

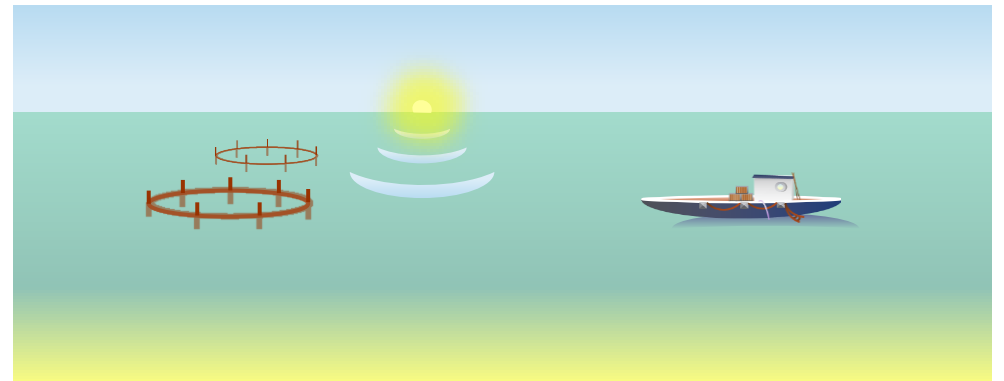


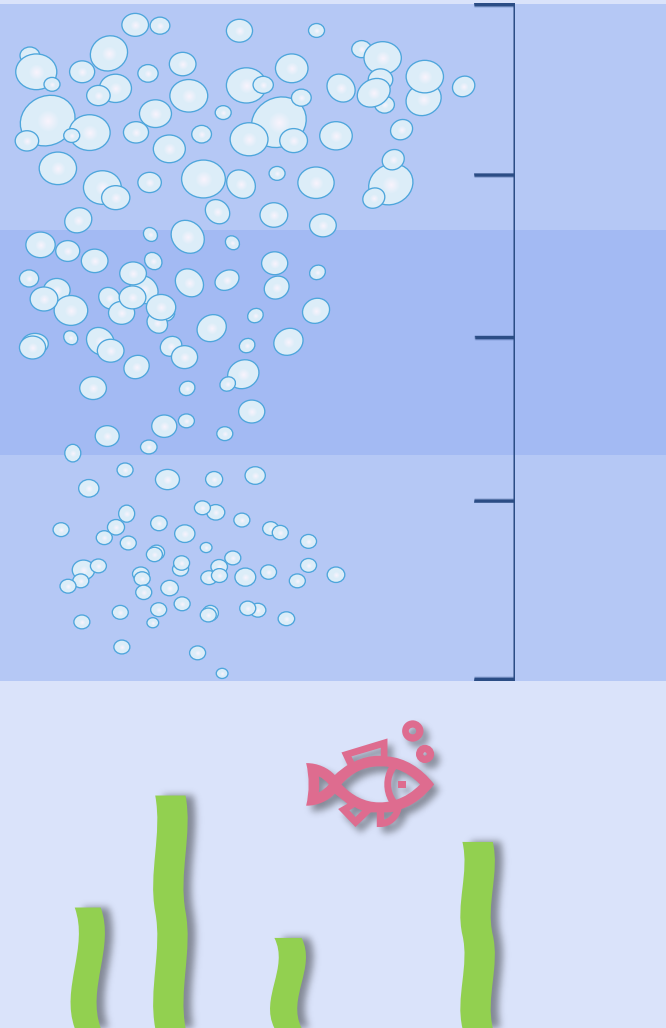
**SCIS.LTD**  
Smart Business Development Solutions

OK NOZZLE

ULTRA-FINE BUBBLES

**AQUACULTURE SOLUTIONS**





**Macrobubbles** — big visible bubbles.

Quickly rises to the surface, creating movement in the water column. Going up they catch debris and bring it to the surface.

**Small and microbubbles** — much smaller but still visible bubbles.

They stay in the water for some time. Usually up to 1 hour. Some of the bubbles of that type merge with others, forming large bubbles. Some of them burst under the water pressure, dissolving. Dissolved oxygen in water is crucial not only for aquacultures but also for aerobic bacteria. The more saturation is the more actively aerobic bacteria decompose organic matter, improving the condition of the water reservoir.

