser getrunken werden, so bei Herz- und Kreislaufbeschwerden, Magen- und Darmleiden, Gelenkerkrankungen, Rheuma, Gicht und Ischias, Nierenleiden, Leber- und Gallenleiden, Nervenentzündungen und Migräne.

● Zu den bisher gesichteten Heilanzeigen für die Anwendung von „außen" über Haut und Schleimhäute als Umschlag oder Salbe gehören Entzündungsvorgänge, die mit Rötung, Schwellung, Hitze und oft mit Schmerzen einhergehen. Das sind alle Zellgewebsentzündungen, Furunkel, Insektenstiche, eiternde Verletzungen, Hautabschürfungen usw. Weiterhin die Blutergüsse aus Prellungen, Quetschungen, Zerrungen, Verstauchungen, aber auch Sehnen- und Gelenksentzündungen der verschiedensten Entstehungsart, selbst der Gelenkrheumatismus gehört dazu wie die Schleimhautentzündungen, Arthrosen oder Venenentzündungen und Thrombosen oder überlastete Krampfadern, Krampfadergeschwüre, alle anderen Geschwüre, Brandwunden usw.

● Von den Hauterkrankungen im engeren Sinne sind die Pilzerkrankungen der Füße etc., die Schuppenflechte, Schleimhautentzündungen der Genitalien usw. zu nennen.

● Auch in der Kosmetik haben Wasser und Cremes bereits einen großen Kundenkreis. Viele Kosmetikinstitute verwenden das Elektrolyt-Wasser als Bade- und Gesichtswasser sowie die Cremes als Tag- und Nachtpflegecreme; außerdem sind Cremes für die Fuß- und Beinpflege besonders geeignet.

● Viele Dankschreiben und tägliche Besuche beweisen immer wieder, daß bei einer Kur mit Hydropuryl-Wasser bzw. der Salbe und den Cremes das Ergebnis die Erwartungen weit übertrifft und die Patienten ihre früheren Bedenken verloren haben. Sie fühlen sich wieder gesund und können ihren täglichen Aufgaben in Beruf oder Familie wieder voll nachkommen.

In the mid 70's was 81 year old Natterer portrayed in the "Der Neue Tag" newspaper with a full page article on which indications of electrolyte water were then established.

Electrolyte water helps almost always and everywhere.

(Translation)

For which illnesses can electrolyte water be used? It can be drunk when healthy or ill! With the first trials that mainly dealt with Hydropuryl drinking cures, almost always could a success-

ful result be achieved with bile duct diseases, inflammation of the gall duct, gall stones, catarrhal jaundice, acute and chronic kidney infections, uremia, real arteriosclerosis, real essential hypertrophy, gout sediment, rheumatic disease, asthma, diabetes, stomach problems, affections of the tongue, Meniere's disease, certain nervous conditions, etc.. Hydropuryl drink cures are prophylactic, even if no physical symptoms appear, and are recommended to everyone who lack exercise or movement, have an unbalanced diet, suffer constantly from constipation, etc. Fundamentally, electrolyte water can be drunk with all abnormal changes to the metabolism, as with heart and circulatory problems, stomach and intestinal trouble, joint diseases, rheumatism, gout and sciatica, kidney disease, liver and gall disease, neuritis and migraines.

With the so far mentioned therapeutic indications to apply topically on the skin and mucous membranes with an ointment, an inflammatory process is accompanied with redness, swelling, heat and often pain. That means all cell tissue infections, boils, insect stings, suppurating wounds, skin abrasions, etc. Furthermore, bruises from bumping yourself, squeezing, strains, twists, and also tendon and joint inflammation arisen in diverse ways, even joint rheumatism belongs to this. Just like mucosa irritation, arthroses or vein inflammation and thrombosis, overburdened varicose veins, varicose vein ulcers, all other ulcers, burn wounds, etc. With skin diseases in the narrower sense should fungal diseases of the feet etc., psoriasis, mucosa irritation of the genitals etc., be mentioned. Also in cosmetics have water and creams got a big clientele. Many cosmetics institutes use electrolyte water as a bathing and face water and the creams as day and night creams; furthermore these creams are particularly suitable for foot and leg care. Many thank you letters and daily visits prove again and again that a treatment with Hydropuryl water or with the ointment and the creams shows that the expectations are greatly exceeded and patients stop having doubts. They feel healthy again and are able to return fully to their daily patterns of work or family."

(End of translation)

As Alfons Natterer died in 1981, in Japan and the Soviet Union the idea of what is possible with electro activated water had already gained a foothold.

There, scientific research had been going on for long, for the effects had also been recognized there. It just wasn't understood why they occur. Also there, pragmatism prevailed: Who heals, is right.

Even though thousands of patients had been treated in Japanese and Russian hospitals, there were only case reports from doctors over patients. Nevertheless in 1992, already over a million water ionizers were sold in Japan.

The manufacturers of the devices were and still are certified as medicinal device manufacturers. Yet there are no established principles on the correct therapeutic procedure when using

electro activated water.

The doctor's don't give multiple therapies, instead the patients follow their intuition, when they should drink and in what amount, in order to feel better.

Even though today we know much more about the work principle of alkaline activated water from Japanese research, we are still far from a systematic and safe therapeutic use. But we know for sure: The water tastes good and does well.

SECOND PART

Electrically activated water

FAQ

The most important questions

INTODUCTION. MANY NAMES: WHAT IS WHAT?

On pages 6-7 of this book you can see a lot of names. Some people really think, all these terms mean the same kind of water treatment. They buy a water ionizer and think, this is just a filter. Or that it produces only alkaline and acidic water.

Even some scientists do not always use the correct terms. The most popular scientific term for decades was „alkaline reduced water" (ARW). Chemists like the word. They learned that „reduced" means: I have got an electron.

But water, a molecule named H2O, does not get an electron to be named as „reduced" and written H2O- . What gets an electron is H+, which is one of the two Ions that form water. This H+ Ion is reduced at the cathode of an electrolysis cell and becomes a hydrogen-atom (H). Immediately it combines with a second H-atom and forms a H2-molecule, which is a gas. Both, the H-atom and the H2-molecule, are reducing, because they tend to give away an electron to other partners in a chemical reaction. So the correct term for cathodic water should be „alkaline reducing water".

So even in science is a lot of confusion around that what a water ionizer does - and what it does not. Some even say that the term „water ionizer" is nonsense. Although I think, it is a better term as „reduced water", because during electrolysis water molecules are dissociated into the two water ions H+ and OH-: The reason for the criticism of the term „water ionizer is that is not due to electrolysis if water dissociates. Water dissociation (autoprotolysis) is a natural fundamental process in water. But water electrolysis amplifies the process of dissociation, because water ions are de-ionized (reduced or oxidized) at the cathode H+ + e- --> H (reduction) and OH- - e- --> O + H+ (oxidation) at the anode.

So the term „water ionizer" at least describes, what finally happens in a diaphragm water ionizer: In the end you have more water ions in each chamber as in normal water.

Since the nature of electro-activated water was not understood up until recently, since 1931 over 50 different descriptions have emerged. Originally, the inventor Alfons Natterer spoke of acidic, alkaline and neutral electrolyte water. Decisive is, since then, the electrolytic production as opposed to, what I like to call, "chemical water ionizers".

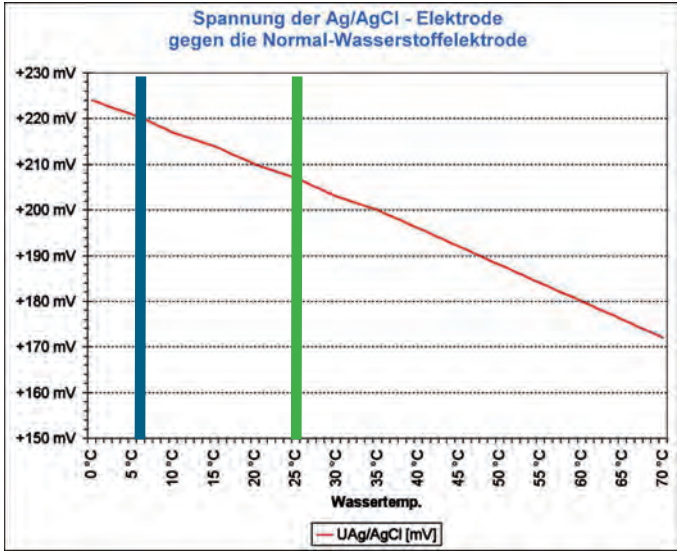
Since in Japan because of other cell construction, initially only the alkaline and acidic variety were produced, the term "Alkaline Ionized Water" was developed for the drinkable alkaline part. This is an unclear definition.

The water becomes alkaline due to a part of the molecules splitting into acidic and alkaline ions. They ionize and therefore separate with electrolysis, so that on one side of the membrane, alkaline water (from OH- ions) results and on the other side of the membrane acidic water (from H+ ions) results.

The counter term of alkaline activated water is acidic ionized water. Often it is referred to as oxidized water.

Later the term brought up by Dina Aschbach in a book: "ionized water" is an unfortunate choice of words, because it only brings the water ions to the foreground. The electric activity of the "activated water" does not found itself directly on the alkaline or acidic character, which is produced from the OH- and H+ water ions, but rather on the enrichment of dissolved oxygen in acidic water and the enrichment of hydrogen in alkaline water.

Due to these dissolved gases a very high (positive) oxidation reduction potential (ORP) is reached, up to 1200 mV (SHE) on the oxygen side and an extraordinarily low (negative) oxidation reduction potential, up to (-) 600 mV (SHE) on the hydrogen side. These are the values that can be measured with a SHE electrode (hydrogen electrode). Since in practice one almost only measures with CSE electrodes (silver/silver chloride electrodes), are the values up to + 1000 mV (CSE) on the oxygen side and from -800 mV on the hydrogen side. These are values measured at 25° C, where the difference between the measurement method and SHE measurements amount to a difference of + 207 mV. The relationship with other temperatures is illustrated in the following graph (from http://www.angewandte-geologie.geol.uni-erlangen.de/paramete.htm)



Above: Voltage Comparison of standard hydrogen electrode (SHE) and usual Ag/AgCl Electrode (CSE) - red line - at different temperatures. At a normal water drinking temperature from the tap (blue line) you have to add 220 mV to the CSE value, at room temperature (green line) 207 mV to get the SHE value.

By electrolyzing water in an electrolytic cell with a diaphragm membrane it doesn't only form both water ions H+ and OH- from water molecules. Oxygen and hydrogen is also released, the difference in both sides is explained by the fact that oxygen gas and hydrogen gas possess different dissolving powers.

Solubility of oxygen mg/l at 1 atmospheric pressure 101,325 Pa

5 degrees C: 2,756

20 degrees C: 2,501

25 degrees C: 2,293

30 degrees C: 2,122

35 degrees C: 1,982

Solubility of hydrogen mg/l at 1 atmospheric pressure 101,325 Pa

15 degrees C: 1,510

20 degrees C: 1,455

25 degrees C: 1,411

30 degrees C: 1,377

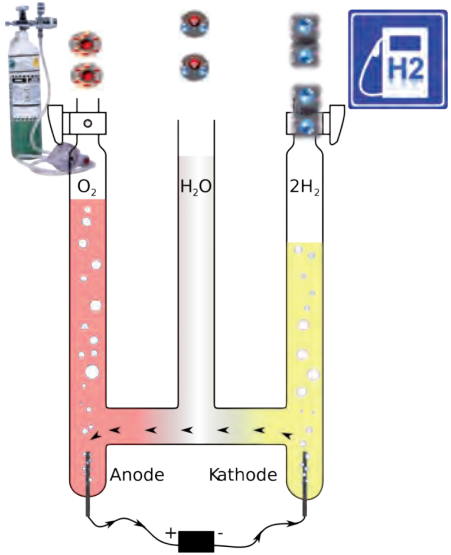
35 degrees C: 1,350

With electrolysis 2 water molecules H_2O release the following gas quantity:

- $2H_2O \longrightarrow 2\,H_2 + O_2$

There is always double the amount of hydrogen gas compared to oxygen gas.

O_2 can, however, at 25 degrees C dissolve 1,6 times better in water. So whereto with the clear surplus of H_2?



The Hofmann Voltameter (left side) is one of the favorite school experiments of chemistry teachers and students. Thanks to its clever design the equation can be clearly demonstrated. In any case the Chemistry teacher has to "trick" in order to show that both gases are formed with the ratio

Content

2:1. If the water is not saturated by both gases, then a ratio of 1:2.5 results with the different dissolving powers and the dissolving speed (oxygen to hydrogen).

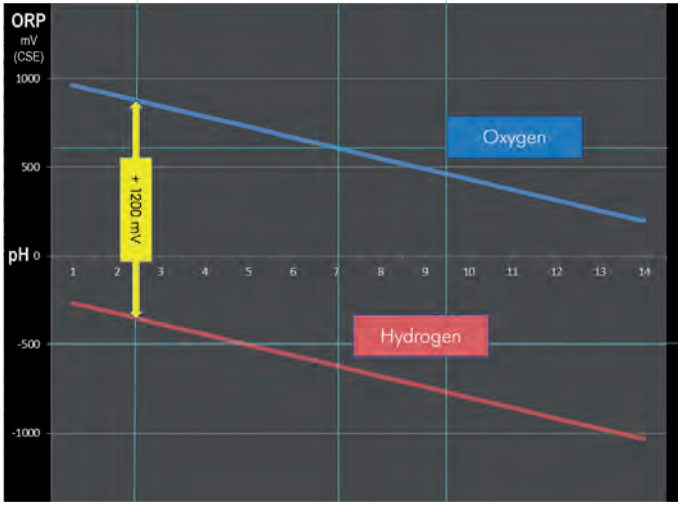
At the end of the experiment we obtained pure oxygen and hydrogen for the beloved detonating gas effect, but also acidic water with saturated oxygen and alkaline water with saturated hydrogen, depending on air pressure and temperature.

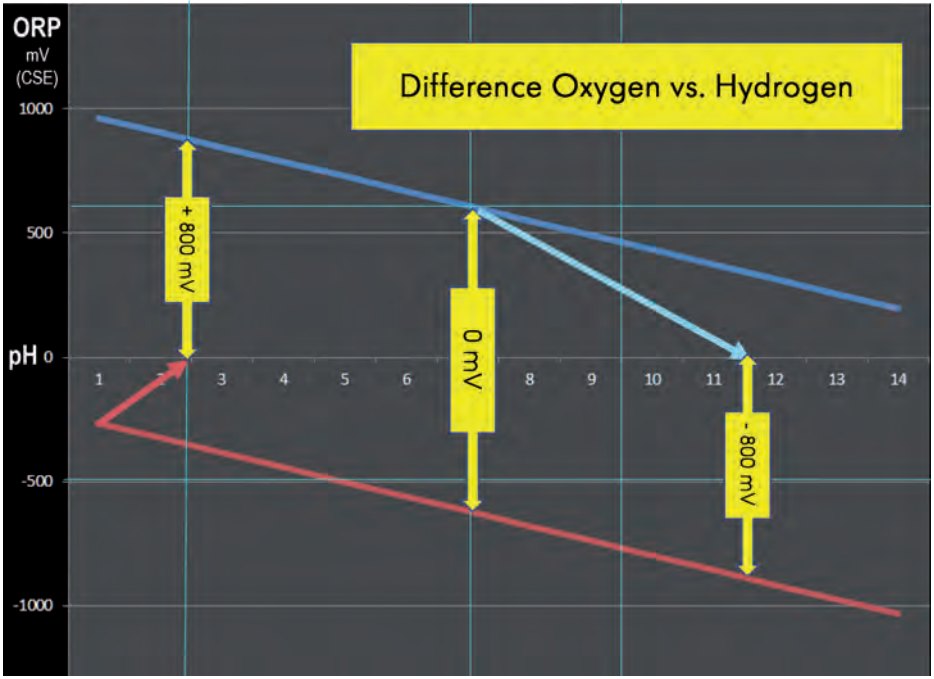
So why does the ORP sink in alkaline, hydrogen rich water to very high negative values?

One should keep in mind that ORP values are not measurable directly. The ORP is always the value of an electric current between two chemical reacting partners, so a relative size. H2 hydrogen gas is defined as a standard potential E0. As opposed to a hydrogen electrode (SHE), gold has, for example, an ORP of + 1680 mV, whereas lithium shows – 3040 mV. Due to the voltage difference one could make a lithium-gold battery with 4720 mV (4.72 Volts). A minus value means that an electron surplus is present, a positive value means a tendency to accept electrons.

The water molecule H2O is composed of two reacting partners, H2 and O. Oxygen (O) has a positive ORP with nearly + 1200 mV compared to H2, so "greedy" for electrons. This voltage difference of 1200 mV is constant with all pH values and measuring methods, even if the values of both reacting partners with increasing pH values sink. See chart beside.

Alkaline electrolyzed water contains much more hydrogen than oxygen. What is missing, very plainly put, are the +1200 mV: the ORP has to sink and become negative. On the other hand acidic electrolyzed water contains much more oxygen than hydrogen. So the ORP becomes positive. The chart below shows only what happens in pure water. In normal drinking water there are a lot of other ions that can influence the ORP values measured with a CSE electrode.





With drinkable alkaline activated water, with a pH of 9.5, is the ORP of H2 has sunk furthermore -700 mV. This is at room temperature. So there are 3 basic parameters which define the value of alkaline activated water:

- **A maximum saturation with dissolved hydrogen**
- **A higher surplus of OH- ions**
- **A possibly complete removal of oxygen gas**

These 3 basic parameters complement each other. Their simultaneous availability is exclusively reached with an electrolytic water ionizer with diaphragm electrolysis. Neither chemical water ionizers nor electrolysis devices without a diaphragm or Hydrogen Rich Water generators can reach the compliance of these parameters.

The first person, to my knowledge, who used the term "alkaline activated water" journalistically in Germany was Engineer Dietmar Ferger in his 2006 published book: "Alkaline Activated Water – how it works and what it can do." The extended version of this book is also available in German, with the title: "Jungbrunnenwasser" (Fountain of youth water).

Dr. Walter Irlacher and I also used the term „alkaline activated water" in our book "Service Handbuch Mensch" (Service Manual for Humans), which first appeared in 2006.

In 2008, together with Ferger, we delved deeper into the topic with the book and documentary "Drink yourself alkaline – a short guide to alkaline activated water".

In 2008 the interest was dominated by an electrochemical measure value, which alkaline activated water, alongside its increased pH values, also possesses: The negative ORP. The Russian researcher Vitold Bakhir believed to have proven, that the ORP is abnormally low and not explainable with the classic ORP chemical equations. The ORP of the acidic activated water was also abnormally high and seemed to also be unexplainable.

In 1997 Sanetaka Shirahata had hypothesized that only atomic hydrogen can be the cause for the antioxidative effect of water. He could establish such an effect with types of water, which didn't have an abnormally negative ORP yet contained atomic hydrogen. One of these waters he tested positively with a content of atomic hydrogen, was a natural water from Nordenau in Germany.

THE NORDENAU PHENOMENON

Since Shirahata's researches the Nordenau water from the slate mine of Nordenau has become famous outside of Germany. Although in Germany it is not allowed to sell it as a healing water, nowadays it is exported especially to it's Korean fans. Some people claimed it to be a natural form of alkaline electrolyzed water.

The first time in 2006 I travelled to there to test the water from the slate mine and could not find any sign of similarity to alkaline electrolyzed water.

It was only slightly alkaline (pH: 8.19) with an oxidant ORP of +134 mV (CSE). Ten years later I tested the bottled Nordenau water and pH was even lower (7.5) and ORP was even +244 mV (CSE). Also there was no measurable Hydrogen gas in it. So I really doubt its antioxidant abilities.

HUNZA WATER

A HUNZA HAZARI AND TIBESMEN.

Marianne S. asked me: The people of Hunza are ancient – though they almost exclusively drink mineral poor glacier water. Do you really believe that mineral rich alkaline activated water is better?

Yes, because I stick to the facts.

Nowhere has the high average age of the Pakistani Hunza people been documented. The myth comes from the son of the Swiss Muesli inventor Bircher in an ancient book entitled: "Hunza – The people that knows no disease".

In fact, there exists a rather early mortality rate. Infant mortality is extremely high, with a mortality rate of 30% before the age of 10, 10% of adults die before the age of 40. (Source: Ensminger, A., Concise Encyclopaedia of Foods and Nutrition, 2nd ed 1995, p. 619).

Just because the Hunza at 2500 m above sea level do not have a good mineral-rich water, but mainly meltwater, they have become known for their relatively high-quality Crystal Salt, which they themselves consume with this water to survive. Since this consists mainly of common salt (sodium chloride) and trace elements, minerals such as calcium, potassium and magnesium are very low. Perhaps one reason for the low life expectancy.

KANGEN® WATER

Kangen Water® is the registered brand description for activated water of the Japanese traditional company Enagic™, existing since 2005, which is produced by an ionizer device made by this company.

In Europe, for example, these devices under the description Leveluk™ offered by multi-level marketing companies are similar to other devices in the assembly and the electrolysis performance. The description Kangen® Water in the operating instructions is only used for activated alkaline water with a pH 8.5, pH 9, pH 9.5 and pH 11. Filtered and acidic water is not described as Kangen® Water. Kangen® Water is high quality alkaline activated water.

pH 11 water is no drinking water. Therefore "Strong Kangen® Water" (>pH 11) has a warning sign not to drink it. One can remove persistent, greasy stains with it, rinse fish, meat and vegetables with it and use it to clean the floor.

