

### Note / Disclaimer:

The chemical formulas shown in these pages are a "chemical shorthand" developed by chemists to represent our understanding of what is actually going on in the water. The actual processes are more complicated, involving other compounds than distilled water, and pure elements and compounds. Also, subscripting, superscripting, and some symbols are difficult to render in HTML and are therefore not entirely accurate on this page.

### Differences between Free Chlorine and Total Chlorine:

Chlorine in water may be present in two forms, free and combined. Free chlorine does the hard work of killing bacteria and oxidizing contaminants. When you add chlorine to water, you are actually adding free chlorine. When the free chlorine combines with contaminants, it becomes combined chlorine, or chloramines. In water, this form of chlorine has very little sanitizing ability, and no oxidizing ability. Total chlorine is just the sum of both combined chlorine and free chlorine.

### Differences between Hypochlorous Acid (HOCl) & Hypochlorite Ion (OCl<sup>-</sup>)

#### Hypochlorite Ion (OCl<sup>-</sup>)

The species of chlorine resulting from dissociation (splitting up) of hypochlorous acid (HOCl) into its constituent parts H<sup>+</sup> and OCl<sup>-</sup> (Hypochlorite Ion).

**This happens if the pH is too high** - if it is too low the hypochlorous acid dissociates into molecular chlorine (Cl<sub>2</sub>).

**Hypochlorite ion is a poor disinfectant** because the negative charge creates an obstacle to penetrating the wall of the cell.

**Hypochlorous acid is 100 times faster than hypochlorite ion in killing a microorganism.**

#### Hypochlorous Acid:

**HOCl = Free Chlorine = FAC= Free active/available Chlorine**

**Also known as free chlorine.** It is formed **when calcium hypochlorite, dichlor, trichlor or chlorine gas are mixed with water and dissociate.**

This is the main pool water and other type of water disinfectant.

#### Hypochlorous acid acts as:

1. a **sanitiser** killing potentially harmful bacteria and microorganisms. It can enter a cell's wall and upset its protein and enzyme function,
2. an **oxidising agent** eliminating organic and inorganic impurities by a process similar to combustion, e.g it burns out pollution introduced by bathers such as sweat and urine for example in the swimming pool water area.

#### Useful amounts of hypochlorous acid can only be obtained if:

1. the **stabiliser level is not too high**
2. the **pH-value is within certain limits**, see **pH-values and concentrations in the table below:**

pH-value:	8,0	7,8	7,5	7,2	7,0	6,0	5,0
% as HOCl:	22	33	48	66	72	96	100
% as OCl <sup>-</sup> :	78	67	52	34	28	4	0

The **hypochlorite ion has a higher oxidation potential than hypochlorous acid, yet hypochlorous acid is a better disinfectant.**

The fact that **hypochlorous acid has no charge allows it to penetrate microbial cell walls easier.**

Therefore, **the lower the pH, the better disinfecting power of a chlorine solution due to hypochlorous acid formation.** The hypochlorite ion is overall more reactive, being harder on membranes and other materials of construction.

## HOCl / OCl<sup>-</sup> Chemistry

When pure molecular chlorine is added to water, it forms hypochlorous acid and hydrochloric acid:



1. **Hypochlorous acid (HOCl) is the stronger form of free chlorine,**
2. and **hydrochloric acid (HCl) lowers pH and alkalinity.**

**Hypochlorous acid further dissociates to hypochlorite ion OCl<sup>-</sup>, the weaker form of free chlorine) and free hydrogen (H<sup>+</sup>):**



**This dissociation is reversable, and pH driven.**

As HOCl is used to kill algae / microorganisms, or as it evaporates, OCl<sup>-</sup> shifts back to HOCl to maintain the pH-mandated equilibrium.

