

## *KITZ Smart Aquaculture*

Introducing our innovative water purification technology and  
propositioning "KITZ Smart Aquaculture"

Since June 2012, KITZ Corporation has started KITZ Water Solutions (KWS), a group which combines and introduces water solution technologies and services of the many KITZ Group companies

We are pleased to announce that KWS has succeeded in verifying KITZ RECIRQUA<sup>\*1</sup>, a new water purification technology which disinfects, decolorizes and deodorizes the water in which fish are cultured in while resolving metabolites including ammonia.

We will be proposing "KITZ Smart Aquaculture", a business proposal for a new market that is made possible by using KITZ RECIRQUA.

### ■ KITZ RECIRQUA

The production amount for wild catch has leveled out. Therefore, farmed fish accounts for roughly half of the fish on the market and that percentage is still expected to grow<sup>\*2</sup>. Unlike marine aquaculture, space for on-land fish farming is not limited so it has been drawing attention. On-land fish farming is done in a closed environment with the use of a water tank because it is more environmentally friendly and the fish's health is easier to manage. In order to sustain the water quality in fish tanks while culturing fish in a closed environment, disinfection, decolorization and deodorization of the water while resolving metabolites is required. Ammonia which is produced by fish if not removed can hinder the fish's growth, so converting it into nitrogen gas is necessary. Usually, the conversion of ammonia into nitrogen gas is done in two-steps with the use of a biofilter. They are anaerobic bacterial degradation and aerobic bacterial degradation. This process is said to be the impediment to the commercialization of closed circuit land based fish farming because managing the bacteria is difficult, complex and a lot of space and time is required.

In order to make culturing fish in a closed environment easier, we have developed KITZ RECIRQUA. It is a new water purification technology which uses radical reaction to cause a chain of chemical reactions to convert ammonia and multiple molecules into nitrogen gas while disinfecting, decolorizing and deodorizing the water in which fish are cultured. By using this technology, traceability is ensured and the use of chemicals can be minimized. Also, stable, high-efficiency and high-density farming is possible.

<sup>\*1</sup> KITZ RECIRQUA : Combination of Recirculate and Aqua to create the image of recirculating water.

<sup>\*2</sup> Food and Agriculture Organization of the United Nations (FAO)

<sup>\*3</sup> Radical reaction : Refers to a reaction in which radicals are involved in the process of organic reaction. It is often seen in photochemical and thermochemical reactions.

## ■ KITZ Smart Aquaculture

The biological filtration process by bacteria is not required when using KITZ RECIRQUA. So, managing the various water qualities required for maintaining the culturing water and managing all the operating conditions of the machine or degradation state of ammonia as digital data which was impossible with the biofilter is now possible.

By combining the cloud ICT technology to this, KWS will be proposing “KITZ Smart Aquaculture”. The data can be collected, analyzed and remotely monitored on a real time basis.

In the near future, we plan to create a new aquaculture market starting from Japan by differentiating ourselves on lowering the cost and using cloud technology to make fish farming management easier, better and can be controlled from anywhere around the world.

## ■ Commercialization

We aim to introduce KITZ RECIRQUA to the market in 2016.

