

Use of MiraCarbon in marine aquaculture and aquaculture tanks



Problems of Aquaculture

● Water quality deterioration

- Remaining food and excrement accumulation due to overdose.
- Red tide and toxic substances generated by eutrophication.
- Deposition of sludge.

● Productivity drop

- Deterioration of quality and catch due to disease and infection.
- Decrease in survival rate of fry.

● High cost

- Administration of antibiotics.
- Maintenance of purification equipment and power costs.
- Water exchange.

Advantages of MiraCarbon

● Water quality improvement

- Water quality and bottom quality are improved by adsorbing and decomposing pollutants.
- Nutrients are reduced and eutrophication is suppressed.
- Since the environmental load is small, it is naturally friendly.

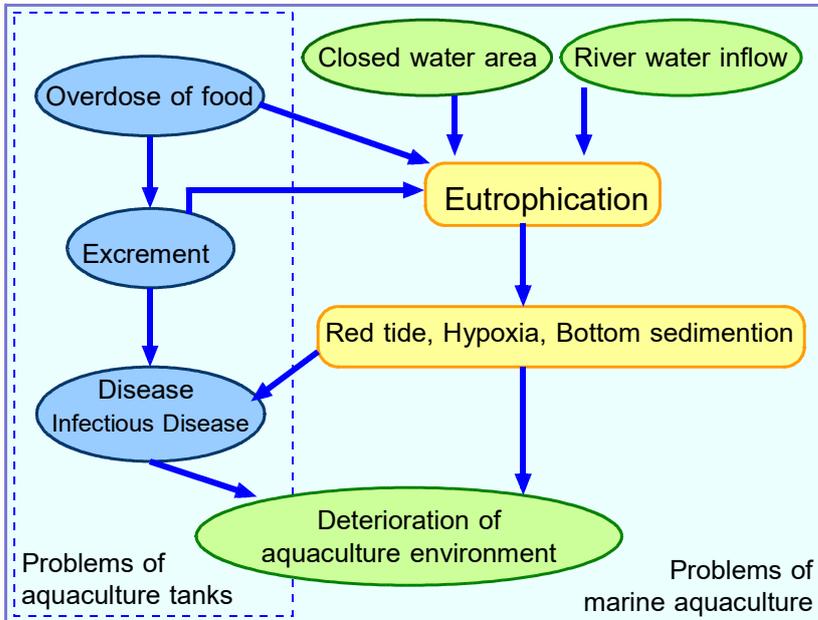
● Productivity improvement

- Disease and death decreased and catch increased.
- Growth is promoted and quality and safety are improved.

● Cost reduction

- Reducing the amount of antibiotics used.
- Can be used for a long time without decay or deterioration.
- Water quality is maintained and water exchange is reduced.

■ Problems of Marine product Aquaculture



When water quality gets worse by overfeeding and waste matter in aquaculture for marine products, it might cause to be sickness and infectious disease.

Moreover, unlike aquaculture in the tank, aquaculture in the marine is influenced by open sea and river water. In case of red tide, poor oxygen, and bottom sediment in eutrophicated ocean area, aquaculture's environment gets worse and worse.

■ Installation considerations

● Terrain

- Submarine topography, Bottom sediment
- Closed water area
- Water depth

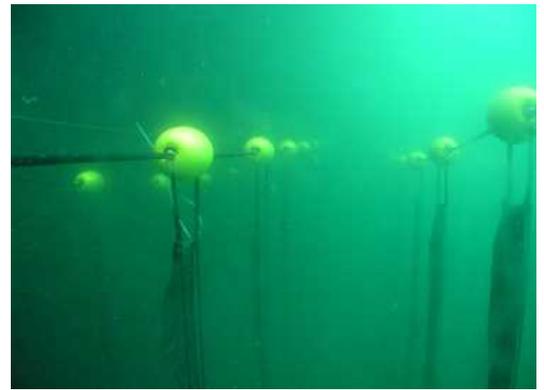
● Water flow

- Tidal current
- Inflow of river water
- Circulating device (onshore)

● Environment

- Fish life style (swimming, benthic)
- Aquaculture area size
- Facility shape

The situation in the marine is greater than inland waters, and installation methods that correspond to various conditions are required.



■ Installation Method

| Method 1 | Method 2 | Method 3 |
|--|---|--|
| In the Marine | In the Tanks (Ponds) | |
| | | |
| <p>Install MiraCarbon on the fish-preserve raft to purify.</p> <p>By installing a fish-preserve raft in inner bay, purification effects are expected and used for supporting bases for fishes.</p> | <p>Install MiraCarbon in the treatment tank and circulate it in the aquaculture tank after purification.</p> <p>Separate the treatment tank and the aquaculture tank to increase the water purification efficiency. Farmed fish do not come into contact with carbon fiber.</p> | <p>Install MiraCarbon in the aquaculture pond to purify.</p> <p>This method can be installed in existing tanks and ponds. By changing the installation of MiraCarbon depending on the fish species, the function as the seaweed bed and the purification of bottom sediment can be achieved.</p> |

Note) ● ■ ■ : Indicates the Miracarbon position.

■ Manufacture

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