Representative pH levels and their corresponding percentages of HOCl and OCl<sup>-</sup> are:

<b>pH-value:</b>	8,0	7,8	7,5	7,2	7,0	6,0	5,0
<b>% as HOCl:</b>	22	33	48	66	72	96	100
<b>% as OCl<sup>-</sup>:</b>	78	67	52	34	28	4	0

The full equation may be represented like this:



1. HOCl is, of course, the “active ingredient”.
2. The OCl<sup>-</sup> is a bank, or reservoir of less active chlorine.

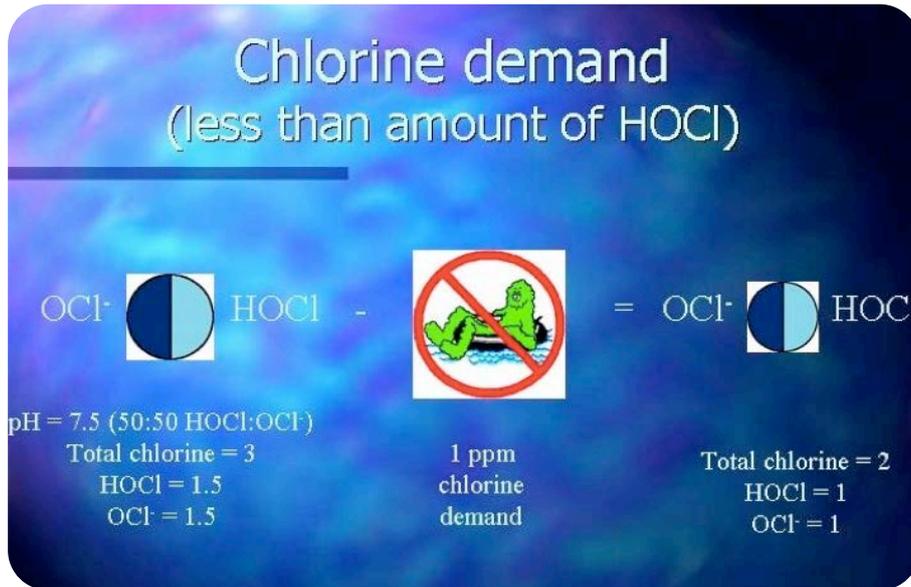
## Misunderstandings and Myths

A common pool industry myth is that when HOCl is used in a pool only OCl<sup>-</sup> remains. In reality, when HOCl is used, OCl<sup>-</sup> immediately converts back to HOCl to maintain the percentage division mandated by the pH. Although the actual reactions in water may be complex, a few illustrations in simplified language may help to describe what happens.

For example, if a pool contained 3 ppm total free available chlorine at a pH of 7.5, there would be about 1.5 ppm HOCl and 1.5 OCl<sup>-</sup>. If 1 ppm chlorine demand is introduced into the water, the myth would have us believe that as the demand is met, the HOCl is lowered to 0.5 ppm with the OCl<sup>-</sup> remaining at 1.5 ppm.

Assuming the pH to be unchanged, what actually happens is that the total chlorine is lowered to 2 ppm, the HOCl is lowered to 1 ppm, and the OCl<sup>-</sup> is lowered to 1 ppm. This happens even though it may have actually been only the faster and more potent HOCl that satisfied the chlorine demand. The subsequent shift of 0.5 OCl<sup>-</sup> to HOCl is virtually instantaneous.

The illustrations on the next page will demonstrate that:



**Illustration 1 above: Example one with one ppm chlorine demand, see explanation page before**

If, under the same circumstances, 2 ppm chlorine demand were introduced to the pool, the 3 ppm total chlorine is still sufficient to satisfy the demand. Since part of the OCl<sup>-</sup> may be used in the process, the kill rate may be slightly slower, but the demand is met. The remaining 1 ppm of chlorine in the pool shifts almost immediately to 0.5 HOCl and 0.5 OCl<sup>-</sup>. That illustrates the following picture