**Ultra-fine bubbles (nanobubbles)** — bubbles with size  $\leq 1\mu\text{m}$  ( $< 200\text{ nm}$ ).

Invisible to the naked eye. Able to remain suspended in water for a long time (sometimes for weeks).

Most of the polluted water sources have a thick layer of sediment at the bottom. This layer is usually in an anaerobic state, as little or no oxygen enters the sediment. Nanobubbles, moving randomly due to the Brownian motion, effectively contacting with the sedimentary layer. They penetrate the sediment, and dissolves inside it, making sediment layer turn to aerobic condition. This accelerates the oxidation and decomposition of organic matter, thereby clearing the sediment layer.

# ULTRA-FINE BUBBLES – NANOBUBBLES FEATURES

Ultra-small size

High Stability

Negative Charge

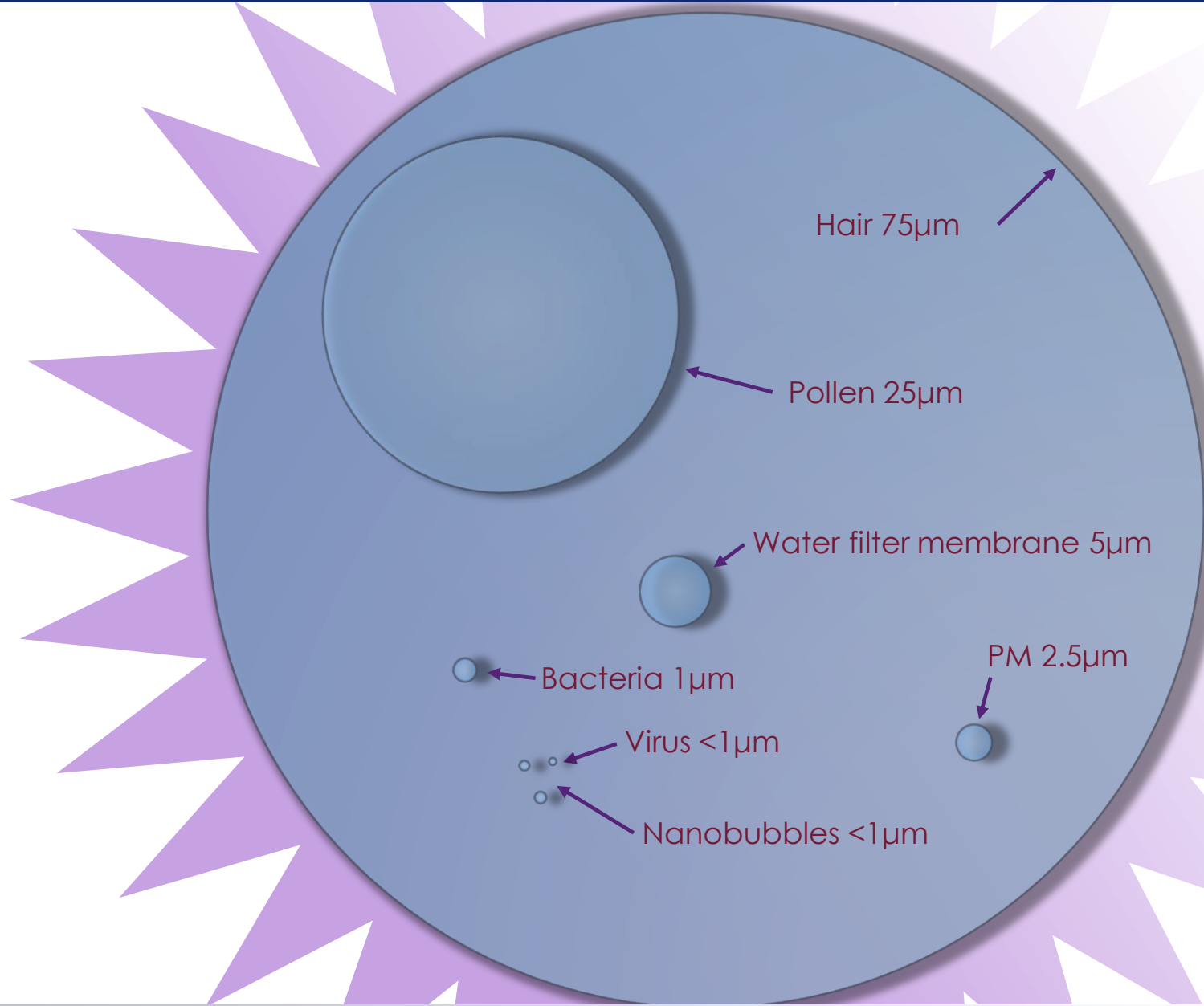
High Penetrative Ability

Brownian Movement Tendency

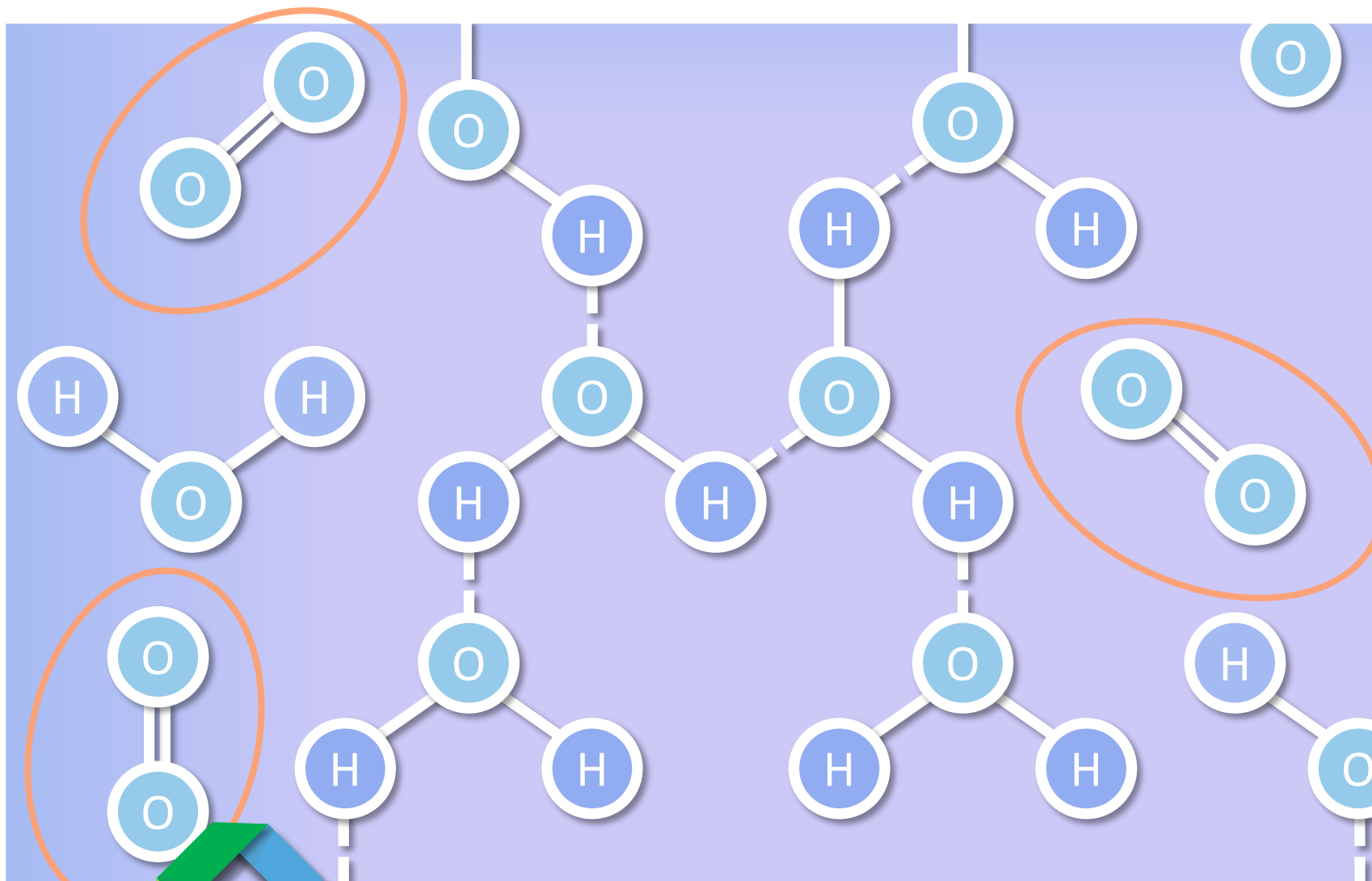
Reduction of the Surface Tension of Water