There is a special feature to the LevelukTM devices: To create "Strong Acidic Water" (Anolyte) and "Strong Kangen® Water" (Catholyte), these devices are equipped with a liquid tank which has an „Electrolysis Enhancer for producing strong Acidic Water" made exclusively by the Enagic Osaka Factory, which upon choosing the operating level will mix the correct dosage of water to it.

This liquid electrolysis enhancer differentiates itself from a usual saline solution (NaCl) in water due to the fact that it also contains sodium hypochlorite (NaClO – hypochlorite acid or also „Eau de Labarraque"). Sodium hypochlorite is, for example, the active component of disinfecting and bleaching household cleaning agents and is also promoted as "active chlorine".

I cannot detect a necessity for this supplement, since mixing common salt to any water ionizer through the supply pipe for salt crystals anyhow creates big amounts of hypochlorite acids in the anode chamber. Hypochlorite acid is the decisive active agent of anolyte, in terms of disinfection power of oxidative water. I presume, that hypochlorite additives in the "Electrolysis Enhancer" are especially used for the saline solution to keep it stable in a germ free condition. The small bottles also have no sell-by date.

Also industrial devices used to create anolyte work with liquid salt (Sole), since it can be dosed more exactly with a so called "Venturi-pump" compared to the addition of salt crystals, which dissolve in varying amounts and varying speeds in water.

As distinguished from industrial devices, which have an exact flow rate control of the feedwater at their disposal, the Leveluk™ devices cannot regulate the water flow rate exactly, since a real-time display is missing. So you have to guestimate with the water tap, since the device can only be connected with the diverter faucet. The problem can be solved with an alternative water connection, which is in exact alignment with the flow rate and therefore guarantees constant results.

In 2016 a similar device for private and professional use was developed by the Korean company "Ionia", a pioneer of water ionizers. The AquaVolta® ECA tractor. (ECA means electro-chemical-activation).

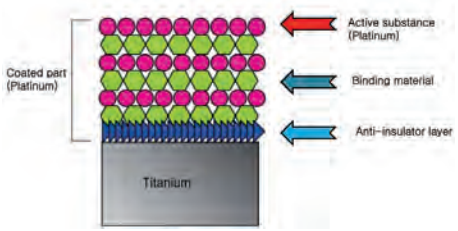
It has two water outlets on top, one for normal alkaline activated water, another for functional acidic or alkaline water (pH 2,5 and 11,5) with salt injection before electrolysis. It is safer to keep them separate to avoid people drinking the strong acidic or strong alkaline water.

The AquaVolta® ECA tractor works with separate electrolytic cells: One with seven electrodes for the normal alkaline activated drinking water. The other with 5 electrodes for the tap water with saline injection to generate functional ECA-Water. The efficiency of this new device in all measurable water parameters (pH, ORP, dissolved hydrogen) in all my tests was much better than any of the Kangen® water devices. Especially the values of dissolved hydrogen differ a lot at a pH of 10 (ionized tap water Munich)

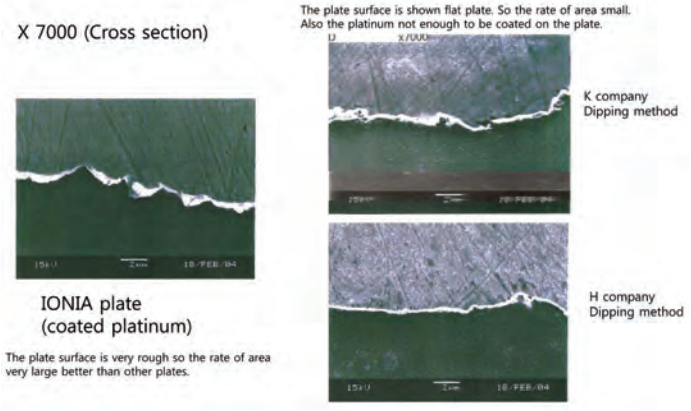
Leveluk SD 501	0,7 ppm
AquaVolta ECA tractor	2,0 ppm

(both measured with H2 blue™)

This enormous difference may be due to the new type of 3-layered platinum electrodes (polymer-ion-mesh method).



In a closer look at the surface we can see the obvious advantages of this new spray-type galvanization:



Photos: IONIA

The new electrode type with its larger surface seems to create more nascending hydrogen and smaller hydrogen bubbles that dissolve better in water than the big bubbles from other types of plates..

Also the descaling system of the AquaVolta® ECA tractor works better and the display shows all the necessary information's, especially a real-time flow-control, that a modern water ionizer must have. So it's time for the Japanese Enagic® Company, to update their old-fashioned and not state-of-the-art Kangen® devices.

Another point for the AquaVolta® ECA tractor is the price. For it is offered by normal distributers and not by a multi-level-marketing system, it is much cheaper, although it is obviously better constructed.

Photos: www.euromultimedia.de (left), IONIA (right)

Only the dimensions of 376 x 185 x 435 mm could be a counterpoint. This is due to the two big pre-filter cartridges in the device. The first filter contains activated carbon granules. The second filter contains a calcium acid and a hollow fiber membrane which is the gold-standard of filtration today.

THE NEW DISCUSSION ABOUT HYDROGEN

The research of Japan's Shigeo Ohta showed in 2007 that also molecular dissolved hydrogen gas, which is responsible for the negative ORP, has antioxidant properties. Since then, molecular hydrogen gas is one of the most interesting subjects which is exploding in medicinal research. 12) It is a promising therapy for the most widespread noninfectious diseases.

Molecular hydrogen combats, in particular the most destroying of all free radicals directly, the hydroxyl radical. It has an ORP of (+) 2300mV which puts it in the lead of cell destroyers, even above ozone (+ 2000 mV). H2 also doesn't have any side effects compared to other highly effective antioxidants: It just makes water!

Let's get to the point of the yearlong discussions about the redox potential and hydrogen: The redox potential is a side effect. The imaginative discussions about "free electrons" or "contactless transfer" are old news in 2016.

For the consumer of alkaline activated water this has very easy, practical consequences. All warnings about metal containers for keeping alkaline activated water can be ignored: it simply depends on whether the container is gas tight. Glass or stainless steel: irrelevant. On the other hand plastic containers, even ones that claim to be free of softening agents, should only be used short term for storing.

This also has consequences for the bottle size: Once opened and in contact with the atmosphere, hydrogen escapes inevitably and very quickly. Therefor the bottles shouldn't be larger than the required drinking amount which can be consumed in a short time. It is about producing as much hydrogen as possible in the alkaline activated water and to maintain this content to the maximum until it is consumed.

Hydrogen escapes from the water into the atmosphere very quickly, for the oxygen previously removed with electrolysis is contained in the atmosphere with 21% and displaces the hydrogen until in balance.

There are companies that have developed O2 water and sell it successfully. It doesn't contain any hydrogen at all. From our present point of view this is not useful. Oxygen is the burner, hydrogen is the fuel in our body. Only with the charging of NAD+ to NADH in the body is the energy storage with hydrogen made possible. Albert von Szent-György has already presented this in his 1937 Nobel Prize acceptance speech - by the way, the same year that electrolyte water was registered in Germany as a specialty medicine. Hydrogen can only be obtained as an energy supply from foods. At the end of the metabolic process we gain hydrogen and the whole biochemical refinement of our cells serves the following purpose, to break down the oxyhydrogen reaction in various gentle steps.

Oxygen can be obtained in any desired quantity and is distributed to the cells via the lungs. In all normal situations is

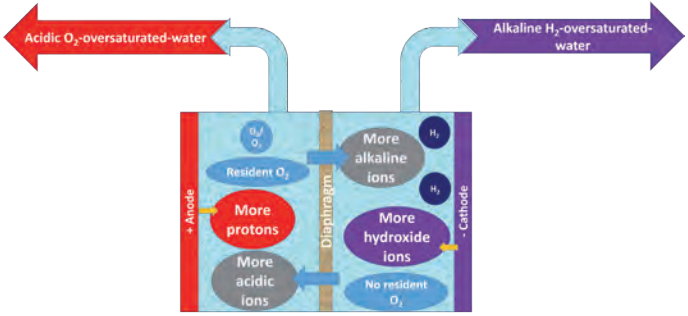
exclusively the distribution of hydrogen the problem in our organism.

With the help of alkaline, hydrogen rich, activated water can the metabolic chain be skipped, we can supply ourselves immediately with hydrogen without the respiratory chain and the citric acid cycle. Due to its tiny molecule size can hydrogen flow through the whole body, including the mitochondria, effortlessly. With alkaline activated water can the fuel of life be easily drunk. Additionally is hydrogen not only the smallest antioxidant, but also the most elegant. For it doesn't become a radical once it has given off its energy, it turns into water. Therefore the new question with alkaline activated water is: How do you get the most hydrogen gas dissolved in water which is suitable for drinking? Since about 2013 there is a heated debate around the world. I will deal with the ideas and flawed ideas in the next chapters

NEW METHODS AND DEVICES

At first we should remember what a classical water ionizer with diaphragm electrolysis does.

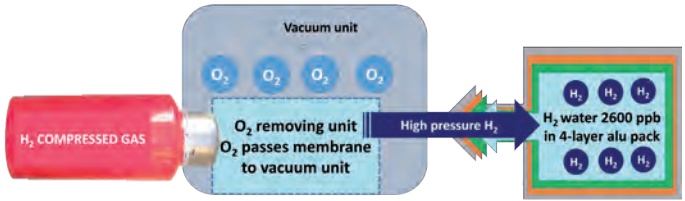
It divides water molecules and separates them in an anodic and cathodic compartment. So hydroxide ions are concentrated on the cathodic side and protons (H^+ions) on the anodic side where they join with water-molecules to form H_3O^+ ions.



At the same times alkaline kations pass the membrane to the cathodic compartment and acidic anions pass it to the anodic compartment. In the right compartment (alkaline electrolyzed water) pH increases, in the left compartment (acidic electrolyzed water) pH decreases. So the cathodic water used for drinking between pH 8.5 - 9.5 is richer an alkaline minerals like calcium, magnesium etc. than tap water.

HYDROGEN WATER BAGS

There is another successful way that has been established especially in Japan to get more hydrogen in water: This works by filling a special kind of bottle it with high pressure. Indeed it is a 4-layer aluminum coated beverage bag. It works like this:



This is the method of IZUMIO® brand being the leading company for this kind of hydrogen water marketing in Japan. The underlying method is using high H2 pressure (2600 ppb which is 1000 ppb higher than normal upper limit in water) and keeping it for some months to get through the journey time to the customer. Also O2 is removed by a vacuum membrane. So the ORP can decrease much better than with other methods. And the hydrogen cannot react with oxygen to form simple water. Shigeo Ohta, the guru of hydrogen water, seems to favor this method. But there is one problem:

This method is very costly. One of these beverage bags contains only 0.2 liters and the average price of one liter is much more than 10 USD. Remembering page 8 of this book, you should drink more than one liter of water per day. So this is a method for the very rich people.

Apart from that, these complexly built up one-way aluminum bags are difficult to recycle and are therefore hardly desirable with our present understanding of sustainable packaging ecology. The existing waste problem with billions of plastic bottles is already bad enough.

The European company Hydronaid® offers hydrogen water in 0.5 liter bags, yet only makes frugal statements of the durability and the ppb amounts. Also here the liter price (July 2016) is at 7.50 €. Too much.

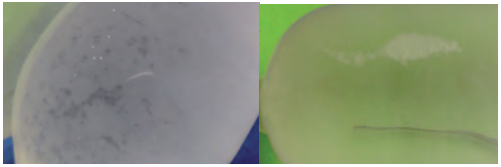
Whether the over saturation of molecular hydrogen in the water from high pressure bottling actually benefits the drin-

ker, or if the resulting loss of hydrogen from storage and transportation is compensated, is another question. For the moment the bottle cap is opened does the overpressure released in a few seconds and falls back to the usual 1600 ppb, with higher temperatures it falls to even less. If the bags are transported in a refrigeration chain, is a bubble formed inside the bag with gassed out hydrogen.

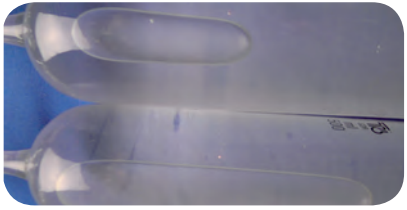
I show you why.: It's because hydrogen oversaturated water (more than 1600 ppb) always will exclude hydrogen. Even inside the 4-layer-bag! Hydrogen is not really dissolved in water, because it is a non-polar gas and therefore hydrophobic. It's just a kind of a dispersion. It will form a big bubble upside of the water as you can see in my experiment.

I filled a so called gas-mouse completely with hydrogen oversaturated water. After a few minutes the superfluous hydrogen gas was excluded and after a week you can see a big bubble.

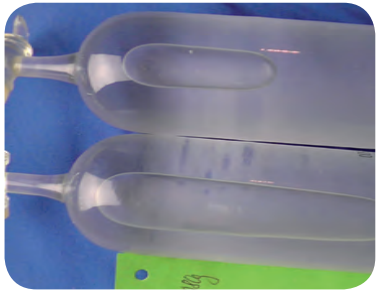
At the same time I filled another gas-mouse of the same volume with the same oversaturated water. But I added a strip of pure metallic magnesium in it. Magnesium in its metallic form dissolves in water to Mg++ ions, H2 an OH- Ions, makes it more alkaline and hydrogen enriched. PH increases. So what happened:



Left side: oversaturated electrolyzed water from a water ionizer. Right side: the gas-mouse with metallic magnesium added to the same water. Immediately after filling gas-mouse.



After one week the magnesium added gas mouse (below) could not store more hydrogen. The excluded hydrogen bubble is much bigger.



After 6 months. The magnesium water has built a bigger gas mouse. No more hydrogen can be stored by this method than from a full-saturating water ionizer.

This experiment can show:

A water ionizer can rally produce hydrogen oversaturated water.

No chemical addition can bring better results.

The experiment showed two things:

An electrolytic water ionizer can produce oversaturated alkaline hydrogen water. But the oversaturation does not remain stable.

Chemical hydrogen production, for example with metallic magnesium also reached the saturation limits. Therefor no better or more stable results can be achieved.

A further experiment with a so-called Hydrogen Infusion Machine (HIM) showed after 23 hours.

I have bags filled with hydrogen water from different providers, all were filled with high gas pressure. Two minutes after opening was only a normal hydrogen saturation (1600 ppb) measure, which sank by 100 ppb every minute since hydrogen gases out into the atmosphere at room temperature.

PH NEUTRAL HYDROGEN WATER

With the increasing meaning of the hydrogen factor have some producers of electrolytic water ionizers developed new ideas, to store more hydrogen in water. Some of them are interesting. Others not. I would like to commence with the weaker methods which can't store that much hydrogen in water, yet compared to the relatively high purchase price of a classic alkaline water ionizer with diaphragm electrolysis is clearly cheaper to produce.

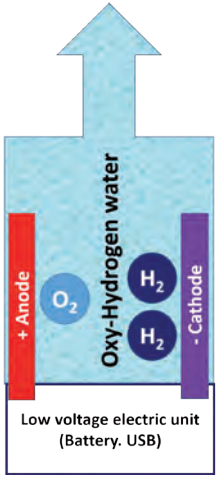
What is common of all these devices is that the producers are keeping an eye on the hydrogen content. They simply explain this as being unnecessary, that water should also be alkaline and that oxygen should be removed because of its oxidizing character. Also the removal of anions is seen as unnecessary, as well as the increase of the amount of cations in alkaline activated water.

The pH value is passé for them. Hydrogen content is eve-

rything. On the following pages I will highlight the most important of these technologies developed since 2010.

OXY-HYDROGEN-GENERATORS

The easiest way to produce hydrogen water is with a 1 chamber electrolysis cell, in which the cathode and anode are not separated by a diaphragm. So oxygen and hydrogen is "dissolved" at the same time. Namely to the ratio 1:2. That is the formula for oxyhydrogen gas. The producers certainly avoid talking about oxyhydrogen gas ionizers since it is explosive and can be dangerous - yet not when in an aqueous solution and in these amounts. They emphasize exclusively the hydrogen and speak of "Hydrogen Rich Water" generators. My personally favorite expression for this is the "Double Bubbler". The basic function is shown in the image on the right: Technically they are very easy. They really create with little effort hydrogen gas in the water, which normal drinking or mineral water does not contain. Really hydrogen rich is this water not. But one can claim that this water is sufficient for a better hydrogen supply and has certain antioxidant effects. The advantage: a simple power supply from a battery that can be recharged with a USB cable. Up to 20 liters of water can be treated when on the go and without a socket. With an OXY-Hydrogen Generator is oxygen not only removed, it is even added. Like this the dissolved oxygen functions as an opposite pole to hydrogen and the ORP will never be as low as with an ionizer. But that doesn't matter, say the supporters of this technology. If one doesn't want alkaline activated water, but a neutral sort, can both alkaline and acidic outlet hoses be led into the same glass. You will measure an ORP of about 0 mV, even though the water contains relatively a lot of hydrogen. In this case you also have the free OH- and H3+ ions. I find this to be a more interesting way, also if the "Double bubbler" is by all means interesting when on the move.



Nevertheless: Abnormally low negative ORP measurements, something performed by a diaphragm water ionizer when

making alkaline activated water, always show very clearly, that this is a water with exceptional properties. And exactly there lies the since 80 years discussed and still not completely understood health benefit. Therefor not every ORP measurement from the start is nonsense. And thus also over 1000 Russian doctoral thesis based on this, are suddenly a thing of the past. ORP measurements can be quite useful, especially there, where direct hydrogen measurements are difficult or not even possible. This affects especially the analytics of body fluids like blood, or the quality analysis of foods or soil samples in agriculture or aquaculture, where ORP measurements have been established a long time ago. .

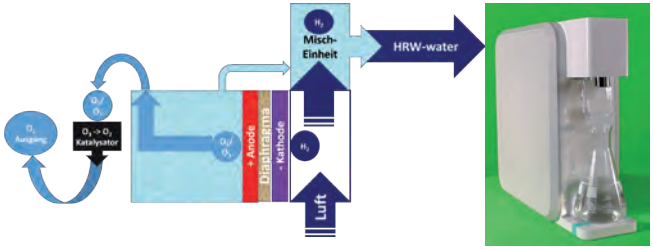
CHEMICAL HYDROGEN GENERATORS

Chemical hydrogen generators like H_2-tablets, some ceramics or hydrogen producing minerals like magnesium add no oxygen but do not remove the oxygen gas that is normally already resident in water. So you get a water with enriched hydrogen content but not a really hydrogen **rich** water.

OTHER ELECTROLYTIC DESIGNS: PEM/SPE/HIM

The best chemical hydrogen generator I found, stored 1200 ppb hydrogen in water. Which is good. But it took 12 hours to get it. This is not compatible with a normal lifestyle. So other designs of electrical water ionizers have been developed that can „dissolve" up to 1500 ppb within some seconds.

In the meantime the established ionizer industry has developed devices that can dissolve up to 1500 ppb of hydrogen in normal water - and within seconds. These so called Hydrogen-Infusion-Machines (HIM) work with PEM-cells, that contain a diaphragm and two chambers, of which only one is flooded with water. The second chamber is the gas-chamber. Also water from a HIM-machine, which can create up to 1200 ppb, secretes gas bubbles over time even quicker than water from a water ionizer.



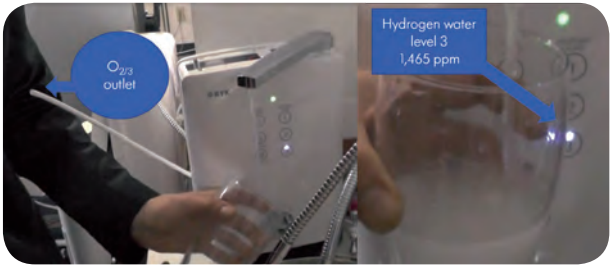
The design has a pressure relief valve on the top which allows oxygen and ozone to dissipate from the anode chamber. In the waterless cathode side only hydrogen gas forms, which mixed with air is pressed through a pump into a mixing unit, through which the water from the anode chamber flows. Since the oxygen (including arising ozone) was already removed from the anode water before, is a hydrogen enriched water produced (HRW-Water). Unlike a water ionizer is no waste water produced. The water also does not become alkaline, it keeps its original pH value. With previous models with this kind of a basic structure is the pictured ozone catalyzer missing, for the produced ozone amounts do not overstep the threshold quantity. Also if the ozone, created with electrolysis and oxygen, leaks into the inside of the housing do sensitive noses notice the typical pungent smell of this reaction product of this highly creative gas.

WATER IONIZERS WITHOUT WASTE WATER

v.l.t.r.: Britney Jun (KYK Overseas department), Karl Heinz Asenbaum, Dr. Kim Young Kwi (KYK CEO), Eng. Yasin Akgün (Owner Aquacentrum Munich).

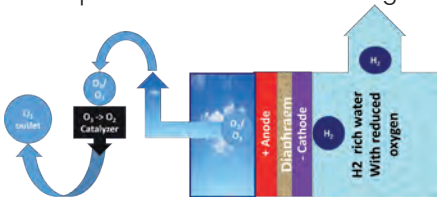
During our Korea visit in spring 2016, did Kim Young Kwi, boss of the renowned manufacturing company KYK, show us a special Hydrogen-Infusion-Machine in his development department. They delivered a sensational hydrogen value of 1465 ppb. In pH neutral water. Oxygen and ozone from the PEM cell are purged through an air pipe.