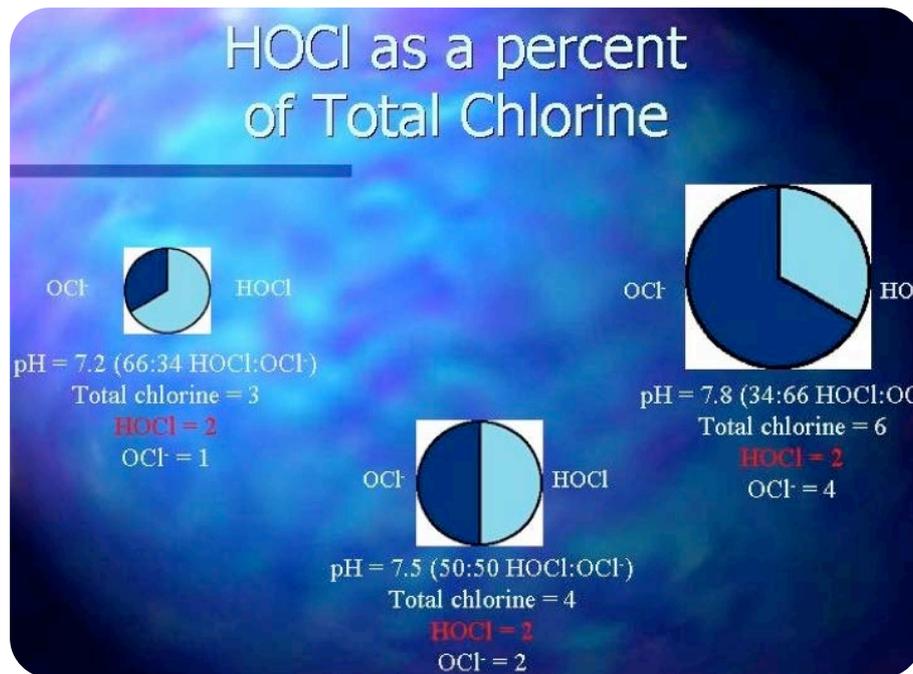
**Illustration 2 above: Example one with one ppm chlorine demand**

## Missunderstanding: Free Chlorine is not less effective at higher pH-Levels

Another myth or misunderstanding is that at higher pH levels chlorine is less effective.

Actually, pH does not so much control chlorine's effectiveness, but **rather the percentage of chlorine in its most effective form (HOCl)**.

Thus, if the target HOCl level in a pool is 2 ppm, examples of how that target level can be met include maintaining 3 ppm total chlorine (pH 7.2, HOCl 2.0, OCl<sup>-</sup> 1.0), 4 ppm total chlorine (pH 7.5, HOCl 2.0, OCl<sup>-</sup> 2.0), or 6 ppm total chlorine (pH 7.8, HOCl 2.0, OCl<sup>-</sup> 4.0).



## Following some important general information:

- The more acidic the neat (pure) anolyt the water, the more Cl<sub>2</sub> is found in the anolyt. As the pH-range of the Envirolyte Neutral Anolyt devices is between pH 6 and 8, less Cl<sub>2</sub> is found in the Neutral Anolyt compared with Acidic Anolyt ranging between pH 1,9 to pH 3,5. For this and many other reasons, the Neutral Anolyt is mostly the better alternative than the Acidic Anolyt
- The ORP levels change only, when the anolyt and the mixed water, that needs to be disinfected have different pH-values. The higher the difference between the pH-values, the more the difference in the ORP. The higher the pH-values of the water, where the Anolyt is solved, the lower the ORP
- In order to set up the system, one has to disinfect properly according the concentrations and detailed steps we recommend on page 8.
- Once the system is completely disinfected, the residual FAC is the most important value. If there is a residual FAC between 0,1 mg to 0,25 mg in the water, which needs to be continuously disinfected, the system should be protected from bacteria, virus and other type of harmful microorganisms. The trick of the game is, to find out, how much ORP and FAC the system is capable to accept, the higher these values, the faster and more sure all harmful microorganisms and viruses will be killed.
- As long the concentrations of the FAC is below 20mg/L (20ppm) in the water, there will be no unpleasant odor or taste in the water, as no reaction between aromatic compounds and the FAC will take place, and thus, no Chlorophenols will be developed.

## Chemical methods for determination of FAC concentrations in Anolyt

For fast measuring the FAC of neat (pure) ANK: Add in 10 ml ANK a few crystals of **Potassium Iodine (KI)**. With the following colour card compare the amount of FAC in the Anolyt. **400 - 500 mg/l is aimed.**

100 mg/L FAC	200 mg/L FAC	300 mg/L FAC	400 mg/L FAC	500 mg/L FAC	600 mg/L FAC

Following a more detailed measurement of the FAC in neat (pure) Anolyt:

### 1. Reagents

- Potassium iodide (chemically pure) KI – available in chemical shops
- Distilled water H<sub>2</sub>O – available in chemical shops or can be prepared
- 1 (N) normal Sulfuric acid H<sub>2</sub>SO<sub>4</sub> - 96% concentrated Sulfuric acid is available in chemical shops
- 0.1 (N) normal solution of Thiosulfate sodium (sodium thiosulfate) Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>·5H<sub>2</sub>O
- standard titer is available in chemical shops

### 2. Preparation of reagents.

Preparation of 1 (N) normal solution of Sulfuric acid H<sub>2</sub>SO<sub>4</sub>:

Carefully add 27 ml of concentrated sulfuric acid (96%) to 750 ml of distilled water. Cool it down and bring the mix solution up to 1 liter by carefully adding necessary amount of distilled water.

