

Combined technology upgrades the function of CarbonFiber **MiraCarbon+**

# Mira Carbon® **Plus**

**Plus3** Combined technology upgrades water purification function of MiraCarbon



**SO-EN CO.,LTD**

# + Air

## CarbonFiber + Circulation & Aeration

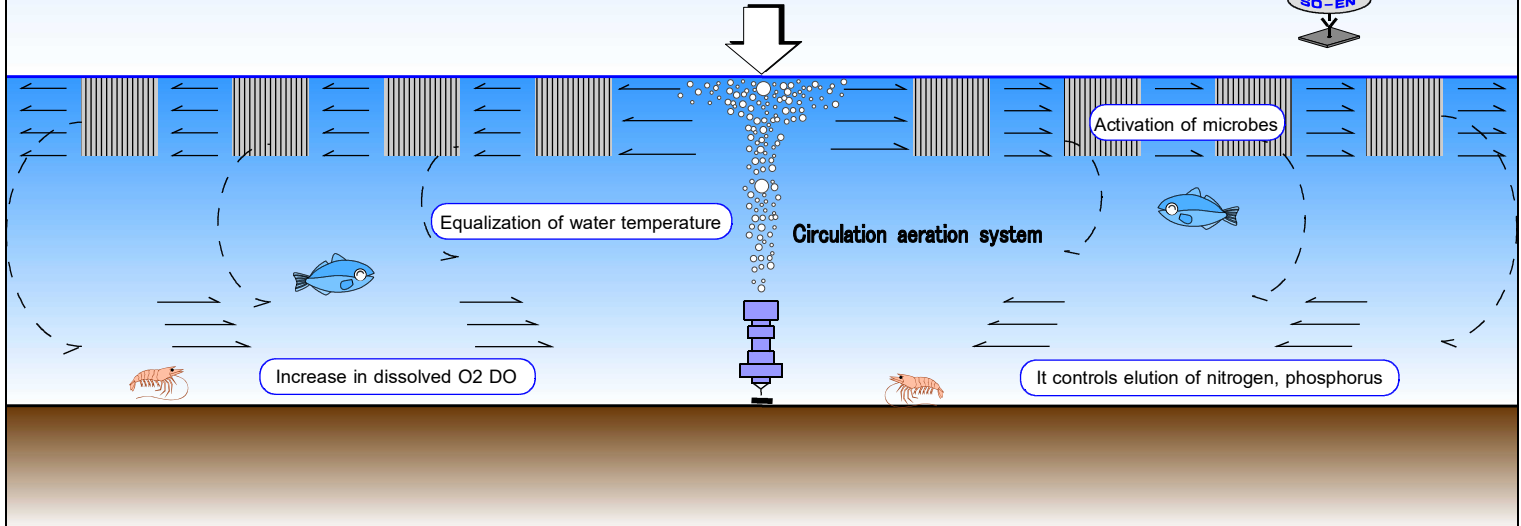
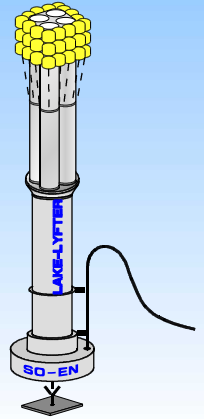
Effect : It increases dissolved O<sub>2</sub> density in water and promote decomposition such as organic matter or nitrogen.

Microbes adheres to CarbonFiber are activated and purification effect is improved.

It supplies oxygen to bottom of water and controls elution of nitrogen and phosphorus from bottom mud.

It helps equalization of water temperature by circulating the whole of water area.

Way : Installing intermittent water convector · aeration system etc in water and supplying .