The interesting question was, if these results can be achieved not only with the mineral poor water from Seoul. For normally we know, with European water hardnesses substantially lower values occur compared to the results claimed by the Korean and Japanese producers.



In the meantime the device is ready for series production and I was able to test one of the first models in Munich. The hydrogen result of 1457 ppb (1.457 ppm) was hardly worse than in Seoul. But with another measuring method (see: Hydrogen Measurement H_2 blue test) it was only 800 ppb. The ORP sank to (-) 675 mV (CSE). Also the pH value rose from 7.7 to 9.4. These results were achieved on the highest of 3 selectable levels.

The secret of this water ionizer without waste water (only exhaust air) seems to come from a revolutionary cell construction which still belongs to the KYK company secrets. The results are explainable with the following order:



This construction would be a mirror image of the HIM-cell, which I presented on page 83. The anode chamber is not flooded with water. Only oxygen and ozone forms and gasses out through an outlet in the device. On the other side is water electrolyzed in the cathode chamber, where hydrogen and hydroxide ions form. So the pH value rises and the ORP becomes strongly negative. This device is very similar to a classical water ionizer when producing the pH value and the hydrogen enrichment. Also the dissolved oxygen is removed. However, there is no increase of anions during the simultaneous decrease of cations.

Next to the 3 adjustable hydrogen levels (bordered in blue), the new device also offers the possibility of switching to ozone water for disinfecting purposes. For this function there is only one setting level. (Red circle). During the function "Ozone Water", hydrogen gas comes out of the outlet pipe which can be used for, for example to bubble up drinks of all sorts. Its hydrogen content is raised without having added any kind of liquids and the ORP sinks. Compare the somewhat laborious procedure with alkaline activated water from a classical water ionizer on page 46 ff. The water produced in the OZONE WATER mode from the main outlet can be used for cleaning due to its disinfecting effect.

Image above: Use of the gas outflow pipe in the OZONE WATER mode for bubbling up drinks with hydrogen. The results of approximately 330 ppb hydrogen with milk and a fruit juice mix were achieved within one minute. Parallel about 1 liter of ozone water was filled from the main outlet.

WHERE IS DEVELOPMENT HEADING?

Today the water ionizer is mainly a far eastern product, even though it was invented in Europe. I myself have sold water ionizers for 12 years to European clients, only to discover: It is not a problem to convince people to drink electro-activated water. But there are 3 problems that have not been solved:

The price is a high entry level

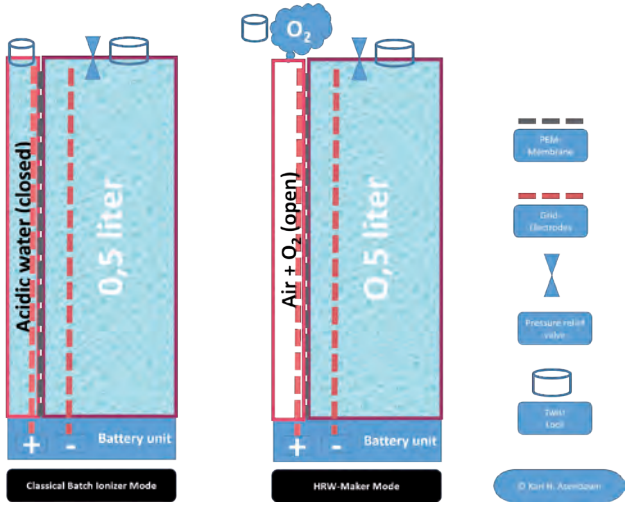
The ionizer being site specific

The short durability of alkaline activated water

All 3 problems were solved by the OXY-Hydrogen Generator presented on page 88. Yet the measured values compared to a stationary water ionizer are very modest, like comparing a moped with a Porsche.

I have been badgering the industry since 2014 to make a mobile water ionizer that is battery driven, with which all maximum values regarding hydrogen, pH value and mineral displacement can be reached. That this is possible I have already proven with prototypes. One can also produce H2/O2 water as well as anolyte and catholyte if required.

It would go like this:



bb. above: The AquaVolta® Everfresh is a portable batch ionizer with battery power supply from a USB voltage of about 5 V. With this voltage no ozone forms on the anode. The grid shaped anode is in direct contact with a Nafion® Proton-Exchange-Membrane. The grid shaped cathode is placed into a, for example 0,5 liter drinking water chamber. When the anode chamber, like the picture left, is filled with water, the device functions like a normal batch ionizer which produces alkaline and acidic water. If only the cathode chamber is filled, then the screw cap of the anode chamber is opened to allow the oxygen produced on the anode side to gas out. The cathode chamber is always filled to the brim, free of bubbles, to maximise hydrogen saturation. An overpressure valve serves as burst protection. The production can be made en route in 15 - 30 minutes. Before drinking one should switch the device on for 1 - 2 minutes. Ever fresh and just in time.

IS ALKALINE WATER NOW OUT OF FASHION?

The new designs of electrolysis cells featured on pages 85 - 93, which focus on the hydrogen content of activated water, in this case deliver very acceptable results. Nevertheless, none of these technologies delivers hydrogen oversaturated water like a classic water ionizer can.

For people who claim that their acidic-alkaline balance is in order, might this be quite an alternative. Also someone who from an alkaline diet or from taking effective food supplements gets enough alkaline working minerals would be well served with this addition.

In Germany is the longest tradition of the use of electrolyte waters. (See pages 64 - 66 and chapter Natterer). Its inventor Alfons Natterer, who developed 3 types (alkaline - neutral - acidic), offered his clients a simple test: drink the type that tastes the best to you. This will help you the most. The body usually knows, what is best for it. Some therapists use the —> sense of taste when drinking electrolyte water even as a diagnosis tool. With help of today's technology can all varieties of electrolyte water be made optimally available. I have no doubt that hydrogen is the most important health factor with potable electrolyte water. Yet there is no reason to believe that the alkaline components are unimportant.

I have worked for 12 years with the deceased Dr. Walter Irlacher in the Thermal Bath Bad Füssing. And I have dedicated this book to him. The Bad Füssing thermal water has a content of 510 ppb of hydrogen and is therefore the most hydrogen rich water source in the world, so far as this to date measured value known to few specialists is raised. No known source in Russia, America, the Far East that has been scientifically investigated, shows such a value and a correspondingly low ORP.

Why did Dr. Irlacher nevertheless decide in 2004 to give over thousands of his patients, as well as bathing in the healing thermal bath waters, 1.5 liters of alkaline activated water from a water ionizer to drink?

Because in contrast to the thermal water it is much more

alkaline and because he was convinced that over acidified patients would benefit the most from this! The continuous success proved him right and many therapists have followed him on this path.

But Dr. Irlacher did not only use alkaline activated water for deacidification. In the tradition of Manfred von Ardenne he proceeded with oxygen. For hydrogen and oxygen are the best remedy for excreting carbon dioxide out of the body, the strongest acidification factor. Therapy is always individual, this we should never forget.

Bad Füssing Spa (Bavaria). Dissolved Hydrogen Content 510 ppb/Micrograms/l. No other natural water has been reported to have a higher content of dissolved hydrogen. The pH value is almost neutral (7.4). ORP - 227 mV

Heinrich H asked me in this context: The U.S. researcher Tyler LeBaron writes that the content of dissolved hydrogen is the sole therapeutic advantage of activated water, even if "mildly alkaline water" from a water ionizer from the same drinking area as you, say between pH 8 and 9, is certainly recommended. If I am not too acidified, because I move a lot and am healthy and eat alkaline foods, why should I then buy a relatively expensive water ionizer and not one of the new electric Hydrogen Rich Water Makers, which are much cheaper and specifically geared to replenish the water with hydrogen gas?

Your question is understandable. But it is, first of all, not a question of price. Because good electric HRW Makers are nothing more than batch ionizers that, usually much smaller versions for small quantities, are much cheaper than the trendy HRW devices. If you must drink the water necessarily in the neutral pH range, because you don't want it alkaline, then just remove from a cheap batch ionizer the diaphragm and you then also produce the same HRW. Because batch ionizers work usually even faster with more power.

After 2007, since the state of research on the therapeutic benefits of HRW exploded, I would not contradict you and Prof. Le Baron, that HRW obtained by electrolysis without a diaphragm can be usefully applied and secured in many therapies.

The first effect complies with the 1937 medicinal product marketed by the German engineer Alfons Natterer. Hy-

dropuryl N, which he created in the middle chamber of a 3-chamber cell without a diaphragm membrane.

Only in the 60's was this neutral electrolytic water of the varieties Hydropuryl S (sour/acidic) and Hydopuryl A (alkaline = basic) pushed back. For the same effect can be achieved by back-mixing A and S. Therefore, for decades no 3-chamber cells are needed, and the 2-chamber system has prevailed.

You can create with each flow through water ionizer HRW, by bringing together the alkaline and the acidic outlet during filling. The yield of hydrogen and oxygen is much greater, because the electrolysis cells are trimmed to high performance. Such devices are of course more expensive, but also offer the advantage of a built-in pre-filter, which is recommended often for our tap water, especially if we want to ionize it for drinking.

An HRW Maker is a one-cell electrolysis device. The water is thus not only enriched with hydrogen from the cathode, but also with oxygen from the anode. With hydrogen we have a desired effect with therapists because of its antioxidant character. Oxygen on the other hand, is the opponent of hydrogen and thus oxidative, but the oxidation of hydrogen ($2H_2O$) is not immediate, and happens with detours, so that both gases remain reasonably stable and separated in the water and do not react to water.

Still, after 14 hours even with multiple HRW production is everything over, as you can see in my readings below in a HRW device called SUSOSU Plus (Identical to Arui Hendy) with Munich tap water.

By pressing the button 1 time, a 3-minute electrolysis process occurs in which one sees both oxygen and hydrogen bubbles rising. In addition to pH and ORP I have the TDS value, the conductive particles measured in ppm. This device also has a small ring filled with minerals, the use of which worsened the result. It is intended mainly for very soft water, as it prevails in Japan and Korea, so in these parts of the world does not count for much.

So what could now be said of such a product? Oxygen has a slight flavor enhancing effect. Everyone who has tried swirled or levitated water knows this because a water vortex is nothing more than an ORW-Maker (Oxygen Rich Water) by swirling oxygen from the air. But swirlers usually have no powerful prefilter and if at all, they are mounted before the swirler, which really is not recommended with our polluted and often germ-laden air. Therefore, an HRW Maker, which is filled with filtered water, is definitely preferable, in my opinion, to a swirler. Incidentally, they also increase the ORP by catapulting hydrogen and carbon dioxide and simultaneously mixing in oxygen. With the loss of carbon dioxide the water does become slightly alkaline. This also happens in a HRW device, because here during electrolysis carbon dioxide is expelled. Also activated water that is mixed back from a batch or flow through ionizer is usually slightly more alkaline than the tap water.

By pressing 8 times, i.e. 24 minutes production time you get 779 micrograms. This value no longer increases with 60 Minutes Production time (20 x 3 min) or 75 minutes (25 x 3 min). The maximum point in the water used settles at 828 micrograms / l. This is slightly more than half of the highest amount with this kind of water with a diaphragm – ionizer measured by myself with a maximum value of 1577 micrograms / liter. So you need to drink about twice the amount of water in order to benefit from the same amount of hydrogen as with this Susosu HRW device. That's basically not bad, because you are supposed to drink a lot of activated water, instead of the usual strong oxygen and carbon dioxide-rich everyday drinks. But who likes to drink water constantly! I therefore think the alkaline water from a diaphragm – ionizer is significantly better than the water from a HRW device.

What is the reason for that? The explanation is, in my view, from the counter effect of oxygen and hydrogen in a non-diaphragm electrolysis separated redox process between the simultaneously produced hydrogen and oxygen. This has not yet been fully explained for electro activated water. Nevertheless, the basis of an explanation is simple and over 200 years old, in the research guessed already by the founders of electrochemistry Alessandro Volta and Johann Wilhelm Ritter and the ingenious discoverer of electrical activation of water; Alfons Natterer. The great chemist Nernst, with his seemingly all-explaining pH / redox potential equation had only viewed the substances dissolved in water, but not the water itself that gets new properties through the process of diaphragm electrolysis. Only Vitold Bakhir in the 1970's had perceived this, but was not able to explain it.

Water molecules are known to consist of two hydrogen atoms and one oxygen atom. These are in a mutual redox equilibrium, which can be expressed in millivolts and is in a specific dependence of the pH value.

If now, the same as with water electrolysis without a diaphragm, oxygen and hydrogen gases out of the water, the redox equilibrium changes, depending on which gas leaves the water faster. This in turn entirely depends on the complete composition of the tap water, how much of these two and other gases were already dissolved in the water prior to electrolysis.

Described on the penultimate page are the SUSOSU measurement examples which show that a 3 minute electrolysis showed the lowest redox potential. It has thus achieved at this stage more dissolved hydrogen in water than oxygen. This ratio then changed at the 7 x 3 = 21 minute long electrolysis, because the redox potential rose again. After 14 hours the water was back, approximately equally balanced between oxygen and hydrogen, like before electrolysis.

In diaphragm electrolysis, oxygen is removed from the cathode water, whilst it accumulates only in the anode water. The hydrogen in the cathode water, however, has no redox partner and the water gets a very low redox potential.

So when it comes to actually producing hydrogen rich water, diaphragm electrolysis is fundamentally superior. Abundance of hydrogen is like someone going shopping with a lot of money: You do not know if the buyer pays for everything with a credit card or whether that person really is so rich. The fact is that you can also buy sensible things on credit.

In this sense, the hydrogen produced in a HRW Maker by single electrolysis makes sense, just as more than 500 serious studies with such water show. You can find clear and up to date information on the website: http://www.molecularhydrogenfoundation.org/

Of course, no one will want to give up, if like me you have been drinking alkaline activated water for 11 years at pH 9.5.

As soon as with ca. 45 years, for unknown reasons, the alkaline buffer of bicarbonate in human blood tilts, I stand by Dr. Walter Irlacher: With age and lifestyle come the spa and hyperacidity diseases. His concept of de-acidification we have presented together in the Service Manual for Humans since 2006 scientifically and hitherto have been unchallenged by tens of thousands of readers and patients. I am still completely convinced: oxygen does not belong in the water, but in the lungs and into the blood.

And a maximum of saturated hydrogen-rich water possible should pass through your digestive system. That's why we should drink it.

What is the role of hydrogen in our body? It is just the basic currency of all energy processes in the body. In his Nobel Prize acceptance speech in 1937, Albert Szént-Györgyi expressed it like this: "Our body really knows only one fuel, hydrogen. Our food, carbohydrates, is basically only a hydrogen package ... and the main event during its combustion is the elimination of hydrogen." Simple and no better way to express it. Chemically, it is very complex.

Back to your question: I admit that what I eat is not always healthy and I am doing too little exercise. For this I argue with the usual acidity diseases such as diabetes, allergies and cancer for supremacy in my body.

But for all-round healthy people, who are actually not too acidic, I see in HRW water already as an alternative to get away from the really over acidified drinks and waters.

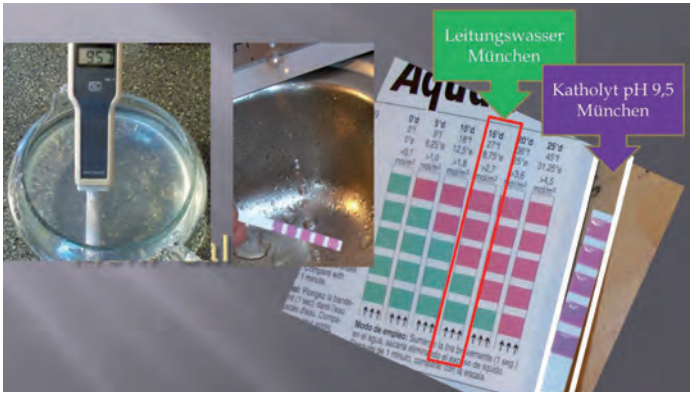
Because even switching from soda to plain tap water reduces the acid load in the body more than any change of a diversified diet to vegetarian. This is even more the case when you change to very slightly alkaline HRW, if you do not need to jump to the right alkaline activated water.

Although it is only half the effect in the alkaline area. Anyway, better than the cascade of acidosis syndromes to acidification disasters – like the uninformed others – to slide further into an age of suffering and disease. I myself was on this path, until I started to think more thoroughly.

UPTAKE OF ALKALINE ELECTROLYZED WATER

In a classical diaphragm water ionizer also some mineral ions can pass the diaphragm, e.g. calcium. If we ionize 2 liters of water we get the dissolved calcium of 2 liters into one liter of alkaline electrolyzed water. Or better said most of it, about 60 % - 80 % depending on some other water parameters.

The increase and decrease of anions and cations when passing the membrane can be determined within a second by using a test strip. For example, the migration of Calcium-Ions during electrolysis can be determined by Aquadur® strips:

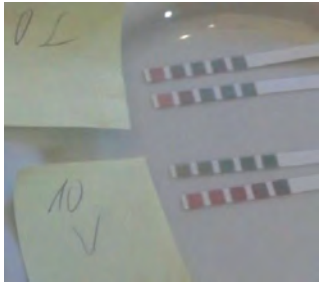


Above: Tap water Munich (green). Electrolyzed alkaline tap water Munich (purple). So the content of $CaCO_3$ increased from > 2,7 mmol/m³ to > 4,5 mmol/m³.

Another example is a test with Volvic® mineral water which has basically a very low calcium content.

Another example is a test with Volvic® mineral water which has basically a very low calcium content.

Only one indicator is colored red. I took samples from the alkaline and the acidic compartment of a batch water Ionizer. Before electrolysis (above) both strips show only one colored field. After 10 minutes of electrolysis the sample from the acidic compartment shows no red discoloration. It has obviously lost its content of $CaCO_3$. But the sample from the alkaline compartment shows 3 red indicator fields. So it contains > 2.7 mmol/m³ $CaCO_3$. In my eyes this is a proof that during diaphragm electrolysis at least the ions of calcium migrate through the membrane and enrich the activated alkaline water.



Above: Testing Volvic^C mineral water after 0 minutes and 10 minutes electrolysis in a batch ionizer (Aquaphaser®) using Aquadur® strips.

Also the migration of Cl^- and Nitrate Anion can be easily detected from the cathode to the anode compartment by simple test strips.

Alkaline electrolyzed water is always much higher in hardness than the original tap water was and acidic electrolyzed water is much lower in hardness! Of course, almost any tap water contains calcium ions which can pass the membrane from the anodic compartment to the cathodic compartment. I have illustrated this on page 26 of this book.

This is very important to illustrate, that the health benefit of drinking electrolyzed alkaline water is not only based on its content of dissolved hydrogen, although this might be the most important.

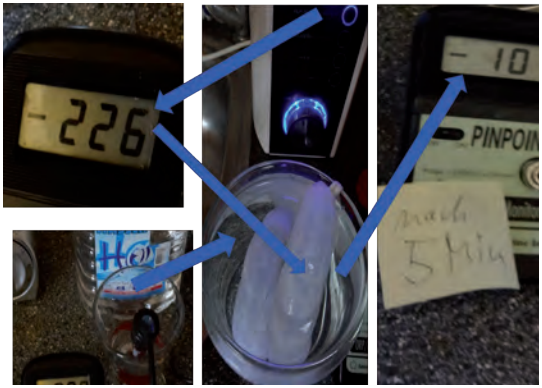
Concerning the alkaline drinking effect, here is another test. I took a Weisswurst (Veal sausage) intestine, which is from a sheep. I poured in electrolyzed Munich tap water with a negative Oxidation Reduction Potential (ORP) of minus 286 mV (CSE) and a pH 9.5. I placed it in a physiological saline solution, the well-known blood replacement, which was pH neutral and with a Redox potential of +194 mV was a little bit oxidant. All Aquadur® indicators remained green.

The transfer occurred in 5 minutes. Afterwards we had a significant absorption of CaCo3 in our saline blood model (3 red indicators). In the saline solution only sodium chloride is present. That is why the test strips for water's total hardness remain green in the salt solution. But the electro activated alkaline water in the sausage was full of calcium and the test strips showed red in all 5 fields. Yet half of this has travelled in this short time through the intestine.

This is all I have to say to the annoying jargon on the internet that dissolved calcium in water, because it is inorganic, cannot be absorbed from water by the blood. You see the facts. I always get a fit when I hear such things.

Now let's look for the mechanism behind all this! Again, we will take the Weisswurst (Veal sausage) intestine, pour in ionized Munich tap water from a water ionizer with a negative Oxidation Reduction Potential (ORP) of minus 226 mV (CSE) at 9.5 pH value. The electro activated water sausage from Munich will be placed for 5 minutes in deionized reverse osmosis water with a neutral Redox Potential of zero (0 mV.) This water has no energy. Yet, within 5 minutes, half of the

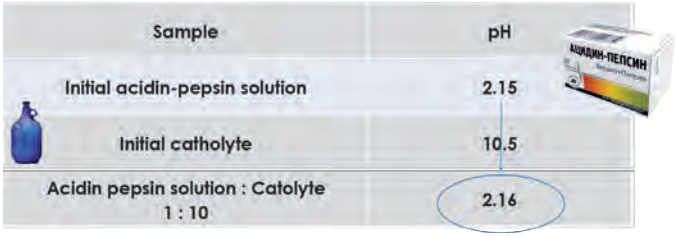
voltage of the electrically activated water sausage has been transferred and the reverse-osmosis-water outside has now an ORP of (-)107 mV (CSE).