Preparation of 0.1 (N) normal solution of Thiosulfate sodium (sodium thiosulfate) Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>·5H<sub>2</sub>O:

Dissolve standard titer flask of Thiosulfate sodium (sodium thiosulfate) Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>·5H<sub>2</sub>O in 0.5 liters of distilled water. Bring the mix solution up to 1 liter by adding the necessary amount of distilled water.

### 3. Analysis.

Pore in a glass flask 10 ml of Anolyt. Add to Anolyt some potassium iodide and stir it. The mix will become brown. Add to the mixture of Anolyt and potassium iodine 50 ml of 1 (N) normal solution of sulfuric acid and stir it thoroughly. Take with a dropper 2 ml of 0.1 (N) normal solution of Thiosulfate sodium (sodium thiosulfate) Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>·5H<sub>2</sub>O and slowly (drop by drop) start adding it into the flask until the brown solution in the flask becomes transparent. The volume of 0.1 (N) normal solution of Thiosulfate sodium (sodium thiosulfate) Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>·5H<sub>2</sub>O you need to spare to achieve full transparency of the mix solution in the flask corresponds to a certain amount of FAC in Anolyt what can be seen from this table:

Volume sodium thiosulfate	corresponds to	FAC (Free available / active Chlorine)
0,58 ml		200 mg/l
0,85 ml		300 mg/l
1,40 ml		500 mg/l
2,00 ml		700 mg/l
2,10 ml		750 mg/l
2,25 ml		800 mg/l
2,40 ml		850 mg/l
2,50 ml		900 mg/l
3,00 ml		1065 mg/l
3,50 ml		1240 mg/l
4,00 ml		1420 mg/l

# Application of Neutral Anolyt in Shrimp Farming

World shrimp farming has grown into a multi-billion dollar industry, creating hundreds of thousands of jobs and much needed foreign trade and hard currency income in many countries. However, the industry is plagued with disease and water quality problems which have become the major obstacles to the future of shrimp farming.

Shrimp Farms and Shrimp Hatcheries lack defenses against rampaging **Protozoa, Fungi and Bacteria, with Viral Diseases** posing the greatest threat. Hundreds of researchers in dozens of countries and thousands of shrimp farmers are seeking new technologies to control disease and improve production.

Enviolyte Industries has solved the problems by developing the world's most advanced method of shrimp farming which is used primarily in Malaysia, Thailand, China and India.

**The process begins with treatment of the Shrimp Pond Water with Anolyt to eliminate all viruses, bacteria and other harmful micro-organisms.**

The initial disinfection of Shrimp Pond Water with Anolyt and daily disinfecting of freshly added water controls the problems of disease. During the past 3 years, test results in Malaysia and Thailand document a **shrimp survival rate of over 90%**.

**The shrimp growth cycle has been shortened from 120-160 days to 110 days with much larger physical size of the shrimp and an increased production rate of 3 to 4 tons per hectare, versus previous harvests that averaged only 1.5 tons per hectare.**



**Enviolyte EL-1200 at a medium-scale Shrimp Hatchery in Malaysia**



**Use of an Enviolyte EL-1200 at a Shrimp Hatchery in Malaysia**



**On-site generation of Anolyt by Enviolyte EL-1600 at a Shrimp Farm in Malaysia**

## In summation, the Enviolyte process:

- Totally eliminates the use of antibiotics providing control of Viral and Bacterial Diseases in all phases of Shrimp Farming and Shrimp processing.
- Provides ideal quality water for Shrimp Farming, with control of pH and algae growth.
- Increases the shrimp survival rate to over 90%.
- Provides better feed conversion, increased assimilation and much larger physical size of the shrimp.
- And many more advantages such as easy, safe and cheap On-Site production of Anolyt, ect...