# + Bio

## CarbonFiber + Microbes

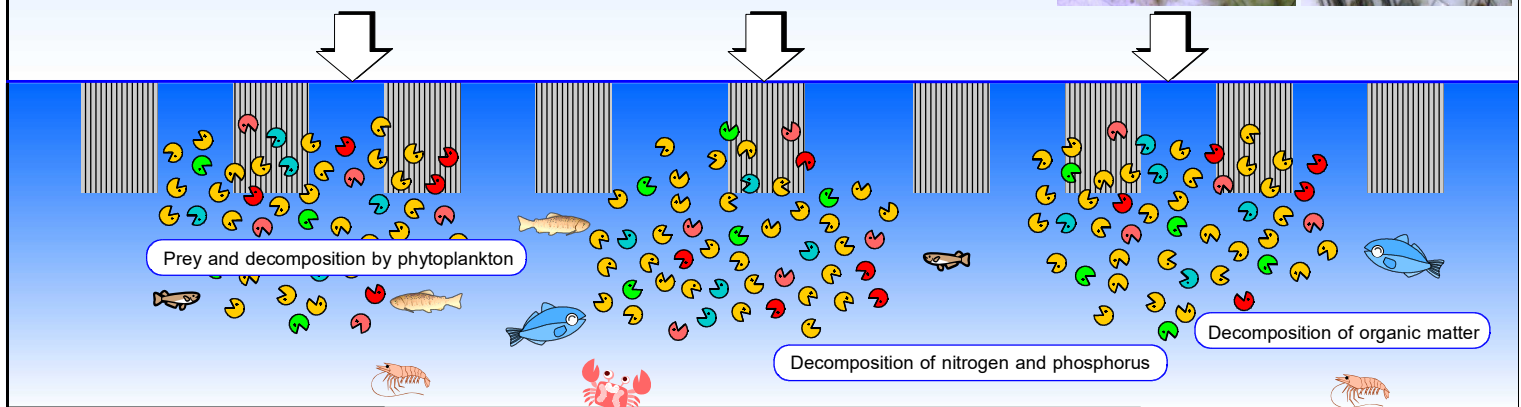
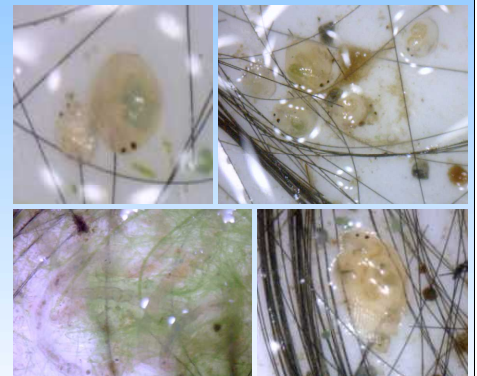
Effect : Zooplankton directly prey and decompose phytoplankton.

Microbes begins to live on CarbonFiber, they are activated, multiply and gain weight.

Microbes decompose organic matter, nitrogen and phosphorus, contribute to water purification.

Microbes become bait for aquatic organism and also for fish etc.

Way : Supplying microbes directly to CarbonFiber.



Metal ions such as **Iron** are the elements which are essential to make rich ecosystem.

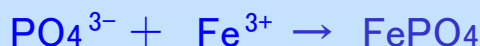
**No Iron** → Aquatic plant and seaweed cannot grow up, and ecosystem is destroyed.

Nitrogen and phosphorus increase algae and red tide, contaminate water.

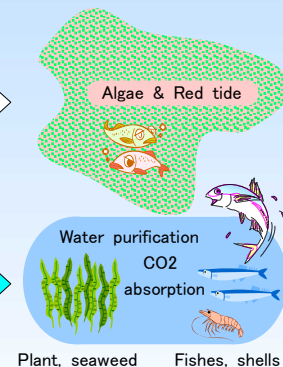
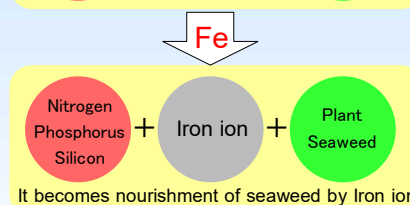
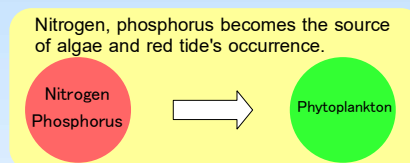
**With Iron** → Aquatic plant and seaweed grow up, rich ecosystem is formed.

Nutrient for algae and red tide is quitted and they does not increase.

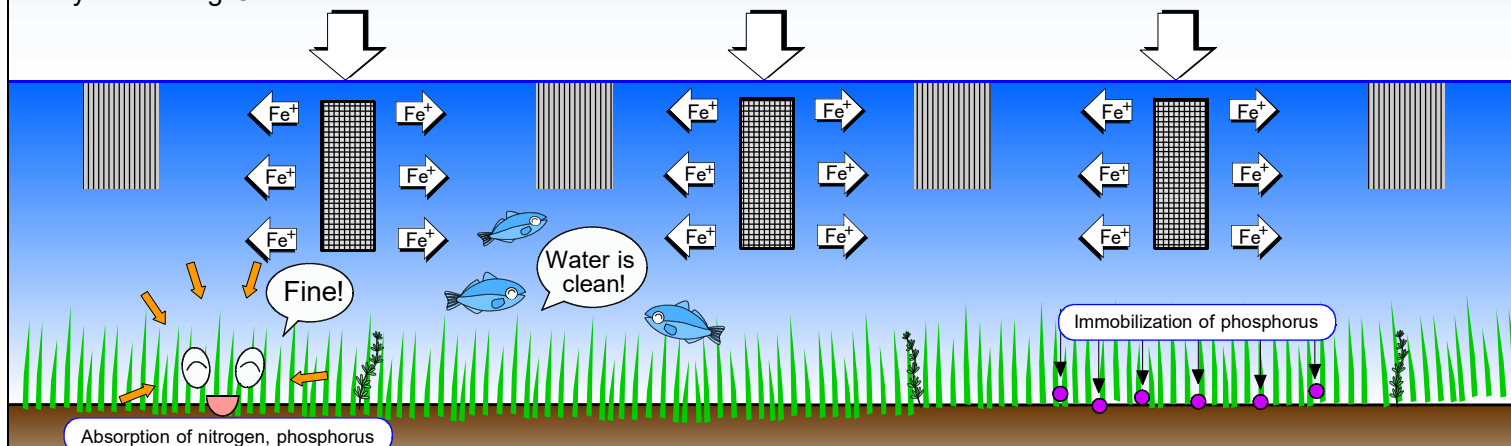
Phosphate ion becomes **Iron** phosphate and is immobilized combining with **Iron** ion.