## ■ For further information contact us:

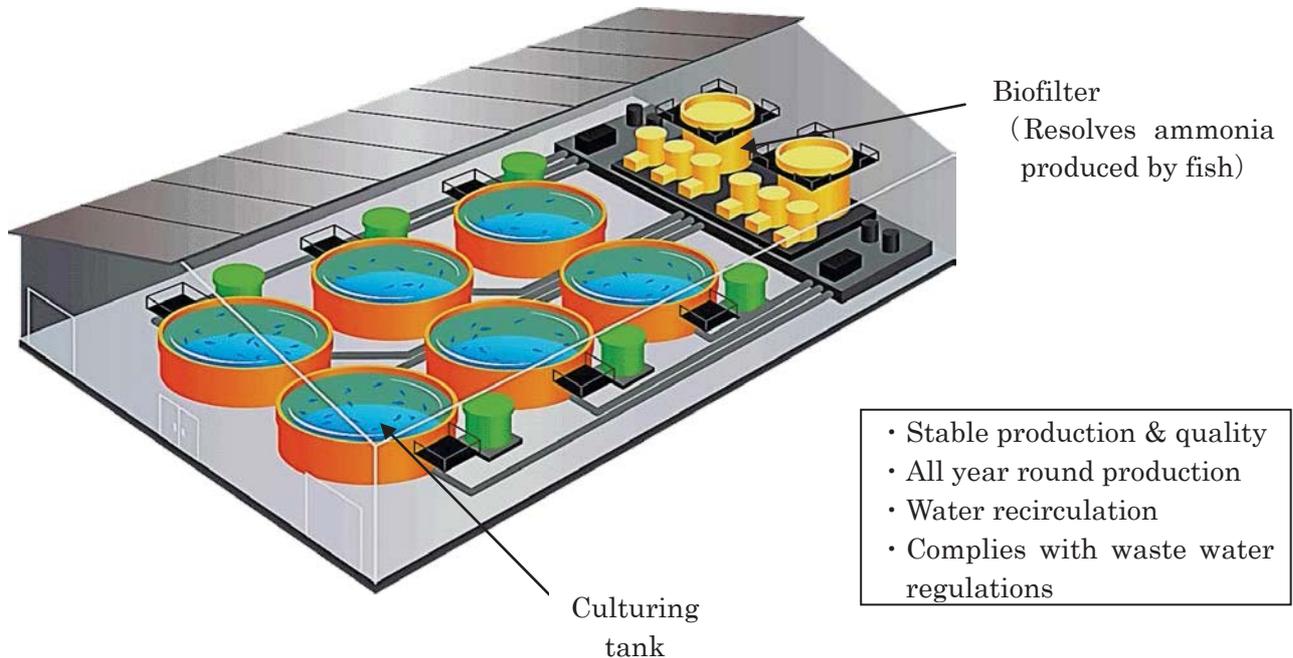
New Business Development Department

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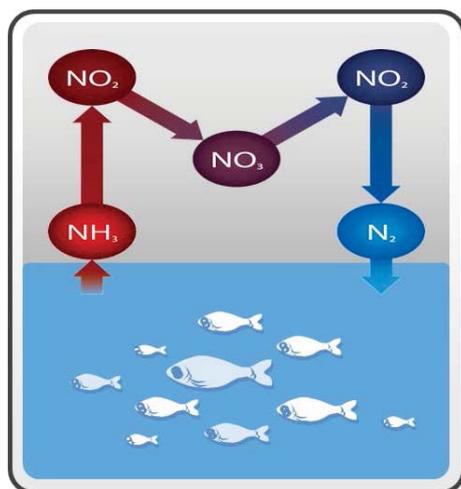
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## 【Image of Recirculating Aquaculture System(RAS) farm】

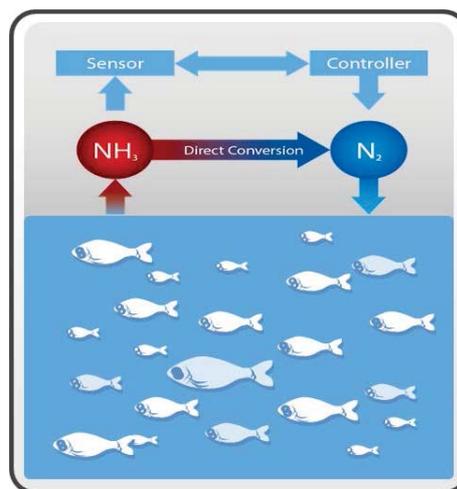


## 【KITZ RECIRQUA】

### Biofilter



### KITZ RECIRQUA



Biofilter

Ammonia → Nitrite → Nitrate → Nitrite → Nitrogen gas  
 Aerobic reaction (bacteria)      Anaerobic reaction (bacteria)

**KITZ RECIRQUA**

Ammonia + Radicals → Nitrogen gas + Water  
 Advanced oxidation process (electricity)

## 【Characteristics of KITZ RECIRQUA】

	Biofilter	<b>KITZ RECIRQUA</b>
Operation/management for ammonia removal ability	Depend on farmers knowledge of bacteria management	Automated, Digitalized
Ammonia removal speed	Depends on the degree of bacteria activity	Removes instantaneously
Ammonia removal ability in low water temperature	Will decrease	Constant
Disinfection	No	Yes
Deodorization	No	Yes
Area occupied*	Occupies about 30% of rearing area	Occupies about 10% of rearing area

\*Ratio of occupied area varies according to the situation