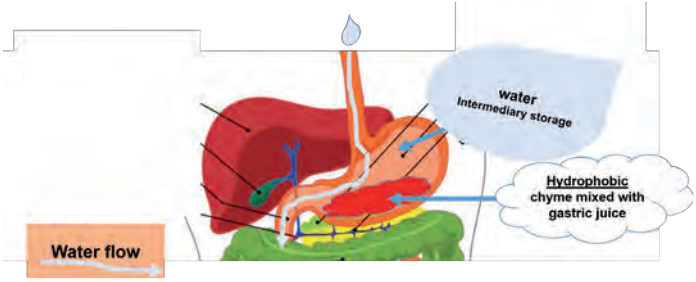
The decrease of the ORP to a balance between the outside and inside of the intestine is caused by the migrating hydrogen gas that can pass the intestine easily. Many examples for these transfer possibilities you can read on pages 45 - 57 of this book.

UPTAKE IN THE STOMACH

Does alkaline electrolyzed water disturb the natural acidity of the stomach? No, it does not. Prilutsky and Bakhir tested it in a model with an Acidin-Pepsin solution, which is similar to gastric juice. There was almost no change in acidity.



Also, water normally does not mix with the hydrophobic chyme in the stomach and slides above it to the intestine.



There is no reason not to drink alkaline water when eating.

UPTAKE IN THE BLOOD

Some sellers of water ionizers still believe in the micro cluster-myth. They call alkaline ionized water „structured" or even „hexagonal water". Small clusters would make this water better hydrating and other scientific nonsense.

The nature of water, if it is liquid and not frozen, is its quick ability to change its structure. So if you would have micro-clustered water during one fraction of a second, the next fraction of the same second it would have changed to another structure.

Anyway, it is clear that the frame of structures water can fill always depends on its content of solutes as well as on the type and pressure of the water surface.

If molecular hydrogen is dissolved (dispersed) in water, it changes its electrical behavior and shows an extraordinarily low Oxidation Reduction Potential (ORP). It will be even much lower than the ORP of human blood, which is about - 50 mV (CSE). So it seems to be plausible that this kind of water can be more easily absorbed by the blood than normal tap water with an ORP up to + 500 mV (CSE). But no one has so far yielded for proof that it is so.

What seems to be sure is the phenomenon that alkaline electrolyzed water hydrates the body quicker than other kinds of water.

It is often quoted that the alkaline character of the low alkaline pH value of blood, with about 7,4 serves better than most acidic mineral waters or other drinks. (See chart p. 13)

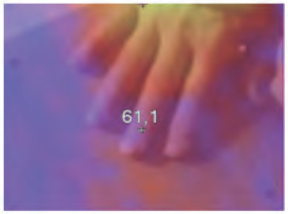
It illustrates the following trial:

The temperature of the fingertips is a very sensitive indicator for the blood flow. If it becomes slower due to thickening of the blood because of lack of water, the fingers get cold. This can be observed from the outside with a thermography camera.

In our trial a person drank at 10 am 1 liter of water. The trial person did not eat or drink anything beforehand.

On the first trial day the trial person drank Gerolsteiner mineral water. This water from the Vulkaneiffel district counts as one of the best mineral waters in the world and has a very high mineral content. 652 mg/l hydrogen carbonate, 140 mg/l calcium and 49 mg/l magnesium.

The drinking of this water provided within 41 minutes 50 seconds to a higher blood circulation with a temperature increase of 3.7 degrees Fahrenheit.

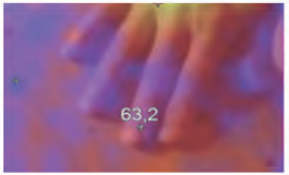


Ausgangstemperatur
61,1° Fahrenheit

Getränk:
1 Liter stilles MIneralwasser

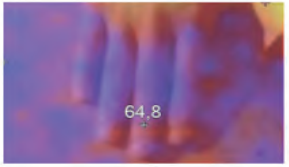
Zeitdifferenz
(Minuten:Sek)
5:19

Temperatur zunahme
(Grad Fahrenheit)
0,7



Zeitdifferenz
(Minuten:Sek)
17:54

Temperatur zunahme
(Grad Fahrenheit)
2,1



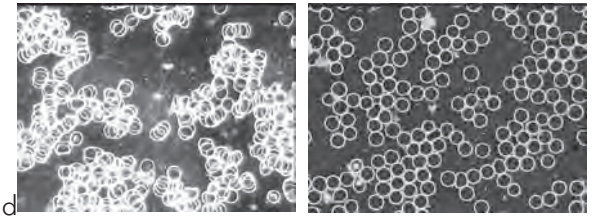
Zeitdifferenz
(Minuten:Sek)
41:50
Temperatur zunahme
(Grad Fahrenheit)
3,7

Above is the result with a mineral water „Gerolsteiner Naturell".

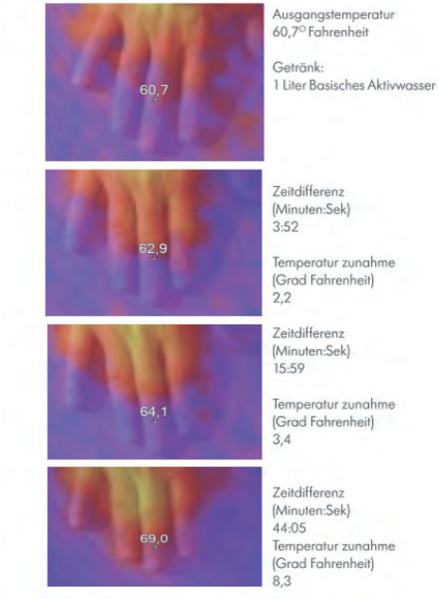
The control trial the next day proceeded with alkaline activated water from a water ionizer, the following parameters show: pH 9.52. ORP (-) 236 mV (CSE). The temperature increase within 44 minutes 05 seconds after drinking 1 liter was at 8.3 degrees Fahrenheit and was at 224% higher than the results from the previous day.

This pilot trial also shows that alkaline activated water can improve significantly the flowability of the blood. This comparison should also be carried out with other drinks that claim that they hydrate well.

Theoretically, the relaxing effect resulting from hydration with subsequent expansion of the blood vessels in the fingertips could also be responsible for the temperature increase. Yet hundreds of before and after blood analyses by Dr. Irlacher indicate that drinking alkaline activated water causes a better fluidity saturation of the blood. So the possible relaxing effect should, at most, be seen as secondary.

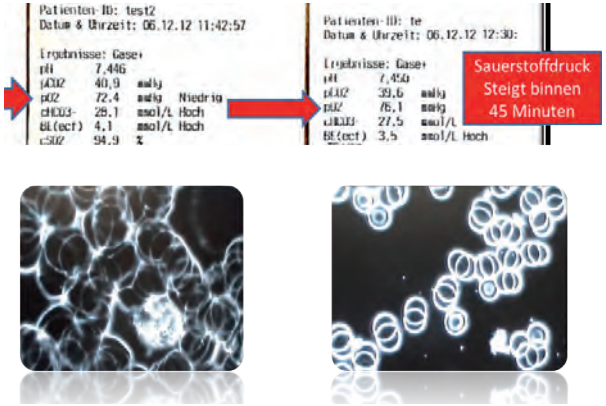
d 

Below is the result with electrolyzed alkaline water pH 9.52, (ORP – 236 mV). Measurements were done before drinking before and afterwards. The result: after about 40 minutes the temperature increased with mineral water 3.7 degrees, with electrolyzed alkaline water 8,3 degrees Fahrenheit. So flow ability of blood can be improved more by drinking electrolyzed alkaline water.



If more blood flows to the extremities, the oxygen partial pressure (pO_2) will increase like in the following example.

OXYGEN INCREASE



Above: : Increase of pO2 within 45 minutes after drinking 1 liter of alkaline electrolyzed water from 72,4 mmHg to 76,1 mmHG.

Photos: Blood flow in a microscope at the beginning (left) was very bad. 45 minutes after drinking (right) much better. Data and photos by Dr. Walter Irlacher

This is a very useful effect for all kinds of circulatory disorders therapies, like problems with coronary arteries, memory disorders, intermittent claudication, tinnitus or blurred vision. It works fast and without any pharmaceutical help. That may be the reason why alkaline electrolyzed water is sometimes named an „aquazeutical".

BLOOD BUFFER

Rolf G. asked me: *My doctor told me after a blood gas analysis, my blood buffer would be perfectly fine, I was not in the slightest over acidic and would not need to drink alkaline water.*

I answered: Then your doctor probably measured your standard content of bicarbonate in the blood, which should be for a man from 22.5 to 26.9 mmol / L. Bicarbonate or hydrogen carbonate, HCO3 is the most important buffer to maintain the pH level of the blood. If the measured value is below standard, the doctor would certainly not give you alkaline water to drink, but a blood buffer solution as an intravenous drip to stabilize acidosis.

Alkaline activated water is not drunk in order to combat an already present acidosis in the blood, it would not be buffered strongly enough, even if it were made of very mineral rich water. After all, an adult has about 5 liters of blood in circulation – if these 5 liters were acidic, you would need to drink a tremendous amount to correct that. Alkaline activated water you drink best with a "subclinical" acidosis, so before serious incidents occur.

The alkaline characteristic of alkaline activated water is used, with a phrase coined by Dr. Walter Irlacher, as a "Perpetuum Mobile for deacidification". He means of course, only in a figurative sense. The many bases in the water when consumed regularly, especially in the tissue fluid, ensure that no acidification can build up which is in the end strong enough to acidify 5 liters of blood. As an emergency medicine for hyperacidity is alkaline activated water unsuitable. Yet it is the ideal replacement for acidic beverages.

Especially with high standard bicarbonate values one should check whether perhaps there is a chronic tissue hyperacidity. Sometimes the blood "hoards" buffer substances in order to be prepared for strong acid attacks, such as extreme binge drinking.

Interesting for your doctor may be to do a comparative blood gas analysis before and 45 minutes after drinking 1 liter of alkaline activated water. In my experience, this improves regularly some core values which your doctor can see in the example above. Perhaps this will convince your doctor of the effect and recommends this to one or the other patient, which more and more doctors do worldwide.

DE-ACIDIFYING

Andrea W. asked me: *When I told my doctor that I now take alkaline activated water against my hyperacidity, he literally laughed at me. If I was too acidic, he would long ago have admitted me to hospital, and with water one cannot de-acidify at all, since it is not buffered, so water ionizers are completely worthless and just used for profiteering. Now I'm totally confused.*

Andrea W. asked me: When I told my doctor that I now take alkaline activated water against my hyperacidity, he literally laughed at me. If I was too acidic, he would long ago have admitted me to hospital, and with water one cannot de-acidify at all, since it is not buffered, so water ionizers are completely worthless and just used for profiteering. Now I'm totally confused.

Even doctors do not always agree. When Dr. Walter Irlacher in the book: "Service Manual for People" calls alkaline activated water as the "Perpetuum Mobile for de-acidification", he wanted to surely not call for its use in emergency medicine for acute acidosis, meaning if 5 liters of blood in the body are already so acidic that it cannot carry enough oxygen.

In such a case, highly buffered alkaline solutions must be introduced directly into the blood cycle. Above all, the emergency patients will get to breathe pure oxygen. There, alkaline activated water would be far too late and could not be administered in required amounts in order to level several liters of blood out of hyperacidity.

Even in conventional medicine one distinguishes different types of acidity (acidosis) as acute, chronic, metabolic and respiratory. Also, the location of acidosis (blood, lymph, saliva, urine, cells ...) plays a role in their medical judgment. In the stomach no reasonable person would speak of acidosis at very low pH levels, but many complain of an "over acidified stomach", which in reality is perceived as gastric juice being pressed up into the esophagus which is not adapted to withstand such strong acids. This is often done by fermentation processes with flatulence in the intestine or in pregnancies that lead to an elevated diaphragm which thus pushes the stomach upward.

Now we come to the buffer argument, which you will always find in articles that position themselves against alkaline activated water. It is always repeated that water is an unbuffered substance which every chemist knows.

This ignores that, unlike pure water which the chemists talk about, alkaline activated water is highly buffered. It not only contains a high number of free OH – ions corresponding to its pH level, but also even compared to the original tap water, a significantly increased number of cations, i.e.: minerals which can form alkali, in short, buffer substances.

You can definitely agree with your doctor that the lung is by far the most important de-acidification organ of humans,

which is why respiratory failure leads to death by acidosis within a few minutes. In the documentary "Drink Yourself Alkaline" we demonstrate how 0.2 liters of alkaline activated water with pH 9.5 for a full minute buffers the acid load of the air exhaled by an adult man.

Maybe your doctor can hold his breath for a full minute to break down carbon dioxide in the body. But if he is not a trained diver, he will breath out as soon as possible so as not to lose consciousness. The buffer capacity of alkaline activated water is by no means as low as that of chemically pure water or water from a reverse osmosis system!

When mineralized water is alkaline, one can unequivocally assume that it can also neutralize acids. However, the pH value is a pure ratio value. One can nicely illustrate in a car race, where two vehicles of the same design and horsepower, driving in the opposite direction on a circular racetrack cruise at full speed. At first you will meet always in the same place. But at some point one of the cars will stop, namely the one with a lower tank capacity. Until the tank is empty, the vehicles are traveling at the same speed. A 0.2 liter glass of alkaline activated water is a small tank for over 5 liters of blood in the body. After 1 minute, it is empty, as we have seen. So for example, to neutralize a glass of coke with pH 2.5, you need 15-30 glasses of alkaline activated water with a pH 9.5. It depends on how many mineral buffers the activated water contains. Adding calcium to soft water increases the buffering of activated water, something which already occurs in modern water ionizers mostly from the filters.

For example, stomach acid is strongly buffered and a glass of alkaline activated water with pH 9.5 would hardly influences this. Nevertheless, many advertising messages place the "alkaline force" of activated water in the foreground, which compared to other effects is only secondary.

You cannot also de-acidify your body by suppressing an acid production pharmacologically: Just as the lung regulates the blood pH, each organ system has its own pH window. If the proton pump produces hydrochloric acid (HCl) from common salt (NaCl) and water for the acidic gastric juice, at the other end alkaline bicarbonate is transferred to the pancreas and blood. If I take a proton pump inhibitor, I therefore block the production of alkaline pancreatic secretions, especially after prolonged use. If you were to take sodium bicarbonate, there is an acidic-rebound effect, i.e.:

the stomach buffers the invasive sodium bicarbonate in the wrong place with an increased acid production whilst simultaneously the pancreas increases its own production of sodium bicarbonate. This can eventually lead to total exhaustion of both organs.

DETOXIFYING

Daniela G. asked me: I read in Dietmar Ferger's book "Jungbrunnenwasser" (Fountain of Youth Water) that it is not recommended "to drink alkaline activated water at the beginning of a pregnancy, as it can possibly lead to acid surges in the body from the detoxification effect which can harm the fetus". On the other hand, it is "ideal if a pregnant woman begins at least 6 months before her pregnancy to drink alkaline activated water for the health of the adolescent fetus".

Again and again alkaline activated water is brought in connection with the subject of detoxifying. There, however, this connection should not be made and you should not be surprised if experts shake their heads at alkaline activated water, to which such absurd effects are attributed.

Dietmar Ferger is an author who has written a long time about activated water. Next to Dr. Walter Irlacher and myself is he a coauthor of the first edition of the 2008 published book "Drink Yourself Alkaline". The there worded statements I can sign today. On this issue however, I have a different opinion.

Many websites and books falsely claim that toxins can be flushed out by bases as well as acids. But, for example highly toxic heavy metals are even so called base builders. They can by no means be released with the help of alkali, but rather require special acids, so-called chelating agents such as EDTA or DMPS, which make heavy metals soluble in water and can be excreted in urine.

Alkaline water can, with the scope of its mineral buffering – deacidify. It cannot detoxify in the toxicological sense, unless there are poisons that are acidic in nature. These would be everyday toxins such as alcohol, nicotine and caffeine. The subject detoxification is nowadays a playground on the Internet for amateurs who cannot distinguish a poisoning from acidosis and recommend deacidification agents for detoxification.

Mercury, one of the worst poisons lurking in amalgam dental fillings, slowly seeps out as a cation through acidic saliva and acidic foods. Amalgam also passes through the air, due to smoking and by improper drilling out of amalgam fillings through the intestines and the olfactory nerve to the brain.

Toxicology is a clear matter in medicine. That within this field charlatans can romp around is because very few people are actually poisoned, it is only suggested to them. Such "imaginary invalids" are also very easy to detoxify, if they take a cat's claw remedy, administer electric shocks or they can swallow anything magical.

Particularly popular is bio-resonance therapy or the kinesiological box of tricks with which you can apparently document every kind of healing, especially with burdens which by the same method were used before to convince the patient of being ill.

The widespread internet claims about the detoxification effect of chlorella algae are well known to me. I wonder why a living being that – like us, unfortunately – absorbs heavy metals, should also do this with a powdered preserve?

Is there not rather a risk that it is contaminated precisely because it also absorbs?

Heavy metals after the uptake phase are stored in target organs and play a very minor part in the metabolism. Even in hair are heavy metals stored.

The elimination there is so low that the half-life of the expulsion takes decades. I am not familiar with an investigation in which a hair analysis or a tissue sample from target organs would have improved the alleged detoxification effect by taking algae preparations or other oral agents.

About Hulda Clark's methods of detoxification: Her basic theses of parasitism in her thick books are more than questionable. Dr. W. Irlacher does per year more than 1,000 vital blood tests and finds more than 30-40 with parasite infections, as shown below. Mrs. Clark claims the fact that almost everyone is affected. I think that is targeted scaremongering.

Nevertheless, we continue to find numerous "detoxification testimonials" in the reports of active water drinkers, which in my opinion materialized because the producers of water ionizers in their manuals suggest these as potential reactions (placebo effect).

Parasite infection of a blood cell. Photo. Dr. med. Walter Irlacher

An example of such a reaction: "It looks as if an extreme detox started, even more strongly than I have experienced it when I switched to raw food years ago." Obviously alkaline activated water has a certain "raw food" effect, because it rejuvenates aged or denatured foods.

This is not a detoxifying effect in the true sense, but the experience of converting to, because of hydrogen, an electron rich and alkaline rich intake which a water dispenser causes: Those who deacidify and energize can cope much more easily with a detoxification!

Ferger's statement "that this can lead to acid flooding" when drinking alkaline activated water is likely to be more of an advertising ploy in favor of water ionizers. From the technical perspective it is in fact illogical: How should an alkaline trigger an acid tide? An alkaline can always mobilize only as many acids as it can neutralize.

Due to the low buffering of alkaline activated water no alkaline flooding in the body is to be expected, even if – what is not to be expected – all acids were neutralized, which is impossible.

Now to the strange statement that one should not start by drinking alkaline activated water during pregnancy: It is known and evident that pregnant women with the additional metabolism of the fetus have a significantly higher acid load than non-pregnant women. Finally, the acid residues of two organ systems must be discharged by a single disposal system. That is why it can be very useful in my opinion, even during pregnancy to begin drinking alkaline activated water. Of course, also applied here is the Drinking Water Ordinance with a maximum pH value of 9.5 (in some countries, pH 9) as the measure of all things, which should also apply during a pregnancy.

It can be assumed that the electron excess of the alkaline activated water affects more positively than negatively pregnant women and fetuses. Most other drinks are oxidative and may increase in pregnant women the already existing oxidative stress.

What I can report from my own experiments is a transfer of a negative redox potential, so antioxidant hydrogen, after birth to the mother's milk. I measured breastmilk with values between -5 mV and -70 mV. When I gave a breastfeeding mother 2 liters of alkaline activated water (pH 9.5, ORP -280 mV), the negative redox potential of her breastmilk doubled within 24 hours. More electrons for the baby!

By storing breast milk in a breast pump it loses its negative redox potential. After keeping it for about 12 hours it has the same values as baby milk powder and becomes oxidative.

Baby milk powder can have almost the same values as high quality breast milk if mixed with fresh, alkaline activated water. Read more under the heading: milk.

In terms of food quality, according to Prof. Hoffmann this could be interpreted as improving product quality. Because of my small database, these tests would have to be reviewed

by a university research institute for the methodology and reproducibility and I would, at most, currently voice a private recommendation.

FASTING

Hildgard F.-K. asked me: *I want two weeks of fasting for purification. As well as alkaline water should I also take Glauber's salt or any dietary supplement?*

You should check with the doctor or therapist who monitors your fasting period. Only he or she can tell you whether laxatives such as Glauber's salt or food supplements are useful for you, if you want to detoxify. I can only give you general advice here.

The term "detox" is a broad term used by experts which can be quite probably controversial. Some mean a colon cleansing, others include, for example, a hemodialysis as a dialysis, others even consider it esoteric nonsense (See https://en.wikipedia.org/wiki/Detoxification_(alternative_medicine)).