For further information, please see also:

<http://www.aquacentrum.de/shop/de/69-industrie-ionisierer>

	
<p><b>Disinfecting Shrimp Feed with Anloyt</b> Like this, the Anolyt can enter the shrimps body and help to protect against harmful bacteria and virus.</p>	<p><b>Mechanical dispensing of Shrimp Feed after treatment with Anloyt to eliminate sources of infection, improve the quality of the Shrimp Feed and provide better food conversion with stimulation, faster growth, lower mortality and improved water quality.</b></p>

- The introduction of Envirolyte units and activated solutions to the Shrimp industry definitely marks a break-through in shrimp production. With the new technique when all phases of shrimp growing become more reliable - and they will - the production of farm-raised shrimp will take another leap forward.
- Diseases represent the biggest obstacle to the future of shrimp farming. Farms and hatcheries have few defences against rampaging protozoa, fungi and bacteria, but it's viral diseases that pose the greatest threat. Disinfecting of the water with Anloyt at the time when it is stored in the pond and daily disinfecting of the freshly added water is an effective way to solve the problem of the diseases
- Daily disinfecting of hatchery water is a part of an effort to execute an ecosystem approach which eventually pays off with stronger post larvae due to its close approximation of natural conditions and the absence of therapeutics.
- Treatment of the prawn feed with Anloyt offers several advantages: better feed conversion, faster growth, lower mortalities, and improved water quality.
- Daily disinfecting of hatchery water is a part of an effort to execute an ecosystem approach which eventually pays off with stronger post larvae due to its close approximation of natural conditions and the absence of therapeutics.
- After Anloyt treatment feed becomes moist as well and mechanical feeder can distribute it evenly and efficiently. Wind does not restrict feeding to only one side of the pond any more.

## **Application of activated solutions - ANK-Anloyt (Neutral Anloyt) and Catholyte in Fisch Processing Industry**

Having in mind properties of activated solutions (Anloyt and catholyte), such as their bactericidal, virucidal and fungicidal efficacy, non-toxicity, harmlessness to foodstuffs and people, proven by laboratory and industrial research, we can successfully use them in fish processing industry.

Considering peculiarities of fish processing we recommend to use the activated solution as follows:

1. Disinfecting and washing of surfaces, walls, premises and containers: First for washing: catholyte should be mixed with the detergent habitually used for removing fat at ratio 1:2-1:4. This enables to cut the amount of detergent needed by 50% or more. Catholyte is an alkaline solution with pH 11.5 – 12.6. This solution itself has washing properties. Then for disinfecting: Anloyt ANK of 0.02% (200 mg/ltr of active chlorine), pH 7.1-7.3, ORP 410-450 is used alone; exposure is 15-20 min. After disinfecting it is not necessary to wash the surface with water because Anloyt returns to its initial state – water and salt (neutralizes), Please note that this application of Anloyt is not enough to ensure complete disinfection and it is only for maintaining a relatively satisfactory hygiene. We recommend disinfecting with stronger Anloyt ANK solution – 0.05% ( 500 mg/ltr of active chlorine) once a week after work.
2. Disinfecting of equipment, closed systems: Anloyt ANK + catholyte should be mixed with the detergent habitually used for removing fat at ratio 1:2. After washing-disinfecting it should be washed out with water. In closed systems the solution has to circulate for 15-20 min.
3. Brine (concentration 10-12% NaCl) that has been used to brine fish, can be decontaminated using 0.05% Anloyt ANK solution, pH 6.9-7.2. The procedure is as follows: to 1000 ltr of brine 20 ltr of ANK is added on the first day; 20 ltr of ANK on the second day; 15 ltr of ANK on the third day.
4. For water disinfecting: with the help of batcher 15 ltr of Anloyt ANK 0.05% (500 mg/ltr active chlorine) is added to the water system for every 1000 ltr of water. Before doing this it is recommended to disinfect water systems with 0,05 % Anloyt ANK solution.
5. Fog generators should be used to spray 0.02% Anloyt ANK for disinfecting air in the premises and ventilation shafts. At the end of working week it is recommended to spray the premises with 0.05% Anloyt ANK solution.
6. For disinfecting waste water the following method is recommended: 1 litre of catholyte is put into every 100 litres of waste water, which provides precipitation, after that 1 litre of Anloyt ANK (0.05% concentration) is added to every 100 litres of waste water, which provides decontamination and disinfection.
7. Before technologically processing fish we recommend to soak it for 3-5 minutes in 0.005 – 0.01% concentration Anloyt ANK solution.
8. Disinfecting of vehicles: first they are washed with catholyte diluting with water in ratio 1:2; 1:4 with a small addition of washing materials. Then they are disinfected with Anloyt ANK with concentration of 0.02- 0.05% (200-500 mg/ltr of active chlorine). After disinfecting it is not necessary to wash them with water.
9. Stock (brushes, washing cloths, etc.) are also disinfected with Anloyt ANK of 0,02%.
10. Fish fillet is processed and at the same time injected with NaCl solution of 10–12% adding Anloyt ANK of 0.05% (10 ltr of brine solution + 1 ltr of Anloyt ANK of 0.05 %).