Nitrogen and phosphorus in water dissolve as nitrate  $\text{NO}_3\text{-N}$  and phosphate  $\text{PO}_4\text{-P}$ . However with this form, waterweed and seaweed cannot take in these as nourishment and cannot grow up. To become nourishment, it is necessary to reduce, get back to the form of nitrogen N and phosphorus P. Reduction is to remove oxygen O, opposite of oxidation, and iron ion Fe of metal ions performs this function.



Way : Installing CarbonFiber and metals at the same time.



## Relations between CarbonFiber and microbes

In water, since all surface electric potentials of CarbonFiber and microbial cell have negative charge, they are repelling each other. However negative charge of CarbonFiber is very small, it does not have electrical resistance. In addition, intermolecular force which materials attract each other is strong between CarbonFiber and microbes. Therefore microbes can adhere to CarbonFiber easily and quickly.

Also, it is revealed that nitrifying bacteria which decompose and remove nitrogen adhere to CarbonFiber well.

## Relations between CarbonFiber and metal ion

CarbonFiber is composed mainly by Carbon . Electron of metals are drawn by CarbonFiber and metal ions are eluted by contact between CarbonFiber and metal because electronegativity of Carbon is stronger than electronegativity of metals. Usually Metals such as iron are difficult to dissolve in water, however iron ion is eluted easily when it is installed with CarbonFiber in water.

Electronegativity : Carbon [ C ] > Iron [ Fe ]

\* Electronegativity : It is a measure of strength which intramolecular atom draws electron, it is relatively decided by each kind of atom.

## ■ Combined technology of CarbonFiber for water purification material

# + A<sup>ir</sup>

CarbonFiber + Circulation Aeration

Although it is mainly a function of aerobic bacterium to adhere to CarbonFiber and to decompose organic matter, aerobic bacterium does not become active in an environment with little oxygen. When there is little dissolved O<sub>2</sub> in water, supply oxygen by aeration. If water circulates by aeration, pollutant contacts with microbes on CarbonFiber and treatment effect increases.

# + B<sup>io</sup>

CarbonFiber + Microbes

Microbes are attracted and adhere to CarbonFiber. However in an environment where there is little or no microbes, water purification does not advance. Water contamination continues when blue-green algae increases and zooplankton decreases. In this case, it is effective to supply microbes which become seed microbes.

# + C<sup>ation</sup>

CarbonFiber + Metal ion

Since CarbonFiber, pollutant and microbes have negative charge in water, they can easily approach and attach when electrical neutralization with positive (metal) ion is performed. Iron ion is essential minerals for ecosystem in water, it activates microbes and combines with phosphate ion, does not become nutrition source for blue-green algae etc.

## ■ Compatible standard product

Sort	Product name	Type	Model	Specification
<b>+ A</b>	Lake-Lyfter	Shallow-water	LP10-1	Water depth : 2~3m      Water Volume : 5,000~15,000m <sup>3</sup>
		Standard	L5-10	Water depth : 20m      Water Volume : 50~100 × 10 <sup>4</sup> m <sup>3</sup>
		Large-capacity	LB5-10	Water depth : 20m      Water Volume : 400~500 × 10 <sup>4</sup> m <sup>3</sup>
<b>+ C</b>	CarbonFiber Bag	Standard bag	CFB-L1	CarbonFiber fabric bag Lsize
		Standard bag	CFB-M1	CarbonFiber fabric bag Msize
		NetBag-insert	CFR-S1	Recycle CarbonFiber + Net bag

\* Please see the catalog for details of each standard product.

\* We don't sell microbes for + B as standard products. We offer it according to the field site.

\* We offer aeration system, microbubble generation system and installation equipments for + A as options.

\* We offer metals such as iron, copper and installation equipments for + C as options.

\* If you use other products, please choose products which adapt to CarbonFiber for water purification material.

◇Please note that the specification, size, and visual aspects can be changed for improvement without notices.

■ Manufacture and Seller

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