The fasting Doctor Buchinger introduced the term whilst fasting. He probably came into connection with alkaline activated water with Dietmar Fergers translation of Sang Whangs book "Reverse Aging", in German "Der Weg zurück in die Jugend". Ferger translates the term "acidic waste" to "acidic slags".

In our joint book "Drink Yourself Alkaline" (with to Eng. Dietmar Ferger and co-author Dr. Walter Irlacher) we have in the chapter "From acidosis to slagging" coined the term "Deacidification waste" which to me still appears to be the best term because Whang's term "acidic waste" actually doesn't

means acid, but a more or less a neutral salt which is an acid that has arisen from a buffered alkaline. However, we also expect a uric acid crystal which has arisen from a mineral buffering of uric acid, or an atherosclerotic plaque in which amino acids and fatty acids have combined with calcium to form a solid structure this also belongs to de-acidification waste. Even stone formations such as kidney, bladder, gall bladder or fecal stones can be expected depending on their composition for this de-acidification waste.

Following the lack of food intake during fasting, the low sugar supplies of the liver are rapidly depleted. After that, necessary calories for the functioning of the body are obtained by from combusting body substance, i.e.: from muscles and the fat supply. As early as the second day of fasting is fat combustion outweighed.

By abundant drinking of alkaline activated water is the degradation of acids generally supported. We have documented in "Drink Yourself Alkaline" why there are fewer "fasting crises".

If you have generated with Glauber's salt, enemas and similar procedures an artificial diarrhea, you have probably lost not only a lot of water, but also a large part of your friendly roommate in the intestine. Since these "good" bacteria of the colon appreciate a low redox potential, is the drinking of alkaline activated water along with a balanced intestinal flora an excellent starting point for their resettlement and the development of a healthy immune system. At least in my laboratory experiments these cheap, intestinal Omniflora cultures grew in alkaline activated water much faster than in normal tap water. If these thereby survive the passage through the stomach better, is still to be researched.

INTESTINAL CLEANSING

Sigrun F. asked me: *Should anyone use alkaline activated water for intestinal cleansing (enemas) as well?*

With respect to the redox potential in the colon, there is a Russian research paper (Vorobjeva, N., Selective stimulation of the growth of anaerobic microflora in the human intestinal tract by electrolyzed reduced water, Med Hyp 2005. 64 (3), pp 543-546), an indication that anaerobic intestinal bacteria multiply only in a potential window from -97 to -197 mV ORP. In an imbalance of the colon bacteria (too many aerobes), alkaline activated water is recommended, to drink for sure. This seems even more practical, because with a direct introduction into the colon as with a Colon-Hydromat, it is likely that only alkaline activated water with a Redox value between -97 and -197 mV will be used. The precise control of these values is likely to be as difficult as the heating process of the water, since the customary colonic hydromats do not have the redox potential friendly heating options.

Most studies deal with the positive effect of drinking alkaline activated water on bowel functioning. There is also a Russian therapy program for the treatment of ulcerative colitis using alkaline activated water (Prilutsky / Bakhir. P.123).

Intestinal cleansing affects the environment of the colon, which at the end is always still alkaline. Upon entering the large intestine, the stool has an average pH of 5.5, so still acidic. In "advanced" countries the stool reaches then in the rectum even values just above pH 7 (average pH 6.5). Here are measurement examples from my laboratory:

Stool from (human meat eaters): pH 7.16

Stool from (human vegetarians): pH 6.45

Stool from (human omnivores with 4 Actimel® Probiotica): pH 6.30

For what reason should the intestinal cleansing with alkaline activated water cause the pH environment in the entire colon to rise? A premature increase of the pH value in the colon passage promotes the growth of undesirable spoilage bacteria, particularly in meat-eaters. Whose growth is effectively inhibited by the presence of acidifying Bifidobacterium. Therefore, I also dissuade from enemas with alkaline water. Water for the intestinal cleansing should be neutral in my opinion, in order to not disturb the delicate environment of the bacteria.

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In our book "Service Handbuch Mensch" Dr. Irlacher and I consider the "Bad Füssinger Darmzottenbad" as the best method for bowel cleansing. Rinsing and cleansing is carried out with neutral water and oxygen. The oxygen disables the anaerobic decay of bacteria most effectively. Alkaline activated water is drunk, which comes through the small intestine and not from the rectum like with an enema. With these favourable redox conditions you create a balanced germ mix, optimal for living and multiplying. To the delight of the immune system!

CANCER

Lydia O. asked me: *In your "Service Handbuch Mensch" book you wrote, that you have been diagnosed with cancer at the age of 45. That was 14 years ago. Has the alkaline activated water let you survive?*

Maybe. But my doctor wouldn't have agreed on that, even though the measurable cancer test results have been diminishing continuously and apart from drinking alkaline activated water, I didn't allow any other therapeutic methods. He also said:" There are no healthy people – most just weren't properly checked up!" Because everyone gets cancer constantly since body cells permanently degenerate. The question however is, how much can our immune system keep in check? And its capability seems enough for me. It is for sure however that the often mentioned Warburg hypothesis on growing cancer cells cannot spread in an alkaline environment is wrong, since the tumor can protect itself with specific enzymes. Therefore I consequently refuse to support any thesis on fighting cancer with alkaline activated water, also if only used for prophylaxis. At least when the cancer, like in most cases of a cancer diagnosis, has afflicted the cells in a non-irreversible measure.

In the book "Trink dich basisch", we therefore refused to include healing reports and wrote that alkaline activated water can be a grain against cancer but only many grains together can build a castle.

It is well known that in some Japanese cancer clinics patients get to drink alkaline activated water as part of a conventional medical treatment. Prof. S. Shirahata spoke in an interview on WDR of even drinking 4-6 liters daily. One reason might be that after a radiological or chemotherapeutical treatment of Prof. Shirahata, firstly proven "radical catcher functions" of alkaline activated water seemed highly welcomed by doctors.

On the other hand one of the discoveries of the Russian activated water research was that alkaline activated water could act as radiation protection. Its application could be therefore downright counterproductive in radiation therapy. Doctor and patient here should always work and agree on closely together.

In the book "Ionisiertes Wasser" by Dina Aschbach, tumor-inhibiting attributes of alkaline activated water have been shown in an animal study.

Prof. Ashot Kathatryan Papikovich developed a special cancer treatment plan with activated water (Source: http://eng.ikar.udm.ru/sb/sb43-3e.htm, there you can also find images). Treatment progresses of breast –and skin cancer in the third and fourth stages with metastases were presented here photographically. Accordingly, the therapy lasted 24 days and worked with catholyte and anolyte with a specific pH and ORP.

These activated liquids can be drunk, given as an enema for intestinal cleansing with repopulation of bacteria and as infusions. Alkaline water mixed with oxygen will be drunk. There are baths in acidic and alkaline active water as well as covers with anolyte and catholyte. Short-term improvements are clearly visible on the pictures; however, medium –and long-term improvements or even cures with final images do not exist according to the best of my belief.

D. Aschbach confirmed in her book (Ionisiertes Wasser, Hochheim 2010, p171) at least the reproducibility of this method. This book is now only available second hand in Germany.

V. Prilutsky and V. Bakhir (a. a. O. p112) reported of cancer treatment trials by the Russian inventor D. I. Krotov, which starts for the first three days with a "shock dose" of highly oxidative activated water (anolyte) and then followed by a drinking period of highly antioxidant activated water (catholyte). So far, I couldn't identify any information about the success of this treatment.

During a Korean animal experiment with skin cancer infected mice, it showed that mice that were given alkaline activated water had a reduced tumor growth and lived significantly longer. The effect is based on the radical catcher ability of alkaline activated water (Lee, K-J., u.a. Anticancer Effect of alkaline reduced water. Source: http://www.jungbrunnen-wasser.de/index.php/studie-anti-krebs-wirkung/).

There are also examples of cancer infected animals: Animals

soaked in alkaline activated water always have smaller tumors than the control groups soaked in tap water (links from pictures originating from YouTube videos on the photos).

soaked in alkaline activated water always have smaller tumours than the control groups soaked in tap water (links from pictures originating from Youtube videos on the photos).

However, I have never seen the disappearance of a tumor in one of those animals documented. The same applies for cancer treatments in humans. There are quite impressive evidences on tumor inhibition, but no evidence of a curative effect on cancer.

Sanetaka Shirahata and others found out in a basic research study (Telomere Shortening in Cancer Cells by electrolyzed reduced water, Springerverlag 1998) that alkaline activated water can shorten the chromosomes and thus the lifespan of tumour cells significantly. This would be a possible explanation for an anti-cancer effect; but this is just basic research and still far away from actual cancer therapy.

ROLE OF CALCIUM

Andrea G. asked me: I sent my alkaline activated water to a laboratory, just to see, if pollutants still remain. The parameters were good, yet I wonder as to why the water hardness was 5 German degrees less than our tap water! Does the filter remove the hard salts, like calcium and magnesium, or does that happen during electrolysis?

No. Alkaline activated water is initially always clearly harder than tap water from which it was drawn. Nevertheless your laboratory made no mistake, for surely it did not examine alkaline activated water, since the relaxation period already elapsed once the analysis took place and the hardness forming minerals were no longer in the water. In addition, the gas composition in the water and the lime-carbonic acid balance has changed. The increased hardness and thereby the higher mineral content can be tested by you immediately after producing this water, if you hold a hardness test strip into the water. (These you get from aquarium shops).

If after a few days the hard salts fall out, then the relaxed activated water is in fact, softer than the tap water before. Why this is so, would here go too far. The reduction in hardness can be monitored with two hardness test strips. (Aquarium shop). Tea lovers, who prefer to have soft water, can use the relaxed activated water very well, to produce streak free black tea.

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Activated water should be drunk cold and untreated. It still contains a mineral surplus then. The hardening salts calcium and magnesium belong to the minerals which are vital to humans. Natural calcium and magnesium compounds contribute to the good taste of the water. With coffee connoisseurs is the calcium rich water a better aroma enhancer. For technical purposes like washing can hard water be cumbersome. Sensible would be to soften only warm water. So not drinking water. In Austria for example, such warm wa-

ter softening is recommended firstly over 18° dH carbonate hardness according to the ÖNORM M 6245 normative. However, also after the chemical softening (Codex chapter B1 Drinking Water) should a minimum hardness of 8.4° dH show (equate to 60 mg/l calcium).

If you also want to soften your cold tap water, then the taste of your alkaline activated water might not be to your liking any longer. With the usual water softeners, by means of an ion exchange, calcium is removed from the water in favor of sodium. The result is by all means in higher pH areas a slight sodium flavor. Apart from that, sodium is an element which we consume more than enough in our diet, whilst calcium as a bulk element, of which we contain from 1 to 2 kg in our body, is practically always needed.

DESCALING A WATER IONIZER

Most water ionizers have automated descaling system. Why do I also have to descale it manually?

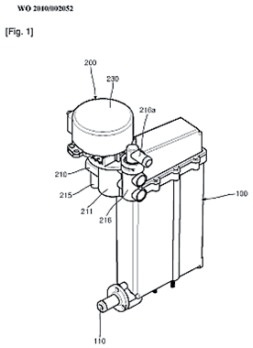
A baby needs nappies, a dog has to go for walks, a coffee maker and an ionizer has to be descaled. It goes with the system. The manufacturers sadly use the term “automatic descaling” very widely. Therefore I will give you some background information: Lime scale deposits in water ionizers always originate at the negative pole, the cathode, which gives off negatively charged electrons into the water. Positively charged calcium-ions are attracted and stick to the metal in thicker layers. This reduces the surface of the cathode, so the total production of the electrolysis cell is diminished.

Additionally, the cathode side of a diaphragm can calcify. These deposits have to be eliminated by the decalcifying system. For that there are different systems on the market.

Method 1: Upstream decalcification: To start with the drawing of water the electricity is reversed for 30 seconds. With this, the cathode becomes the anode, the positive charge repels the calcium. During the pole reversal the device will give warning indications, that the water from the alkaline outlet is not drinkable. In the long run it only runs perfectly if the water is tapped for only 30 seconds after switching the electricity back. Usually it is tapped longer, so that the cathode builds up a lime scale layer. The disadvantage: The user has to wait 30 seconds until one gets activated alkaline water. The advantage: Warmed up stagnation water from the water pipes and the pre-filters flows out. The average user would still wait until the water flows out cold.

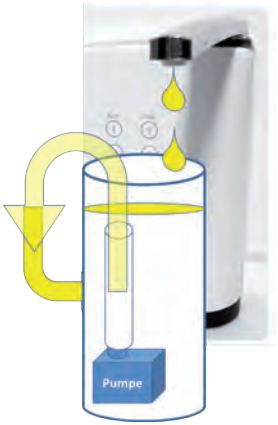
Method 2: Downstream decalcification: At the end of drawing water the device still holds some water in the electrolysis cell for a few seconds and reverses the polarity like in Method 1. Subsequently the run-off water flows through the drain pipe directly to the acidic water outlet. The advantage: No waiting time. The disadvantage: Only a few seconds of electricity current reversal and when first drawing water you will get warm stagnation water from the water pipes and pre-filters. Until the water flows out at a cool temperature, it takes time, in which a lime scale layer can build up. Conclusion: Worse than Method 1.

Method 3: Cyclic decalcification: The polarity of the electricity will be reversed after a certain rate of flow or a certain amount of time (usually 12 hours) for a 30 second cleaning cycle with alarm signals. The advantage: Technically easier than Method 2 and therefor cheaper. The disadvantage: Especially when drawing water frequently in small amounts a day no decalcification will take place, even though a big amount was produced. So a higher predisposition of scaling and a lot of manual post decalcifying is necessary. Annoying: Even if for 12 hours no activated water was produced, a decalcifying cycle takes place with current reversal.



Method 4: Flow change – Polarity change and drainage reversal: After drawing water the previously used cathode chamber used as a cell chamber becomes the anode chamber, in which the polarity is changed and the drainage is channeled to the other outlet. Like this a permanent self-descaling process takes place. The advantage: With smooth electrode manufacturing, (electrolysis cells), this method protects the cells reliably from calcifying. This method was patented by the Korean company Alkamedi (European brand name Aquion®). The disadvantage: As a rule only alkaline activated water flows exclusively out of the upper outlet and never acidic water. Since alkaline activated water starts to relax immediately after being produced, (relaxation period), minerals will be isolated when leaving the cells, which can constrict the outflow. So here with a decreased outflow a manual decalcification is necessary. Just not that often.

Method 5: Manual decalcification. When the achieved pH output noticeably diminishes with the same water flow amount or if the flow capacity of alkaline activated water is less compared to acidic water – The same amount of activated acidic water should flow out, never more than alkaline water – then you have to decalcify manually. Most manufacturers provide fixed intervals for hard water. Premium devices even indicate automatic guidelines for a due manual decalcification. Please follow these indications and don't forget to unplug your device.



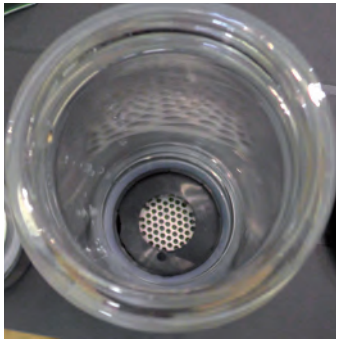
Please carry out the manual descaling with the included descaling pump, also available as an accessory. The pump should run at least an hour (up to 12 hours) with the descaling agents. It should not get warmer than 35°C.

With heavy calcification – for example when citrates (lime salts from the descaling agent citric acid) fall off as white crystals or the descaling agent turns yellowish, you should replace the descaling solution. Please do not forget, after the descaling process, to rinse the pump thoroughly with clear water, since it can get blocked because of incrustations.

An incrusted pump, that does not start, usually runs again when you soak it in clear water for an hour. After the manual decalcification set your water ionizer on "Purified" (filtered water) and let about 10 liters of water flow through to rinse. This is not drinking water and can still contain traces of the descaling agent.

For the new designed Flow Hydrogen infusion machines with PEM-Cell constructions I can see only one descaling method:

If the manufacturer offers a filter cartridge filled with citric acid, you should use it. If you do not use it, take H2 blue™ Kit Hydrogen measuring drops. If the device produces less hydrogen than in the beginning or even none: Ask the person who sold it to you, what to do. A concept for the maintenance of these devices has to be developed.


This is the reason why I still prefer batch Hydrogen water makers with a PEM or SPE Cell, You can easily descale it, because you see the Cathode, whenever you fill it. Anyway they allow to dissolve much more Hydrogen (up to 6 ppm) in water than the flow devices (1.2 ppm), because they can work with more pressure.

CONDUCTIVITY MEASUREMENT

PPM means Parts Per Million. With a conductivity meter you can measure the number of all dissolved particles. Often the conductance is also shown in microsiemens. He says something about the amount, not the quality of the water components. 5 ppm lead, quicksilver, uranium or cadmium can be catastrophic, 1000 ppm calcium in comparison is perfect! Whoever wants to judge the quality of water with a measurement of conductance, is either completely uninformed or purposefully does not tell the truth, for to advertise —> reverse osmosis, I refer to this in another section.

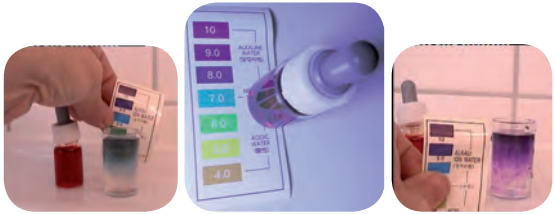
Where does the increase in ppm come from, even though the water before electrolysis is filtered and like that the contaminants are removed? In the cathode chamber minerals build up from 2 liters of water in 1 liter alkaline activated water. Aside from some filters also adding —> calcium, because it is good for us and for the buffering of activated water. That is why it has mostly more ppm, yet fewer contaminants, which can be measured in alkaline activated water.

- Last but not least I have to point out that with the conductance solely electrolyte, hence ions can be measured in the water, electrically neutral atoms cannot.

- Furthermore you should consider, that the very bad contaminants like lead, quicksilver or uranium, also hormones and antibiotics in minimal amounts are very harmful.

Heavy metals are measured in micrograms, whilst the good metals like calcium, magnesium or potassium are measured in milligrams, so the order of magnitude is a thousandth bigger. If a filter can remove ppm from the water, it does not mean by a long way that the “evil” ones were removed.

PH - MEASUREMENT



Hardly any manufacturer of water ionizers gives the consumer more than the pH measuring drops. Strictly speaking these are adequate. To display the effect of ionization, you only have to observe the difference between the colored tap water and the alkaline activated water with the different color indicator.

It doesn’t depend on the absolute pH value after the decimal point, instead, that the difference amounts to maximally 2 color levels, depending on how strong you want your water. Tap water is mostly green, light alkaline activated water is blue and the stronger one is purple.

Test strips are relatively expensive, since you cannot use normal indicator paper. It has to be coated so that when pulling the strip out of the water the result is not distorted by the air.

Electric pH-meters are cheaper. With today’s guarantee rules it is not given as an accessory, since they would survive few measurements of activated water, especially in the

hands of amateurs. This is the case with expensive as well as cheap pH-meters. The electrodes break quickly in activated water and they can only be exchanged in the expensive meters.

If you can cope with the maintenance efforts, storage in special liquids and calibrating with every use in new calibration liquid, because you want to measure exactly: you need at any rate a device that can be calibrated with an exchangeable electrode. I have already worn out hundreds of them.

Buy plenty of bags with calibration liquid and with storage liquid and don't forget that you always need distilled or deionized water for cleaning.

The best option is to buy the meter in a specialized aquarium shop nearby, where you can buy the necessary accessories again and where you have experts who are informed should there ever be a problem.

For owners of a water ionizer it is important to measure the pH. It is the best way to control its proper function. But normally the drop-test is absolutely sufficient for that purpose.

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ORP MEASUREMENT (REDOX-POTENTIAL)

The known dual function meters in the redox measurement range cannot be re-calibrated, which is actually needed with every measurement of activated water. Do not buy!

A redox meter is more expensive than a pH meter. Yet the same limitations apply as described under the key word —> pH measurements.

So far the most stable ORP electrode I found in a device from "American Marine Pinpoint". But, like I have said, this is for specialists and one has to exchange the electrodes frequently for a lot of money, since the activated water attacks them very quickly.

To determine exact values it is absolutely necessary to polish the electrodes after every measurement with the mostly not delivered and very expensive **polishing strips**. If you forget to do that you will obtain **completely wrong measurements.**

The measured redox potential with the usual redox meters (CSE = Common Silver Electrode, sometimes also called Ag/AgCl) do not correspond with the scientific standard Eh (sometimes also SHE = Standard Hydrogenium Electrode).

When comparing the measurements you have to indicate which electrode reference is used. There are also electrodes with mercury or gold, for which there is no abbreviation. These also have to be indicated with the measurement. If not, the values hang in mid-air, for ORP values are only a reference value to a certain electrode.

Conversion: CSE (mV) + 207 mV = Eh and reversed Eh (SHE) mV – 207 mV = CSE. The reference temperature amounts to 25^0 C. Good devices register the temperature and correct the corresponding measurement. Besides, there are also reference electrodes of a particular kind with other conversion parameters, but CSE and SHE are the most used.

Above from left to right:
1. Tap water with iodine solution.
2. Electrolyzed alkaline water (EAW) pH 9.5 stirred with the same amount of iodine.
3. EAW discoloring:
4. Antioxidant ability like vitamin C (1 g)

The more drops of iodine you can discolor, the lower the ORP of your water. Because of dissolved hydrogen.