Knowing the properties of solutions (Anloyt ANK and catholyte) we can successfully apply them in all spheres of fish processing (cooking, brining, freezing, vacuum packing, preparing of salads, filleting, etc.).

Fish factories “Norvelita” (<http://www.norvelita.lt>) and “Lignesa” (<http://www.lignesa.lt>) use this technology in Lithuania since the beginning of the year 2006.

Based on articles from Envirolite Industries Int. Ltd. Tallinn, Estonia. More information @ [www.aquacentrum.de](http://www.aquacentrum.de)

## The World of Farming and Animal Husbandry 04/2004:

### Example-Project: Shrimp farming with Anolyt in China

這項4國聯手開發的Eurostel電膜激發機是最先進的養蝦系統，刻下正在大馬等4國採用。激發機電化反應先把輸入的加鹽自來水處理成為可殺滅所有已知病毒與細菌的液體配方並稀釋於池水中，以使養蝦取得豐收。

一項迄今最為先進的養蝦系統已經分別在大馬、泰國、中國與印度採用，系統核心乃引用歐洲4國即英國、荷蘭、德國與俄羅斯科學家所聯手開發的Eurostel電膜激發機。激發機通過電化反應把輸入的加鹽自來水處理成為可殺滅所有已知病毒與細菌的液體配方並稀釋於池水中，使養蝦得以取得豐收。

縮短，由現有120至160天的養殖期縮短到110天之內，收成為每公頃3到4噸，比當下平均每公頃少過1噸半的成績增加了一倍，更甚者，所費出的

**養蝦成活率逾 90%**

上述科技系統是由 S V Aquatech (馬) 有限公司引進。過去3年來，它在國內與泰國的試用成績顯示，養殖蝦的成活率不但超過90%，而且蝦隻的成長期也可



SV Aquatech (馬) 有限公司董事經理許興剛欣喜地展示收成蝦的體積

畜牧世界 04/2004 ■ 090

Words in the picture: The manager of S V Aquatech Mr. Simon Shih is happily displayed the harvest of shrimps.

Following the translation from Chinese into English:

**World of Aquatic Products --- New shrimp-raising system Writer: A Jiang \*S V Aquatech (M)**

### **Abundant harvest of shrimps through Employing advanced system -- Envirolyte Generator**

The Envirolyte Generators, collaboratively developed by four countries, is the most advanced shrimp-raising system, which is now widely employed in four countries, including Malaysia. The Envirolyte Generator's electric performance is to firstly process the running water which is added with salt into the liquid formula which could kill and eliminate all known viruses and bacteria and then dilute it into the pond water, through which the abundant harvest of shrimps could be achieved.

A set of the most advanced shrimp-raising systems up to now has been adopted in four countries - Malaysia, China, Thailand and India. The core of the system is the Envirolyte Generator jointly developed by scientific researchers from four European countries - UK, Holland and Russia.

The Envirolyte Generator's performance is to firstly process the running water, which is added with salt, into the liquid formula which could kill and eliminate all known viruses and bacteria and then dilute it into the pond water, through which the abundant harvest of shrimps could be achieved.

**The survival rate of shrimp raising is over 90%**

Important initial information for the use of Neutral Anolyt, for e.g. shrimp farming - page 10 of 12 pages

The above system is introduced by S V Aquatech (Malaysia). During the past 3 years, the tested results both domestically and in Thailand show that not only the survival rate of raised shrimps is over 90% but also growth cycle of the shrimps could be shortened. The cultivation time could be shortened from the current 120 days or 160 days to within 110 days. And the harvest could be 3 to 4 tons per hectare, which has increased from the current harvest that on the average is less than 1.5 tons per hectare.