Another simple method needs at least 2 hours. Time depends on the oxidant ability of your tap water. This is a really good method to compare different kinds of water. Here I take a „famous"antioxidant water from Nordenau. Cf. p. 81.

Left side: Steel wool test of antioxidant abilities of water. After 3 hours. Cf. p 81. From left to right:

- „Nordenau" bottled water
- Alkaline electrolyzed tap water (Munich) from a water ionizer (pH 9.5).
- Deionized water with 2 g metallic magnesium

What you see is what you get!

HYDROGEN MEASUREMENT

Hydrogen measurement shows parts per million (ppm) or parts per billion (ppb) of the molecular hydrogen (hydrogen gas) content in water. In former times this kind of measurement was a job for only few scientists.

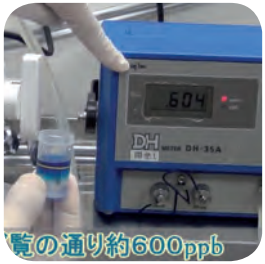
Above: portable polarographic DH meter („dissolved" hydrogen) from the TOA-DKK Company. This device is according to the manufacturerer certified for research of electrolyzed water

After the beginning of the „Hydrogen-Rich-Water" - Boom in 2010 there was a need for less complicated and cheaper methods of hydrogen measurements.

In 2012 the Japanese MIZ – Company, a developer of new electrolysis technology for hydrogen rich water, presented its MIZ-Reagent. „A convenient method for determining the concentration of hydrogen in water: with the use of methylene blue with colloidal platinum" (Seo et al. Medical Gas Research 2012, 2:1). This agent in the form of droplets on the basis of methylene blue and platinum changes to colorless

leucomethylene if dissolved hydrogen is present. One could determine the exact hydrogen content: 1 discolored drop in a 6 ml cup with water means 100 ppb (0,1 ppm) dissolved hydrogen in the water.

Everybody would have been happy with these drops, if they would work correctly with any kind of water. But the more alkaline it is - the more imprecise they are.



A controlled comparison by the renowned manufacturer of water ionizers Nihon Trim showed the incorrectness in alkaline electrolyzed water pH 9.0 with 604 ppb hydrogen. It is published in a video https://www.youtube.com/watch?v=84gWhCGFJVY (2016.06.07) The drops showed only 300 ppb.

Nihon Trim writes: „Those re-agents have been tailored to the hydrogen water produced by MIZ manufactured machine."

It is true: The MIZ machine produces neutral hydrogen water.

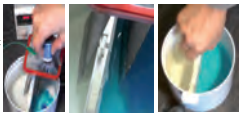
The Video of Nihon Trim was published in 2014.

Also an U.S. organization in the meantime distributes droplets based on the same concept under the name “H2 blue™ test kit”. After my carried out tests in September 2016 the drops from MIZ as well as the H2 blue™ test kit react in pretty much the same way to hydrogen water. Since both only measure exactly 100 ppb, yet the results with the amount of drops was identical, can small variances of color intensity be dismissed and the drops can be considered equal measuring instruments.

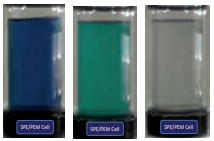
Anyway the results differ depending on the way of hydrogen production from those of an electronic measurement or calculation of the ORP. Eye-catching was that the methylene blue turned azure blue if the hydrogen rich water was produced by a diaphragm water ionizer. With a PEM hydrogen generator which doesn’t allow the water to become alkaline, this did not occur.

Decoloration during electrolysis

DC 20 – 32 V.
H2 Blue Drops in Cathode compartment
Color change between electrodes almost Immediately. After 30 min. all cathodic water, which should have a high H2 content, is colored azure blue. Due to decay of methylene blue by hydroxide ions. Happens also with alkaline ionized water after electrolysis.



DC 7 - 8 V.
H2 Blue Drops in AquaVolta Pocket
1. Start
2. After 20 sec.
3. After 25 sec.
Hydrogen bubbling. No forming of hydroxide ions. All is decolored.



Some chemistry publications speak of a decomposition of methylene blue under the influence of hydroxide ions, which in alkaline activated water are present in excess. (See e.g. Adamcikova, K. Pavlikova and P. Sevcik: The decay of methylene blue in alkaline solution. React.Kinet.Catal.Lett. Vol. 69, No 2,91-94 (2000). With the so far tested models no azure blue came into being when dealing with a simple lye with the same pH value (9,5), like it did with alkaline activated water. Nor was this the case during the production of catholyte. One should always control with an electronic measuring system. Yet the drops are being developed further, and it would be good, if they could be used in a defined field of water types.

At least, if no hydrogen is present, like in the "Stollenwasser" from Nordenau, are the electronic measuring device from Trustlex ENH 1000 and the drops in agreement.

On the contrary, if one electrolyzes the Nordenau water for 30 minutes long in a —> batch ionizer, one obtains alkaline activated water with a pH of 10.7, ORP (-) 739 MV (CSE) and a value of 1600 ppb (1,6 ppm), which equates exactly to a complete saturation of hydrogen, something reached by all outlet water with such a long electrolysis time.

From scientific literature it is by no means clear, at which value of dissolved hydrogen is it dealing with a "therapeutic standard". The pioneer of the U.S. hydrogen movement Tyler Le Baron wrote to me in regard to this: "There really are not enough studies to this question. It depends on the individual person and the illness, and it depends on how much one drinks, for example 1

Liter with 1000 ppb or 5 Liters 500 ppb. In some cases can 80 ppb be enough, others need more. The standards, developed by Shigeo Ohta in Japan, claim that it should be at least 800 ppb. I myself claim it should be at least 500 ppb. This requires also drinking a greater quantity of water."

Another renowned US-author, Randy Sharpe, proposed in a Facebook blog 3000 ppb (i.e. 3 mg) per day as a therapeutic level, but also has no scientific proofs for it.

Dr. med. Walter Irlacher, who treated about 20,000 patients with alkaline ionized water from 2004 - 2015, recommended to drink 0.3 l per 10 kg of body weight daily. The water he could produce had only 900 ppb dissolved hydrogen. That means a 70 kg average person would drink 2.1 l/day and get 1,89 mg dissolved hydrogen per day.

My personal view is based on taste. Not only my own, but more than 2000 people I am in contact with for years. Most of them are drinking alkaline hydrogen rich water from a water ionizer, a few are drinking neutral hydrogen water from one of the new devices. But almost everybody says that the water is smoother and has a better taste when it has more hydrogen. You can measure it and test it yourself: People like the feeling of hydrogen in water. They instantly will drink much more water than water without or low hydrogen. The best water I ever drank had a level of 6100 ppb (6.1 mg).

Today one cannot reach such high levels with a classical alkaline water ionizer nor with a Flow-through HIM (Hydrogen-Infusion Machine). It needs a high-pressure system like the AquaVolta Hydrogen Booster with a PEM-Cell.

Another way to get high levels of dissolved hydrogen is with hydrogen releasing additives that are dissolved under high pressure.

On the following pages you see the results with an electronic measuring device Trustlex ENH 1000 which is based on an ORP algorithm in a comparison with the H2 blue Kit results. All tests were done in summer/autumn 2016.

Comparison I: Additives

Method	Description	Trustlex ENH 1000 ppb	H 2 blue ppb	Remarks
Hydrogen bubbling in open Reverse Osmosis water (ROW) 20 min.	Generator: KYK H2H in Ozone Level 3	0447	0200	different 
Hydrogen bubbling in open tap water Munich (TWM) 30 min.	Generator: KYK H2H in Ozone Level 3	0868	0400	color reaction
Hydrogen bubbling in gasmouse /(20 ml) TWM 10 min.	Generator: KYK H2H in Ozone Level 3	1451	0200	
Metallic Magnesium 	2 h in ROW 2 h in TWM	0905 0847	0600 0400	Reaction in TWM stopped after 70 min. Reaction in ROM continued 2 h.
Aqua H2 hydrogen generating pills in TWM in completely filled up double walled steel bottle.	2 pills in 0.75 l. Bottle closed for 12 h. After 20 h open 4 pills in 0,75 l. Bottle closed for 12 h	0403 0000 0833	0200 0100 **2800**	Acceptable taste Bad taste Very bad taste 

H2 MEASURING OF A DIAPHRAGM WATER IONIZER

Comparison II: Diaphragm water ionizers

Method	Description	Trustlex ENH 1000 ppb	H 2 blue ppb	Remarks
Aquion Premium (Alkamedi) 5 Electrodes	Level 4. Flow 1.8 l/min. TWM.	1140	0600	Decalcified (4 years old)
Enagic Leveluk SD 501 (Enagic) 7 Electrodes	Level 9.5, Flow 1,8 l/min. ORP -434 mV (CSE). TWM.	872	0300	Decalcified. No Enhancer salt solution used. 5 years old.
Enagic Leveluk SD 501 Platinum 7 Electrodes	Level 9.5, Flow 1,8 l./min.	1488	0700	Decalcified. No Enhamcer- 3 years old.
Ionwater Premium 7-Electrodes pH 9.8	Level 4; 1,2 l/min.	0926	0900	New device
Aquion Premium 4100 (Alkamedi) 7 Electrodes	Level 4, 1,5 l/min.	1280	0600	Decalcified (4 years old)
Allsbon Dion Special 9 Electrodes (undersink)	Level 4; 1,2 l/min.	1514	0700	Decalcified. (2 years old)
AquaVolta EOS Touch (Jay) 9 Electrodes	Level 3; 1,1 l/min.	1199	0600	½ year old.
	Level 5: 1,1 l/min.	1578	0800	
Tyent YT 11; 11 Electrodes	Level 3; pH 9,5	1239	0100	4 months old. Decalcified.
	Level 4; pH 10,3	1432	0700	
AquaVolta ECA tractor	Level 3; pH 9.5	1203	0500	5 months old. Decalcified.
7 + 5 electrodes by Ionia	Level 4; pH 10.9	1594	1100	Not ecacified
	Level 4; pH 10.0 with AFM System	1730	2000	7 months old. Decalcified
	Level strong Alkaline pH 11.8 (catholyte)	1720	1700	With Enhancer salt solution. **Same Result with Trustlex and Drops!**
Life Water M 13X, 13 Electrodes	Level max, 1,2 l/min. TWM	1463	0700	

Comparison III: Hydrogen Generation by PEM/SPE

Method	Description	Trustlex ENH 1000 ppb	H 2 blue ppb	Remarks
H2fXCell HIM	TWM	1291	0700	New
HfXCell HIM (same sample)	TWM (prefiltered)	1136	1100	3 months old
GiseAqua HIM (similar to H2fXCell)	TWM	0952	0300	New. ORP – 390 mV (CSE)
GiseAqua HIM (same sample)	TWM (prefiltered)	1085	0600	
GiseAqua HIM (other symple)	TWM (prefiltered)	1221	0500	New after 20 x used
KYK H2/O3 Hisha (reversable for Ozone water)	TWM	1202	0800	2 months old
AquaVolta Everfresh Pocket. Batch SPE-Cell	ROW 5 min.	0969	0800	new
Everfresh Pocket treatment of mineral waters	ROW 7 min.	1074	1200	TDS before/after 251/301
	ROW 7 min. production + 30 min. open	0963	0400	pH before/after 7.9/7.9
	TWM 7 min.	1106	1700	T: 22 d C
	TWM 5 min.	1094	1300	
	Aqua Panna 7 min.	1050	1900	
	Evian 7 min.	1134	1300	pH 7.4
	Volvic 7 min.	1076	1300	
	Volvic 7 min. prod. + 30 min. open	1040	0800	
	Volvic 5 min.	1018	0600	
	Staatlich Fachingen Healing water 7 min.	1110	0800	
	Mehrner Quelle „Nothelfer“ Healing water since 1267. 7 min.	1078	1400	
Everfresh Pocket treatment of designed water	ROW with 235 TDS of Punjab Salt Range (so called Himalaya red crystals) 7 min.	1327	0700	
Everfresh Pocket treatment of bottled table water	Nordenauer Stollenwasser	1033	0500	

RELAXATION TIME OF ACTIVATED WATER

How long can I drink the alkaline or neutral activated water? How long is it active? When does it lose its usefulness?

This question concerns the duration of the relaxation time, which can be regarded as a core concept for electro-activated water. It concerns the period in which alkaline activated water retains its antioxidant properties. After the relaxation period, it is only alkaline water, not activated water any more.

Dating back to the researchers Prilutsky and Bakhir (electrochemically activated water: anomalous properties, mechanism of biological action, Moscow 1997) one understood the period in which an exceptionally low redox potential in the alkaline activated water can be measured under relaxation time. This is different from place to place, from water to water, in all climate conditions. It is difficult to predict. Ultimately you don't get around to an empirical measurement.

Alkaline activated water can, compared to acidic activated water, keep for years under favorable conditions, it has a very low relaxation time of a few minutes up to a few days. This is a so-called metastable state. Hydroxide ions and the hydrogen content contribute to this index parameter directly. Also, the nature and quantity of the cations plays a role.

The most volatile parameters are the H atoms generated at the cathode, their antioxidant capacity one can demonstrate, for example, by reduction of tungsten trioxide. Hydrogen atoms unite quickly to H2 – molecular hydrogen – hydrogen gas. Both are very powerful antioxidants.

Since the year 1997 Sanetaka Shirahata (Shirahata et al., Electrolyzed reduced water scavenges active oxygen species and proteins ECTS DNA from oxidative damage. Biochem. Biophys. Res. Commun., 234, 269174, 1997.) has also constantly discovered atomic hydrogen in activated water and it has been discovered and proven that this atomic hydrogen on a DNA level protects against oxidation from free radicals.

Also since 1997 different hypotheses have developed about where and how long these hydrogen atoms "park" before they bond as hydrogen gas. For example, Dietmar Ferger represents the hypothesis of the so called alkaline nano mineral colloids, which is neither contradicted nor proven. Quote: Ferger, "Jungbrunnenwasser", Weil am Rhein, 2011, p. 71:

"There is virtually an 'electron cloud' that surrounds alkaline minerals and hydrogen and binds them together. So also the hydrogen is negatively charged and activated, and therefore > activated hydrogen < is produced." If the aforementioned borderline scientific explanation for the behavior of alkaline activated water is actually correct and needed, is doubtful. For also the antioxidant properties of water, which is merely enriched with hydrogen gas, fulfil my expectations as an adequate explanation of the phenomena. It is quite clear that the hydrogen saturation is entirely responsible for the negative redox potential. If the somewhat

more difficult to measure hydrogen content decreases, then the redox potential (ORP) also decreases. So it is ultimately irrelevant whether one or the other value is determined. In flow through ionizers where the water in a pressure tight electrolysis cell is ionized, in the cathode chamber a relief of hydrogen gas is produced, since under normal conditions there is only a maximum of 1500 microgram/l hydrogen gas in water, although during the electrolysis substantially more will be created. Therefore, when flowing from the outlet hose of a water ionizer hydrogen gas bubbles are formed and after a few seconds evaporate into the atmosphere, provided that they are not drunk with the very fresh, bubbling alkaline activated water.

With a non-pressure tight batch ionizer, activated water can be fully saturated with hydrogen gas in the cathode chamber. The formation of bubbles and the outgassing of the surplus hydrogen already takes place during the longer electrolysis process. Both with a batch ionizer as well as with a modern 9-electrode device I was able to produce with alkaline activated water with a complete hydrogen saturation and over saturated water up to 1800 microgram/l, but within minutes it falls back to the normal saturation. Since the beginning of 2007, research of Shigeo Ohta can hardly be doubted that hydrogen gas (H2) is the decisive share of the antioxidant capacity of alkaline activated water. (Overview: Ohta, P., molecular hydrogen as a novel antioxidant: overview of the advantages of hydrogen for medical applications, Methods Enzymol. 2015;555:289-317). It is therefore essential to ensure that a water ionizer must be designed so that in the event of a drink the ideal pH values of 8.5 to 9.5 are reached with as much dissolved hydrogen gas in the water. Compared to the model of Nihon Trim, which Shirahata used in 1997 and therefore reached in the drinking pH range a hydrogen content of only between 200 and 350 micrograms/l, here between 2010 and 2015, significant performance increases were reached with more than 5 times those amounts reached. Other new techniques have already as a prototype have reached the complete hydrogen saturation of 1500 micrograms.

For further issue of hydrogen saturation please read the FAQ hydrogen rich water. A decisive factor is the extension of the relaxation time by preventing the outgassing of hydrogen. For we cannot always drink freshly ionized alkaline activated water immediately. This shows a clear advantage in the combination of a very dense materials such as stainless steel and thick blue glass when storing the bottles horizontally after having completely filled the bottles, no air bubbles. We have tested the following materials and after 19 hours of horizontal storage (except crystal carafe) they have been measured again in the Refrigerator:

One of the most interesting questions is of the active hydrogen which Hidemitsu Hayashi, a top Japanese researcher who works extensively in the field of alkaline activated water. Also, the molecular biologist Sanetaka Shirahata is at the forefront in this area. The German biologist U. Warnke

speaks of "H-minus water". (Source: Interview in practice: nature 4/12).

This means the normally highly unstable hydrogen anion H-. You can hardly measure so quickly, how it gives off its excess electron H+ to a much bigger reaction partner, or at least a hydrogen cation. However, there is growing evidence that hydrogen anions alongside strong cation clusters, known as mineral colloids with positive external charge, could temporarily park there.

The theory of hydrogen mineral colloids comes closer to understanding the strange behavior of alkaline activated water. For clearly in the beginning there are more cations gathered than what can be kept in this water.

Hydroxide ions are not known to be particularly volatile, because chemical lyes are stable for a very long time. Their excess electrons are kept longer and therefore cannot be responsible for the abnormally low redox potential of alkaline activated water.

Hydrogen is extremely volatile, it cannot even be contained in most storage vessels. If during electrolysis quickly produced hydrogen anions actually complete a "Park"time with mineral cations, this is a plausible explanation for the falling out of cations in a period of 0-36 hours, which is usually observed.

Back to the question and my experience after thousands of measurements of oxidation reduction potentials: you get the most benefit from drinking it immediately. Great benefits within the first 3 hours. A high benefit up to 36 hours. Good benefits up to 48 hours. After the water has normalized electrochemically, the ionized mineral surplus has been visible and the water is softer. It is still a useful drinking water, but you should use it for tea or watering flowers.

At last a technical aspect of the relaxation time: The Electrolysis cell. Should it be dry?

This is with all counter top ionizers. Would activated water still remain there, this is subject to the rules of the relaxation time, that is, among other things, that minerals like calcium fall out which would ultimately hinder both electrolysis and the flow of water through the outlet hose.

The reason why I recommend so far only one model of under the counter ionizers, lies precisely in this: The activated water cannot flow and forces in calcareous water which leads to unreasonably frequent manual decalcifying procedures.

Corrosion is not an issue in this question. An electrolytic cell in a modern water ionizer is corrosion resistant for decades, as long as the plated platinum layer is not damaged. In case of inadequate filtration, iron particles that come to the anode build up an oxide layer on the platinum layer, which reduces performance. One can scrape off the oxide layer and have the platinum plate clean again, yet for that you must disassemble the electrolytic cell.

DURABILITY OF WATER CONCENTRATES

Sahra W. asked: In your book "Drink yourself alkaline", you wrote how alkaline water concentrate can be made with a batch ionizer. How long does the Redox Potential/ORP keep?

After many tries with keeping and diluting alkaline water concentrates, I advise against it, even the home made one. Even if you make it from a balanced mix of sodium, potassium and distilled water, in the end you only have a diluted caustic potash and caustic lye, which has no taste and only contains a chemically produced negative Redox Potential, which becomes uninteresting when diluted. The relaxation period of electric activation with diluted concentrates doesn't hold longer than with ready to drink alkaline activated water.

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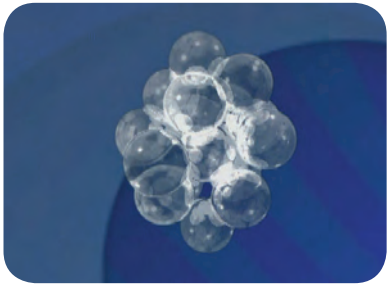
WATER CLUSTER

A really frequently asked question is: How big are the water clusters in ionized water recommended by you?



In the electrolytic cell of each water ionizer large and small water clusters are torn by the prevailing forces inevitably apart, because only individual water molecules and not clusters participate in electrolysis. Individual water molecules are torn out of existing hydrogen bonds when they come into the vicinity of the cathode. The overall analysis for residual water in the electrolytic cell thanks to the magnetic resonance representation can ascertain that the overall cluster size is reduced when the water comes out of the electrolytic cell. When water runs out of the outlet of the ionizer do the normal rules apply: Immediately after electrolysis can mostly smaller clusters be measured, because the bigger ones still need to form. But larger ones form in a fraction of a second, before you can drink the water. Because the changing

in teraseconds of the cluster structure of water molecules depends primarily on the temperature. The warmer you are when you drink alkaline activated water, the bigger the water clusters become inside you. For only you determine, because of your thermal energy, the size of the water clusters you have drunk.

What occurred in the water ionizer and is depicted in the photos or graphics of the manufacturer, took only a terasecond and is long gone when you drink the water. It's easy: with increasing temperature, the water clusters are getting bigger, until they disintegrate into their component parts during evaporation. Conversely, this means that up to the freezing point, they are smaller and stop at the well-known hexagonal shape of snowflakes and ice crystals.

Of course I know that you ask me this because a water ionizer salesperson told you the ionizer would provide particularly small water clusters and this water would be good for you because it can be absorbed better. I regret to say that this seller is completely incompetent, because the smaller cluster size of water molecules would reduce the absorption of water more.

It is not so, as Dr. Robert Young, an American de-acidification author has stated: "The smaller the cluster, the better they can slip into the cells." The opposite is the case! That is why our body functions at an operating temperature of about 37 degrees Celsius. Only at the prevailing higher temperature do large water clusters ensure a good water supply to the body. I still reproach this today, that I have so uncritically cited Dr. Young's completely false statements in the book: "Drink Yourself Alkaline". Here Dr. Young is unfortunately, completely wrong. The still not eradicated statement, that small water clusters are one reason for the positive effect of alkaline activated water, is in scientific terms still far below the statement that the earth is flat. Why?

The best water cluster reduction machine is working constantly in every one of your body's cells. Aquaporins.

Aquaporins are the sluice systems that transport water exclusively as a single molecule, and never as a chunk (cluster), to the cells of our body. Why should aquaporins take water molecules from small water clusters, if very large and loose water clusters at higher temperatures are available, which require less of a force to extract individual molecules?

This is simple physics! With larger water clusters less energy is required to detach a single water molecule. Smaller water clusters, that due to the laws of nature would not find their way from the ionizer to the body anyway, would be highly unbeneficial for hydrogenation.

That alkaline activated water hydrogenates cells better, is not yet a proven fact. I could thermographically show that it promotes better blood circulation compared to an excellent mineral water, but an increased blood flow does not mean better hydrogenation of cells outside of the blood. But very plausible theories could be set up:

1. First: cluster sizes play no role in the absorption of water into the blood, since prior to absorption by the blood the temperature is increased to body temperature and thus the clusters also have a temperature-dependent identical cluster structure.

2. Alkaline activated water is better absorbed by the blood compared to other aqueous solutions because it is more alkaline than blood and thus the blood and the whole organism welcomes it. It can push minerals such as calcium, magnesium, potassium and sodium to the impoverished organs. An argument against that, that the mineral buffering of alkaline activated water is relatively low. But it is at least twice as high as that of tap water with a total hardness of dH 16, as I was also able to show in experiments.

3. Alkaline activated water is absorbed so much better than any other aqueous solutions because the redox potential is much closer to blood (-5 to -120 mV (CSE) according to our measurements from the vein) than any other beverage. In general, the redox potential of alkaline activated water is even 100 to 300 mV lower than that of the absorbing blood. It brings a significant electron asset with it.

4. Alkaline activated water carries dissolved hydrogen gas with it. This is the absolutely indisputable minimum consensus. Japanese researchers around S. Shirahata also postulate even the existence of atomic hydrogen. Both are maximum effective antioxidants, which the body has a constant need of due to its aerobic metabolism, which is not adequately covered in many health crises and diseases.

Point 4 does not mean that water penetrates faster into the cells. For "carried on" hydrogen is much faster than the aqueous solution, to which it hangs on to in a very volatile adhesion, according to current theories of Shirahata ("Mineral colloids"). It rushes through the body much faster than water itself, which in this case one should correctly name: "waste alkaline water" because it has lost its "active component". After all, this "residue", which consists of an excess of hydroxide ions in the body, is more welcome than any acidic aqueous solution, which is the standard model of our current world-wide drinking culture.

Therefore, I oppose both convincing studies discussing hydrogen supplements from the molecular-hydrogen-foundation:

1. H_2 enriched saline solutions for infusion, as discussed by the, since 2007, published work on "Hydrogen as a healing gas". They bring no alkaline advantage and are therefore of limited use.

2. H_2 inhalation applications. Because the lung is a major excretory organ for non-consumed hydrogen, as it is exhaled especially by anaerobic bacteria excess in the colon (immune system). The lung is less geared to take in hydrogen. The intestine can achieve much more here. Therefore, hydrogen-rich water is more useful there than in the lungs.

I want to express my very important answer to your question.

More detailed: Water clusters (water molecule chunks, heaps, ordered collections) thanks to hydrogen bonds are geometrically ordered water molecule associations. Hydrogen bonds need about a trillionth of a second.

Therefore, measurements of cluster sizes are only snapshots without any kind of claim of a different kind of hydrogenation, which can be naively imagined with smaller clusters.

Alkaline activated water pouring from a water ionizer is still subject to numerous relaxation processes in which i.e.: Hydrogen gas escapes. These turbulent swirls may contribute to alkaline activated water vibrating in lower frequencies than normal water in nuclear magnetic resonance imaging. Stable or even useful cluster structures are not derivable.

Hydrogenation of cells does not take place because of water clusters, but because of individual water molecules passing through aquaporins. Merely freezing water leads to a permanent snapshot of water clusters, which is why every snowflake looks different. But since frozen water has no physiological occurrence, the structure of ice crystals may also not have a physiological effect or even a "memory" of water. Water, to use a statement from an earlier presentation of mine, is: "the whore of the universe", having imposed on every event in the Milky Way. With the help of electrolysis we can force water to stay on Earth.

That's just a picture, and some will not like it. But before I continue to reflect alone for another 12 years on how to improve this world with water, I prefer to find provocative statements.

URINE TEST

When drinking alkaline activated water: Can it be that at some point, if all acid is flushed out, that the urine should transition to alkaline?

The dead do not pee. Without acid excretion I would be seriously worried about you. Acid in the urine is a very complex issue. You could, for example, be highly acidic and still have an alkaline urine.

Not all acids get to the kidney. Therefore, the urine test for the acidic diagnosis is less useful than generally claimed. The saliva test would be wiser, although it does not show the overall situation, it only indicates a section which has manifested in the interstitial fluid. After all, a large amount of liquid and more than that little urine.

There are urine interpreters in Internet forums, that claim that a glass of alkaline activated water makes the urine even as antioxidant as a serving of broccoli. Never have I measured an antioxidant value in the many urine tests I have done, although I have been drinking activated water for 10 years. This seems to me absurd. Why should the body flush electrons voluntarily into the toilet?

The measured urinary tests ranged between +6 and 91 mV (CSE). The single antioxidant human body excretion according to my measurements were breast milk and semen, with values between -27 mV and – 78 mV. Here the electron donation makes sense, since it is addressed to their own offspring.

BODY WATER

Richard T. asked me: *Although I have drunk daily 2 liters of alkaline activated water for a year and my diet is healthy with lots of fruits and vegetables, my body analysis scale always shows me to be below 55% of body water. Do I need to drink more water?*

The World Health Organization indicates 60 – 65% body water for men, for women 50 – 55%, for children 60 – 75%. Now apparently due to the measurement with bio impedance scales, or a body fat meter, you suspect to be dehydrated. I think this is very unlikely, since these scales are usually very inaccurate. Talk to your doctor about this suspicion, he can tell you shortly without scales if you are not supplied with enough water.

If you actually are, he will not necessarily advise you to drink more. Perhaps he has prescribed, because of high blood pressure or heart failure, diuretic medication to keep the body water deliberately low. Maybe you have more of a female body with more fat tissue, where 50 – 55% is optimal. Or you are overweight.

Sometimes a vegetarian diet is so low in salt that your body cannot hold water. Then a pinch of salt in your water is sufficient to improve this deficiency. Already Batmanghelidj has recommended this kind of water drinking.

All these questions can be briefly cleared by your doctor. I can only say that you definitely do not drink too little alkaline activated water. Either, you don't have a problem, or the problem has a different cause.

MAKING COFFEE

For some people this may be the only important question when thinking about alkaline or neutral activated water.

These are for many people downright existential questions, because they want to give up everything, just not coffee. I receive a lot of questions regarding this subject and I would like to give a detailed answer.

Yes, coffee is sour, as well as varied. Robusta coffee beans, which are mixed into filter coffee blends – these are cheaper – are the sourest, Arabica coffee is more alkaline than most mineral water. Regarding the acid/alkaline balance one should opt for the more expensive Arabica bean.

I am speaking of basic black, unsweetened coffee. Additives like milk, cream or sugar can change the values of your special properties.

Also the method of preparation plays a role with the pH values. The most acidic is Turkish coffee/Greek mocca. When the coffee powder mixes with the boiling water and does not get separated, most of the acids go over to the water. Since this mix is usually offset with sugar, the acidic taste is masked. Also filter coffee has a relatively long contact time with the powder, so it is correspondingly acidic. The least contact time is with Espresso/Café Crema, and has a correspondingly low acidic burden. Instant Arabica Espresso is mixed by experts optimally and dissolves immediately. The pH level varies according to the used water.

If you use alkaline activated water, you can marginally push the pH value up with each preparation method, since coffee is a strong acid buffer liquid, which through water, similar to stomach acids, hardly gets disrupted when acidic in character. There are a couple of other points that speak against cooking coffee with alkaline activated water: Fresh alkaline activated water is rich in minerals and harder than regular tap water. Therefore you have to decalcify your kettle or coffee maker more frequently because if not, when heating more minerals fall out. Also when heating normal tap water minerals fall out as lime scale.

More sensible would be to mix the fallen out minerals with the coffee powder. With a small trick you can buffer up the activated water stronger, in which a neutrally tasting, calcium rich mineral powder (1/2 teaspoon) is mixed with it. The result, for example is a Café Crema from the Espresso machi-

ne with a difference of 0.5 pH in favor of the buffered coffee powder. Also the Crema gets stronger. There is no discussion about the taste, yet coffee connoisseurs know that calcium is a wonderful taste and aroma carrier and therefore and prefer, contrary to tea preparations, hard water. Especially if they have very soft water at home, then the trick with the mineral powder helps.

The answer to your question is thus actually done, but I allow myself pointing out that acidification is not even the main problem with coffee. Because coffee, in the worst case, is not as acidic as most other daily, favorite drinks and is not consumed in such large quantities, such as cola, fruit nectars, lemonades or beer. We even know that a single cup of coffee can bring the salivary pH down, but this is also quickly compensated if you continuously drink not more than 1 to 2 cups a day – best espresso.

The real health issue when it comes to coffee is its antioxidant content. Although by roasting the green beans there is a loss of a lot of antioxidants, but there still remain plenty of antioxidants during the gentle and slow roasting of the more expensive varieties. Americans are not known for their healthy and balanced diet. Fruits and vegetables as a supplier of antioxidants tend to be more of an exception in their diet. Therefore, there is according to a study in 2005, actually coffee is by far the most important source of antioxidants for the population. (Source: Americ.Chem Society, http://chipsa.com/coffee_O2.pdf).

In Europe there is fortunately a health orientated food culture, so that coffee can only be regarded as a luxury and doesn't play a role as an antioxidant supply. The antioxidant power of alkaline activated water can be seen, like with coffee, because of its low or even negative ORP.

With various coffee samples we have measured values between + 157 mV (espresso macchiato cup from the refrigerated section) and – 285 mV (instant coffee, alkaline activated water pH 9.5 / -350 mV, heated by a microwave).

In an ordinary heating method (electrical stove, coffee maker, kettle), the use of alkaline activated water does not cause a reduction of the ORP in coffee, as all heating methods destroy obviously faster the redox potential compared to the coordinated water molecules of a microwave.

Nevertheless, with an electric espresso machine we have

prepared freshly ground Café Crema – no matter with which water we used to prepare it – we measured an average of -70 mV ORP.

If you just want a cool, caffeinated soft drink, I recommend my method: Two cups of espresso with 1/2 teaspoon powdered mineral additive (like calcium carbonate) produced in the machine. Place fresh alkaline activated water in the soda machine to carbonate it. Pour the Espresso into a glass with the 0.5 liters of activated soda water. Add some ice cubes if you wish. Delicious, very rich in antioxidants, lightly carbonated, sour, bitter and aromatic. This is anything but "cold coffee", rather Coke for coffee lovers! For me, of course, without sugar or sweetener.

LOSING WEIGHT

Mario M. asked me: *How much alkaline activated water should I drink to lose weight?*

The inventor of the pH diet Dr. Robert O. Young is preaching for years, fat is nothing but a self-protection of the body from metabolic acidosis. Fat cells, which are nothing but fatty depots, which are outsourced from the metabolism as excess acid.

Sangh Whang said bluntly, fat is acid. And he invented the ambitious attempt where he put pieces of beef fat alterna-

tely into acidic and then into strong alkaline activated water. Lo and behold, in the activated alkaline water the fat gradually disappears, it literally "melted" away. While both of this is true, however, it does not prove by any means that alkaline water helps to lose weight.

Sang Whangs attempt could also say that the fat that we eat can be absorbed more easily using alkaline water. Anyway, how is the water that we drink supposed to even reach the fat deposits in our bodies unless we get them surgically removed and then soak it in alkaline water. It seems just from drinking the alkaline water a direct impact is impossible. But what speaks for an indirect, systemic action? Alkaline water with its active contribution to the metabolism inadvertently builds up acids because the reduction of fat leads to increased amount of acids. However, this can only take place if the condition for a fat reduction is given as it would be with a diet below the required calorie intake.

There are many examples of how people could reduce their overweight alone by drinking alkaline activated water without fundamentally changing their eating habits. This simply happens because they managed to let go of high energy drinks and, therefore, changed to a low-calorie state – while still eating the same amount of solid food. A quantity formula of maximum 0.3liter (pH 9 to 9.5) per 10kg of body weight has proven good results. If someone is on medications with a diuretic effect, the treating doctor has to prescribe the water intake according to the performance of the heart.

The reason for losing weight by drinking water is most likely that by drinking water (0 kcal/liter) the commonly underestimated calorie intake of sweet drinks is reduced without actually eating less. A good example of the influence of soft drinks on obesity are the Mexicans. Today they have managed to get to the top of the world's obesity statistic, even though they eat less solid food than ever before. However, per capita they are drinking a staggering amount of 160 liters of high-calorie soda each year. (Source: ZDF Morning Magazine 2. 7. 2013). In his lectures, Dr. Walter Irlacher regularly points out it is easier do acidify your body through drinks than it is with food. He states that it is quite easy to drink 2 liters of strong beer at the Munich Oktoberfest in only 2 hours. However, it is impossible to eat 2kg of pork at the same time. (http://www.dr-irlacher.de/publi.htm)

Frequently I get feedback like this: "My notorious cravings for sweets- done! I still can eat sweets but less and most of

all I can stop whenever I chose to :). And equally, in stress situations, where previously my stomach acid literally was coming up, suddenly I've got it all under control. Still my mind recognizes the problems, but not my body. For me, these are new horizons." This seems to be a psychosomatic reflex: Food makes you tired and initiates a resting phase. Therefore, many people use food as a substitute for happiness because it deflects them from stressful situations at short notice. Especially sugary foods increase the level of the so-called happiness hormone serotonin at the expense of the stress hormones. Therefore, sugar can become a drug and because of its high calories also becomes a fattener. As soon as one only thinks of food, the cephalic (head) phase of the digestive system starts to work. The stomach begins to lower its resting pH of about 4 and the secretion of stomach acids begins. Now, if instead of addictive sweets you only drink water, the filling state of the stomach is increased for a short time. However, there is nothing to digest so that the cephalic phase of the digestion comes to its final state without the intake of any calories. Thus, the stomach goes back to its resting pH. The stomach acid does not occur in stressful situations anymore.

The rapid coupling of the intake of alkaline activated water (see also tags —> redox potential, —> hydrogenation) into the bloodstream, with the major water consumer, the brain, is better supplied as well. This is the primary reason for the "little hunger in-between (snack)." The need for rapidly absorbable minerals and water. Due to the minerals in the water, satiation without the intake of calories takes place.

If you drink alkaline activated water shortly before a meal, this will lessen the pressure on the stomach walls and even when genuinely starving it will reduce the cravings for large amounts of food because the satiating feeling is achieved much faster. There is a "stomach-is-full" reflex which triggers a cascade of hormones that suppress the feeling of hunger. A deactivation of digestive enzymes by pH increase does not take place. —> Stomach acid. Fizzy drinks increase bloating through the stomach volume, which suppresses the natural satiety during its continuous use. Alkaline water contains no active flatulent carbon dioxide. It flows through the upper part of the stomach bag directly through the gatekeeper in the duodenum – if the stomach is empty.

CRITICAL OPINIONS
MISTERWATER

Sandra P.: *On the webpage www.misterwater.eu I had 3 "secret water reports" sent to me. In the third part of the secret report it advises heavily against drinking alkaline activated water. Besides it I also found a 10 page report about ionized alkaline water, which dissuades heavily from drinking it.*

- Such exclusive information freebies can have various reasons for being sent, for example, to gain addresses of potential clients, avoiding the publications of forbidden healing statements of own products and unpunished defamation of the competition. The website belongs to the EM Wassertechnologie GmbH, which is represented by the manager Erich Meidert. In the aforementioned secret report 3 it is about the evaluation of water filters. The company philosophy of Misterwater reveals itself on page 32. The company doesn't sell a ready made filter system, but rather configures one from different filter components after the requirements needed on site. This is also done by water ionizer suppliers.

- An optimum drinking water according to Misterwater needs:

- 1. Germ immunity

- 2. High oscillation energy

- 3. Neutral to lightly alkaline pH-values

- 4. Oxygen-rich

- 5. Low mineralization availability to cells

- 6. Highest chemical purity

- 7. Freedom of physical contaminant information

- On page 33 of his secret report, Meidert speaks of the improvement of the redox potential, yet doesn't claim, how this occurs. This can be ascertained on the webpage. There we see:

- The offered filter systems are called "Futura with organic energy", "Futura with Joana Energy", "Cortesia with organic energy", "Direct Flow New Generation", "Bio Energie", specifically "Joana Energy" and costs (published July 2013) between 1595 € and 3199 € without installation fees. The filter change flatrate is between 179 and 219 €. Along with the filter system with a germ barrier and a separate withdrawal pipe, the systems also receives an "energy-module for subtle preparation according to homeopathy" as well as a "water Alchimator device for optimal mineralization".

- In addition Misterwater offers products named "Frequator", frequency carriers between 830 € and 11.400 €, which in the shape of rings are laid around the water mains and frequency carriers in the shape of the symbol "flower of life" painted coasters made of aluminum-sili-

con called "Vivalisator" for 100 € to 209,25 €. Quote: "The Vivalisator can bring life back into your food and drinks, prolong its shelf life and make it an intensive taste experience". "It transfers the stored natural and vitalizing information to all drinks and foods that come into contact with it". Since this might sound a bit odd to those who are not usually bustling through an esoteric trade fair, in the small print you can read that the facts are not accurate: "that the effect of the Vivalisator according to scientific criteria cannot be measured." Audacious is the claim: "Foods can store more biophotons", for biophotons are very scientifically measurable. Such a measurement is not put forward by Misterwater for the Vivalisator.

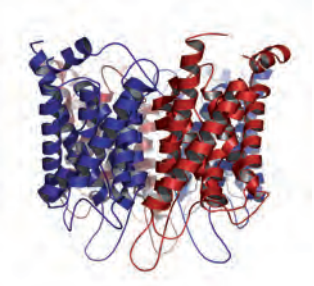
- On the webpage http://www.misterwater.eu/allgemein/so-wird-aus-einer-trueben-bruehe-klares-wasser.html is the application of, for example, with dialysis machines a usual super fine filtration described and then executed: "The generated water and its purity can only be compared to very few natural springs". I have to contend that. Not one natural spring has such technically pure water. Also, what for?

- The "preparation of subtle materials" takes place with theories from Wilhelm Reich, Viktor Schauberger and George Lakhovsky, documented by water crystal photos in the style of Masaru Emoto. Water crystals don't actually exist – they are called ice crystals – but one could have the idea that ice is completely different to drinking water. To illustrate this better please read under the article heading Töth, Ewald. Luckily here objective evidence is not missing, that none of the preparation methods lead to measurable scientific effects.

- On the page another of his pages, now not online any longer (http://www.misterwater.eu/datenblaetter/alchimatorwasser.pdf) you discover how the redox potential of water is meant to change with a device called the Alchimator. The Alchimator is a device in which water is swirled into a funnel shape, similar to a device called the Twister, which we have described in another section. It looks like a household blender which swirls water likewisely. Performance numbers like revolutions/minute etc. are not published. By swirling hexagonal structures, which are made up of 6 symmetrically arranged water molecules. About that Misterwater claims: "and exactly these structures are the ones that pass best through the water channels – aquaporins – of the cells." (Page 11). This is a fairytale. Magically shown by Masaru Emoto's pretty 6 edge ice crystal photos, the author seems to have completely overlooked that such a 6 edge cluster, which is a sign of very cold water, would be too large for the water channels in cells.

- These water channels, which Misterwater means, so called —>aquaporins, measuring 0.3 nano metres, are so fine, that only single water cells can pass through.

They don't give —> water clusters any kind of chance and dissolve hydrogen bonds in the water, to singularly channel the water molecules in an aligned electromagnetic field into the cell.