**Words in red below the following two shrimp pictures:**

By using the advanced shrimp-raising system, the growth of shrimps becomes quicker. The picture on the left is the Tiger Shrimp that has been raised for 41 days and its length is 6 inches. And when the Shrimp is raised to the 47th day, its length has been over 7 inches as the picture on the right shows.

健康蝦完全不含藻／赤藻與弧菌，除此之外，蝦隻體積更大及有更佳的飼料換肉率。

SV Aquatech (馬) 有限公司董事經理薛興剛指出，這是綠色系統 (Green System)，使養蝦作業完全不用抗生素與化學品，同時養出的蝦也不含細菌，因此，收成可在海外市場行銷。

有鑑於此，該公司已與一家掛牌公司屬下的冷凍廠合作，通過採用上述科技系統養蝦而把收成的蝦隻悉數供應給對方，以便冷凍加工製成各種產品出口外銷到食品安全規格嚴苛的歐盟市場去。

薛氏指出，上述系統容易操作及方便使用，低投資，低成本，已經作業的蝦場如果加以安置，對蝦場現有的基礎設施只需進行很少更改，與此同時，養殖規範也不致有大改動，當然最重要的是，它不致破壞蝦場生態環境，尚且越養越好，可以使養蝦業做到永續經營。

薛氏在該公司市場執行人員陸文禮的陪同下向本刊介紹上述科技系統，他說，系統核心之 Eurostel 電膜激發機有大、中、小 3 種款型，視蝦場



▲ 通過先進的養蝦系統，蝦隻的成長快，左圖為養了 41 天的虎蝦，體長 6 吋，而養了 47 天，體長超過 7 吋。

Besides, Algae/Red algae and/or any virus do not contaminate the raised healthy shrimps at all. Further, the volume of shrimp meat is bigger than before, which is the results of better conversion ratio of meat vs. feed.

The manager of S V Aquatech, Mr. Simon Shih, points out that this is Green System, which could ease the process of raising shrimps without antibiotics and chemicals, and, at the same time, there is no virus affecting the shrimps. All of these could lead to the overseas marketing and selling of the harvest. Considering the above-mentioned, S V Aquatech has cooperated with a cold-storage plant who is the subsidiary of a licensed company in exporting all kinds of products made by freezing process to the European Union market that has the strictest Food Regulations. In this cooperation, S V Aquatech provides the harvested shrimps raised by this advanced system to the cold-storage processing plant. Mr. Simon Shih also points out that the above system is easy and convenient to operate with low investment and cost. For the already operated shrimp-raising plants, only little of the existing infrastructure needs to be changed, if this system is to be applied. At the same time, there is no need to make big changes to the current scale of raising shrimps. Of course, most important is that this system is not going to destroy the biological environment of the shrimp-raising plants. On the contrary, the environment will become better and better, which could lead to the ever-continuous operations of the shrimp- raising industry.

Based on articles from Envirolite Industries Int. Ltd. Tallinn, Estonia. More information @ [www.aquacentrum.de](http://www.aquacentrum.de)

Mr. Simon Shih made the above introduction of this advanced technological system to our publication accompanied by his company's marketing manager - Lu Wen Li. He said, The Envirolyte Generators could be divided into 3 models - big, medium and small, according to the different needs, which could be installed in the shrimp-raising plant by the cultivation personnel and could be put into operation immediately.



Words in red below the picture:

These two pictures are for the shrimps that have been raised for 120 days. The length of the above one is up to 1 ruler. The picture on the right is the comparison between the shrimp and the hand.

He said, as estimated, one Envirolyte generator could produce 1 million tons of processed liquid formula for one day on the average, namely Anloyt - oxidizing liquid & Catholyte- reducing liquid. The operation method is to add water and salt at the same time into the Envirolyte Generator. The outcome of its process should be put into the pond water at the dilution ratio of 1:1000. Therefore, within 24 hours, 1,296,000 liter of pond water can be cleaned and disinfected.

Mr. Simon Shih points out that to disinfect 1000 liter of water only 1 liter of Anloyt liquid by Neuroses generator is needed, which could be produced by only at 18 V of electricity, without any other chemical additives.

He also said that it is quite safe in terms of reducing chlorine (Cl) elements and decreasing the contamination of virus. Besides, the liquid is definitely harmless, which is not going to irritate the skin of the workers or lead to the disease of pinkeye.