- On page 23 it would be: "The Alchimator delivers a neutral to alkaline water, which is still soft. The minerals, which the water absorbs during the Alchimation with the mineral ring, are big and indigestible like minerals from tap, mineral or alkaline water, instead because of the transformation of the swirling at high speeds they are small, alive and energetic." The water swirler, as well as the swirling motion, adds minerals to the water with a mineral ring. Misterwater doesn't specify which minerals are being dealt with and especially, why these are "big and indigestible" like "minerals from tap, mineral or alkaline water". One would rather like to believe that water, which has worked longer than the 6 – 8 minutes in the swirler with the solution of minerals in anions and cations – natural water has had weeks to millions of years – has rather few minerals, for the full solution of minerals in water takes a substantially long time. Why certain minerals are "indigestible", and others not, is not stated by Misterwater. Minerals are by definition a non-organic material and it makes absolutely no sense to speak of indigestibility in these terms. (Please see also organic availability).

- On page 19 he speaks of a correlation with chelating and believes, with bioavailability the chelating of minerals is meant. Yet chelating is a method that makes non soluble materials, like heavy metals, soluble. Alkalinous and alkaline earth minerals are, as a general rule, completely soluble and therefore appear as an ionized form in water. They do not have to be chelated at all. They are already maximally bio-available, because they already exist in an ionized form!

- The proof, that Misterwater-Alchimator water fulfills the complete conditions of the drinking water regulations, is not delivered. Yet it is very unlikely, that in the aforementioned ultra-filtered water, that from swirling with mineral rings so many minerals are continuously absorbed so as to reach the requisites of the drinking water norm. How many minerals dissolve when the swirler of the Alchimator is running for 2 minutes, what is to be expected with 8 minutes activity? Since minerals dissolve with varying speeds in water: Which ones are used first, which ones

last? Is the Alchimator germ safe with its mineral rings? How does the Alchimator stay sterile? Misterwater still owes us these answers.

- You have learnt something of the principles of the offers from Misterwater. Neither micro filtration nor swirling is new. Water vitalization from esoteric sources have a mere entertainment value and a fairytale character. One can transmit, theoretically, binary and analogue information with water, for very short intervals it can be stored in hydrogen bonds, but definitely not in the framework of drinking water.

- Also post mineralization for highly filtered water is very frequent. On the following webpage from Misterwater, ionized alkaline water is described as harmful: (published 28.7.2013) http://www.misterwater.eu/datenblaetter/ionisiertes_basisches_wasser_schaedlich.pdf. The cited arguements lead to Misterwater-Alchimie, yet are polemic, illusory and the main point is based on a magical world view.

- Next to the picture of a desperate looking man, sitting on the lavatory, Misterwater writes: "The Japanese health authorities, which recently still recommended drinking alkaline water from water ionizing devices, have distanced themselves from this recommendation, after many stomach and intestine problems arose from drinking this artificial and extremely treated water. "This is in all sorts of ways untrue. The Japanese health authorities have never recommended the drinking of alkaline activated water, this would be a highly partial statement in contrast to the rivaling pharmaceutical industry. Yet with extensive safety tests for treatment for stomach and intestine complaints it was permitted, not recommended. (Source: Bulletin of the Monitoring and Guidance Dept. of the Japanese Ministry of Health and Welfare, Pharmaceutical Monitoring Vol. 57, issued on October 19, 1992)

- This water for medical treatment, for which doctors in Japan are still responsible, after another regulation, devices have to be produced by a certified medicinal device manufacturer. That is why most water ionizer manufacturers, at least in Japan and Korea, have the certification and produce the devices according to the determined norms and consumer protection. About the qualification history of water ionizers in Japan, please see: http://www.3aaa.gr.jp/english/alkali/hs.html or in my book "Activated Water – an invention with extraordinary potential". In Germany activated water was named Hydropuryl® already in 1938 and was entered in the Gehe's code of pharmaceutical specialities.

- The Hydropuryl® Water was not only available in the 80's as neutral and demineralized water but also as acidic and alkaline (base) activated water from the factory of the inventor Alfons Natterer. It's effect was for a long time in Germany categorically analyzed and

well known, before Soviet, Japanese and Korean researchers started to thoroughly go over this subject. In the USA until today no scientific explanation took place with the German invention and the activated water only found approval with Doctor Fra Albertus, who in the 60's already tried to contact Alfons Natterer.

- On page 3 Misterwater repeats the same fairytale of the alkaline acting lemon and fantasizes with the trend of the esoteric scene about organic minerals. (Alkaline acting foods). On page 4 Misterwater plays with the term chelation. Chelation means to make water-insoluble substances with certain chemicals water soluble. Mineral substances have to be absorbed by the body yet don't have to be made soluble, since they already are from the beginning. Also the minerals from our organic food are not dissolved by chelation, but rather by the water in the food itself. In water, minerals are the easiest and have the least digestion effort for absorption, because water is the main mineral transporter. So when Misterwater writes (on page 3): "Humans are designed according to their digestive system, minerals are meant to be obtained from food and not from their drinking water", this can only be referred to as absurd.

- On pages 4/5 Misterwater presents chemical specialist terms: "In this alkaline water you have bonds like calcium hydroxide (= limestone... its main application is normally for mortar in the building industry or for its corrosive effect as a fungicide in fruit farming...), sodium hydroxide (caustic soda), potassium hydroxide (caustic potash), magnesium hydroxide (used medicinally for neutralizing the stomach acids and as a laxative)". Lay persons are astonished, yet the specialist is not surprised, for these substances are found in nearly all drinking water. However Misterwater did forget to include the abbreviation "(aq)", with which you refer to substances not as salt, but rather are present in an aqueous solution and are therefore completely normal and harmless, even health promoting. Withheld is the main feature of alkaline activated water, namely the existence of an abnormal redox potential outside of the thermodynamic balance. –> Relaxation period.

- Caustic soda and caustic potash, according to Misterwater's strong statement on page 5, tend to "store themselves in the tissue and joints". A truly interesting pathology, which seems to have come from the script writer of a CSI episode, yet has nothing to do with the physiology of humans.

- From page 6 onwards the talk is about juice and weak water instead of the electron richness. This water can evoke cardiac muscle damage. The background to this I have explain under the keywords: Jan Roberts.

- Incomprehensible is the reference of Dr. Hidemitsu Hayashi, a Japanese doctor and water researcher, who through his clear articles has contributed a lot to the

dissemination of alkaline activated water. His work was taken on in Germany by Dietmar Ferger and extensively featured in his book "Jungbrunnenwasser" (Fountain of Youth Water, 2011).

- The well-known advocate of the exclusive reverse osmosis scene, the Frenchman L. Vincent, has unsustainable theories about water hardness, which are linked to Misterwater with a theory about the disruption of "cellular redox signaling molecules". This is based on the network marketing of ASEATM and "redox signaling molecules" is a scientifically unheard of, invented term.

- Point 8 on page 9 is, in the light of Misterwater's filter product range, naturally no surprise. The internal filters of water ionizers are completely insufficient with over 2000 potential contaminants. This is, first of all, pure scaremongering, for potential contaminants don't harm you, only real ones and in Germany and central Europe they are more controlled than anywhere else in the world. Secondly, when in demand of a filter you can, at any time, choose a special filter or switch beforehand. The pre filter issue is an inappropriate criticism of water ionizers. Real and more detailed filter problems I have described under the keyword —> Filter. A complete con is Misterwater's sentence: "Exactly like with the activated carbon filters, with ionizer devices the ppm values are too high." Briefly: There are no "too high ppm values". The extended version of this is under the keyword —> Conductance. The faked equation of ppm values with contaminants is a typical feature of —>reverse osmosis sales persons.

- Misterwater's statements are in the German language the fiercest attacks on alkaline activated water. In English there are pages, which might have served as a model, for many, which so far were sales people for reverse osmosis devices and similar devices, are in the meantime have changed sides to water ionizers. There is also a battle between the manufacturers of such different systems. There they often roll up ones sleeves. Yet I have never seen an argument that starts with a man with his trousers down sitting on the loo.

JAN ROBERTS

Is alkaline water healthy?

In an article by Mrs. Jan Roberts, in the Nexus Magazine, issue 19, it is claimed that drinking alkaline water causes health problems. Is this true?

• The quoted article from the Australian pharmacist Jan Roberts, from 2008, is titled: Is alkaline water healthy? It appeared before in English in the magazine Informed Voice and quite surprised the water ionizing branch, since this was the first big attack on this technology from a pharmaceutical perspective. It was investigated and it became clear that Mrs. Roberts was employed for a filter company and therefore must have seen a rival product in alkaline water, an interest that she had kept secret. It is still worth it to deal with her arguments seriously, since you can reflect on what the manufacturers and distributors of water ionizers have placed and are placing thoughtlessly into the world. Historically seen, the article of Mrs. Roberts has contributed to a conceptual clarification and education in Germany of the nowadays established definition "alkaline activated water". I would like to go through the article point for point, even if my reasoning should repeat itself or overlap. I will cross reference where useful.

Mrs. Roberts begins with a criticism of the inaccurate definition "alkaline water", which back then was dominant. Since the English speaking world was in tune with the Japanese inventors and researchers about "alkaline water", many sales representatives had ignored a quickly growing market, everything that can make water alkaline. Even though this all depends on its composition, most think only about minerals. Gases do influence the pH value in liquids much more. The solubility of these gases depend on the temperature. Acidic carbon dioxide has practically disappeared from the water when at more or less 60 degrees, so that a hot bath is mostly alkaline, an "alkaline bath salt additive" is not needed. Most of these additives don't make water alkaline at all, yet rather acidic.

To professionally measure the pH value of water, it should be, as a rule, degassed beforehand. This does not happen when reviewing water ionizers, so you don't have an absolutely correct pH value. This criticism is objectively correct, yet, as a result, doesn't change much, since tap water, which is used as a measurement comparison, is also not degassed previously. Furthermore, consumers usually don't degas drinks beforehand. Acidic gases do not play a role when assessing drinks.

Moreover Mrs. Roberts makes a reference, that a pH value is a relative value between acids and bases, so a relative strength of two counterparts, yet says nothing about their individual endurance, which is called buffering capacity. Without a buffering capacity a pH value in water means nothing. This is correct, as well as completely trivial. Mrs. Roberts calls the buffering capacity of alkaline water low,

as opposed to a strongly buffered hydrochloric acid. This is also correct and with regard to alkaline activated water was already analyzed scientifically in the 90's. An alkaline activated water practically does not sink the pH value of an active stomach. But Mrs. Roberts neglects to ask the question, where does the buffering capacity really lie with alkaline water. This also depends on the grade of mineralization, for there is very soft alkaline activated water and very hard alkaline activated water, which features a higher buffer. It also depends on which type of minerals are ionized together with the activated water.

Yet Mrs. Roberts simply wrote the unevaluated sentence, which has been heard countless times from advocates of reverse osmosis, in which she untruthfully claims: "The mineral content of common tap water is negligible. The alkalinity effect is too small, to be measurable." (Page 13). It really seems to be like that in Mrs. Roberts Australian home land, for there one is mainly instructed to use rain water cisterns or one uses desalinated sea water. It seems though, that Mrs. Roberts has never grappled with the facts of European drinking water analysis.

Let's take the water of the three biggest cities in Germany and observe the 4 most important buffering relevant minerals:

It is quite obvious that from drinking 2 liters daily of common tap water in the 3 biggest cities of Germany you have an intake in quantities of alkaline generating minerals, which with calcium are one seventh to one fifth of the daily recommended allowance. Mrs. Roberts considers this not measurable and negligible. Nevertheless you reach a noteworthy calcium gain, without biting into a calorie rich, fat cheese!

We still have not talked about alkaline activated water, who's mineral content during the procedure of electrolysis at the cost of the acidic water gets compressed. A controlled measurement in Munich with freshly produced alkaline activated water pH 9.5 from tap water has a gain of 30 mg calcium and 10 mg magnesium!

One entry from one of Mrs. Roberts quoted keywords "Gesundheit" and "Basisches Wasser" (health and alkaline water) in Google gave on the 23rd July 2013 around 9000 results. The entry of the same keywords in English "health" and "alkaline water" lead to 1.51 million results. One has to ask how long did Mrs. Roberts research for her article. Thereby the term "alkaline water" due to its inaccuracy is not the term one should be looking for. If you type in today's standard terms in quotation marks, you obtain following results:

Even the term "activated water" delivers before the release of this book 5500 extraordinarily interesting hits.

Yet Mrs. Roberts asks on page 14 of her article the rhetorical question: "Is there scientific evidence?" Yet she doesn't engage herself with the 117.000 results, which Google, on the 16.9.2013, shows under the search terms "alkaline water", "studies", "scientific". Alone in the year 2013 there were

already 258 results in Google from the term "scholar". Mrs. Roberts ignores those plain and simple and talks about the "statement of the manufacturers".

The same ignorance is illustrated by the quoted American bestseller author Andrew Weil on page 15, who is mistaken or is consciously lying when he says in 1999: "This mindset is not supported by any kind of scientific analysis". Even the many studies from many Russian water researchers through Prilutsky and Bakhir with 165 scientific sources; these statements were published 2 years before Mr. Weil's testimony in English. —> Russian research. Also the Japanese and Korean research was known in the USA since 1990 from the book "Reverse Aging", by S. Whang, which today is still a bestseller in many countries. Also the German electrolyte water therapy – since 1938 registered in Germany as a specialty medicine – was already published in English in an article by Albert A. Riedel. Mr. Weil had only to read the sources. For some time we haven't heard anything from him about this topic, yet his statements from 1999 are still eagerly quoted by opponents of water ionizing.

A further authority is quoted on page 14 by Mrs. Roberts, the "Health Department of the University of Columbia, USA". This claim could not have done without a certain amount of boldness. Should one research the given source (http://tinyurl.com/6x82j5), then you do not stumble on to an official statement, but rather on to a blog of a certain "Alice" from 9.6.2006, who describes the whole procedure of acid/base balance with school textbook level to a healthy person and doesn't even go into activated alkaline water or chronic hyperacidity.

HANS-PETER BARTOS

Hiltrut G asked me.: *When staying many years ago in Bad Fussing I learned at a lecture by Dr. Walter Irlacher about alkaline activated water and acquired a water ionizer. I drink alkaline water regularly ever since and have also recommended this water to others and even given it away. Now my son in law came across an article on the Internet: "Alkaline water – a business idea with harmful consequences" published on 09.11.2013 by VISION AQUA by Hans-Peter Bartos, in which alkaline water is depicted as unhealthy and harmful. We are now totally confused whether we can continue to drink alkaline water.*

On the mentioned website that you visited, Best-Water distribution, I was not able to find this article. Such sniper actions against activated water by advocates of reverse osmosis and swirlers have a certain tendency to migrate, since they could also be prosecuted under competition law because of their false allegations.

Nevertheless, I know this article, because it was also repeatedly sent to me with a similar request. I have already gone into detail with the core arguments in the articles: Tödt, Roberts, Mister Water, Twister, and reverse osmosis. I now will certainly only grapple with new arguments presented by German Engineer Hans-Peter Bartos.

I can't blame Mr. Bartos that he deals critically with "alkaline water", since newly so many inflationary terms have flooded the market terminology. He says in his article quite rightly, that everyone could produce such a water without expensive electrolyzers very cheaply even by admixing pure water with a few crumbs of caustic soda or caustic potash.

But the alkalinity is just the saturation side dish of electrochemically activated water and certainly not what is on the main menu. Also a lye, like the one Mr. Bartos wants to make with caustic soda, one could refer to as "alkaline water". But there is something missing in this equation: Activated Water. This arises solely from electrolysis.

Bartos continues: "Tap water contains naturally, depending on the area, other substances such as calcium sulphate (gypsum), which is then decomposed by electrolysis into calcium hydroxide (slaked lime) and sulphuric acid."

Here Bartos overlooks that gypsum and hydrated lime are solids, while calcium cations and sulphate anions are a completely normal part in an aqueous solution in many German mineral, medicinal or tap waters. You can find this on practically every bottle of mineral water when you look up anions and cations in the content.

Yet this has nothing to do with water ionizers! The ions are only the means to an end, to produce a very high surplus of electrons, an ORP in the water which is therefore called activated water, or "electrochemically activated water" (ECA).

Bartos does not recognize what is involved with activated water when he writes: "It is even argued that a liter of treated "alkaline water" has the antioxidant power of ten lemons, even though lemon juice is not at all alkaline, on the contrary extremely acidic (pH 2,4). Such a comparison is not convincing but rather proves the opposite."

Bartos has indeed understood that a lemon is not alkaline (alkaline acting foods). But because lemons contain citric and ascorbic acid (vitamin C), they are very rich in antioxidants, although not nearly as rich as alkaline activated water.

But he has confused sour lemons with rusty screws. Because the antioxidant power of alkaline activated water is in a class of its own that is completely independent of the alkaline character of water. Using electrolysis you can even produce an acidic or neutral water with antioxidant properties. So Bartos has not understood at all the basic idea of alkaline activated water, that it can be alkaline and antioxidant simultaneously.

The core of Bartos' thesis structure lies in his following statement: "Why "alkaline water" is not healthy." An alkaline effect would not even go beyond the stomach, because the digestive juice of the stomach is highly acidic and would neutralize the alkaline water immediately. Rather this would weaken the gastric acid and the body would have to respond by producing more stomach acid.

To this end, I wish to highlight: Our stomach, when it is not busy digesting a meal, has a pH value of 4 which is less acidic than a glass of orange juice. Only the gastric juice, which is injected into the stomach only during food intake, has a pH of about 1.5. It is therefore about 10 x more acidic than a soda with a pH of 2.5. However, this gastric juice has a high acidic buffer so it is hardly changed by neither neutral tap water nor alkaline activated water.

This has been thoroughly researched in Russia in 1997 and confirmed scientifically. (FAQ: Russian research, stomach acid). Blocked protein digestion, pepsin inactivity, parasite promotion – everything Bartos lists, according to current scientific knowledge, has been proven wrong.

Alkaline activated water for drinking has mostly a pH of 9.5, which the German Drinking Water Ordinance permits even for tap water. Natural waters, for example long mountain rivers such as the Inn, are often very alkaline. Water with this pH cannot remotely disturb the production of gastric acid, unlike certain agents such as Alka-Seltzer or proton pump inhibitors do.

It is important that our drinking water is preferably alkaline and that we can replace the many harmful acidic drinks. This is an important, constant step towards beating hyperacidity.

Precisely for this reason are electrolysis cells in a water ionizer for drinking purposes designed, so that they produce an antioxidant alkaline water. You could also create an antioxidant neutral or acidic water, but the experience, the physiology and the flavor speak for alkaline water. But primarily

with alkaline activated water it's about the energy wealth in the form of a negative ORP.

If Bartos writes about the redox potential, it shows his whole misunderstanding of the relationships. The core concept of relaxation time is not even familiar to him. That alkaline activated water does not have a permanent antioxidant effect, he considers a disadvantage. But precisely this is its attribute, because a fresh apple is also healthier than an old one. So its redox potential also has a relaxation time, albeit longer. Just like us when we age. With alkaline activated water we can evidently extend this process of ageing.

About the erroneously illustrated relationship by Bartos, in the context of minerals in the water and risk of heart attack, as well as the WHO assessment, please read further details under the headings: risk of heart attacks and stomach acid.

ABOUT THIS BOOK. DEDICATION AND ACKNOWLEDGEMENTS.

Electro activated water is the thing that helped me so much, even with major illnesses like cancer, plenty of allergies, psoriasis and diabetes, in happily surviving the last 15 years. I am committed to distributing this highly beneficial technology in such a way, that water ionizers will become staple household appliances like coffee makers.

This book lives with the contact from its clients! If I hadn't stayed in contact for 12 years with thousands of people that drink water from a water ionizer, who listened to my lectures or had developed such devices, would no word be true... From this dialogue does especially the second part of this book live, which grows almost daily. If you have only bought the first part, then you have the basic knowledge. Everyone who has bought this book, either the printed version, as a DVD or online, is a partner of this dialogue, for you get the electronic update for three years at no extra cost per email. The book continuously grows with your questions. And you will have these questions, regardless of whether you use electro activated water or not, or if you are a chemistry professor or an amateur athlete, a teacher, a truant or simply someone who is not happy with their physical condition. For some questions I have made a video response, since nowadays moving images are the quickest and most accessible method to generally represent complex problems comprehensively.

Therefore I continuously upload lectures and videos for the "internet generation" onto the web. To find these you just need to visit the website of the publisher (www.euromultimedia.de). This book, with its multimedia system, is not a "publishing risk". It is an ecological and economical tool - just like electrically activated water is.

A lifelong health is wished to you from Your KarlHeinz Asenbaum (asenbaum@web.de)

I dedicate this book to Dr. Walter Irlacher. Without his years of long, generous demand and support, it would have never existed. For helping with the editing of the many versions I would like to thank Orsa Repp, Eng. Yasin Akgün and Constanze Asenbaum. Special thanks to my translator Yolanda Tenorio-Tagle and my chemistry coach Dr. Peng Hu, who is a great scientist of the hydrogen age. I am just a journalist developing PR for it - he finds new solutions. Last but not least I want to thank Tyler Le Baron for his work and continous patience during our long discussions.

Karl Heinz Asenbaum

The internationally respected expert for electrically activated water writes in his third activated water book his 12 year long collected knowledge about one of the most fascinating health issues in a continuously updated form.

The topics portrayed in the first part of this special edition are not likely to change much in the next few years.

The second part is considerably more extensive and comprises already with the first (german) edition more than 200 pages - it grows almost daily to answer questions that have come from all over the world.

It appears as a periodically updated E-book in the form of a personalized PDF.

The whole book is available by www.wasserfakten.com

This english edition from November 2016 has been revised and shortened by the author.