### The shrimp-raising industry could earn a lot of foreign exchange

The shrimp-raising industry in the world has developed into the greatest industry counted by billion of Yuan. It not only creates many employment chances, but also earns a large amount of foreign exchange for our country. But unfortunately, today the shrimp-raising industry in each country has been hampered for the reasons of management, diseases or the quality of water. Just because of this, hundreds of researchers and specialists have been trying hard to find and develop new technology, new system to overcome the above problems and to increase the production of the shrimp-raising plants.

Envirolyte technological system is the advanced product resulted from the surging of mentality of the researchers, which increase the survival ratio of the shrimps during their growing period from 20% -30% to 60%-90%. Especially, with this system, there is no need at all to use antibiotics that is strictly forbidden in the developed countries, such as EU, U.S.A, and Japan. Once it is detected that there is only a little bit remaining of antibiotics in frozen shrimps or other shrimp products, all these products from the exporting countries will be forbidden.

Mr. Simon Shih points out that the above technological system is a great breakthrough for the shrimp-raising industry. It could make this industry much more reliable and more secure. Therefore, it could be

forecasted that this system could help the development of shrimp-raising industry of every country up to a new level in a cross step.

Mr. Simon Shih said, along with Malaysia, Thailand, India and China have given quite positive responses and have employed the Envirolyte generators in order to have abundant harvest.

## The World of Farming and Animal Husbandry 04/2004:

# Evergreen Fresh expects higher production with new technology

■ By MARINA EMMANUEL

MALAYSIA can spin an estimated RM30 billion tiger prawn industry, by tapping a home-grown technology which rehabilitates disused pools found at tiger prawn farms.

The technology, which was introduced two years ago by an obstetrician and gynaecologist, controls the water quality in the ponds and weeds out bacterial contamination through ionisation.

It has yielded "environmentally-friendly" tiger prawns at a farm in Kampung Pasir Gebu Tepi Laut, near Kepala Batas on mainland Penang.

With an annual production of 60 tonnes of tiger prawns, Evergreen Fresh Aquaculture Sdn Bhd is now looking to produce 100 tonnes a year to meet increasing demand from local exporters.

"The ionised method, which does not employ any chemicals such as antibiotics or probiotics, reduces the cycle of tiger prawn harvesting from the traditional 140 days to 40 days," the company's managing director Dr Vong Nyam Seng told reporters yesterday during a visit to the farm by Deputy Agriculture minister Datuk Seri Mohd Shariff Omar.

Dr Vong said he was inspired to employ the technology in prawn farming, after observing the technique employed to disinfect the floors of his clinic in Soberang Prai.

He said operational costs in employing his method with tiger prawn farming was RM15 per kg, and he had managed to re-



**FRESH CATCH:** Mohd Shariff (right) with Dr Vong (centre, partially hidden) and Hunza's Khor (left) hold up some of the giant prawns which are farmed in ionised water.

duce this figure to RM10 for every kg.

"Our aim now is to bring it down to less than RM5 per kg," he added.

Evergreen Fresh Aquaculture's tiger prawn farm sits on a 13.2ha site, where its ponds are filled with recycleable brackish (or salty) water.

The company sells its produce exclusively to Penang-based seafood packing company Hunza Consolidation Bhd.

Hunza's group chairman Datuk Khor Teng Tong, who was also present, said there is increased demand for the tiger prawns cultivated by Evergreen

Fresh by countries like Japan, Europe and the US.

"They keep asking for more," he added, saying that the environmentally-sound manner in which the tiger prawns are cultivated, along with its firm and fresh texture are plus points.

Meanwhile, Mohd Shariff said the potential of exploiting Dr Vong's method will be looked into by his ministry.

"We hope to enter into a smart partnership with the company through the Department of Fisheries in extending the applications of the technology to rehabilitate tiger prawn farms which have been abandoned,"

the minister said.

Figures released by the ministry two years ago revealed that the country's tiger prawn industry was growing at an average rate of 21 per cent yearly from 1991 to 2000, producing some 17,500 tonnes valued at RM495 million.

Mohd Shariff said the industry involves a pond area of 3,200ha, of which 10 per cent was disused.

"Since this technology still needs to be fine-tuned, we will need to work closely with the private sector in learning more about it," he added.