High Surface Area to Volume Ratio

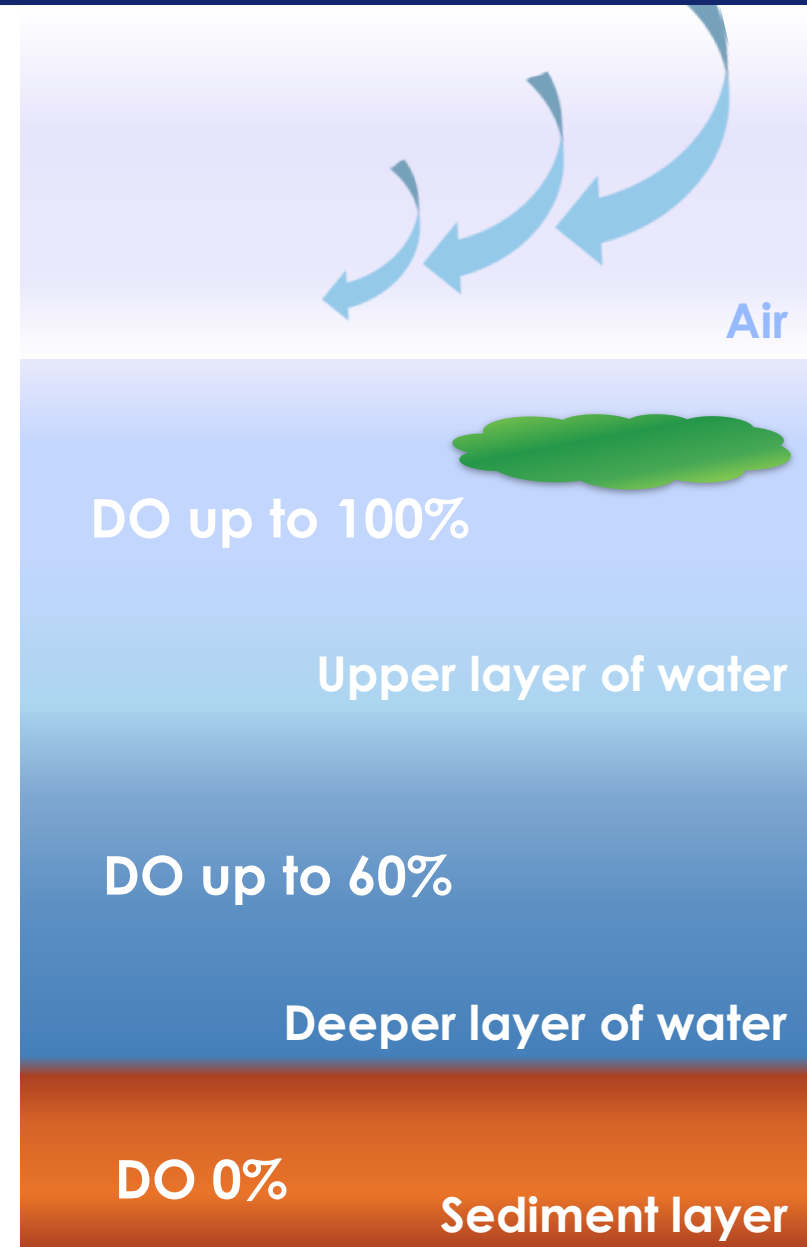
High Surface Tension and Gas Pressure Inside



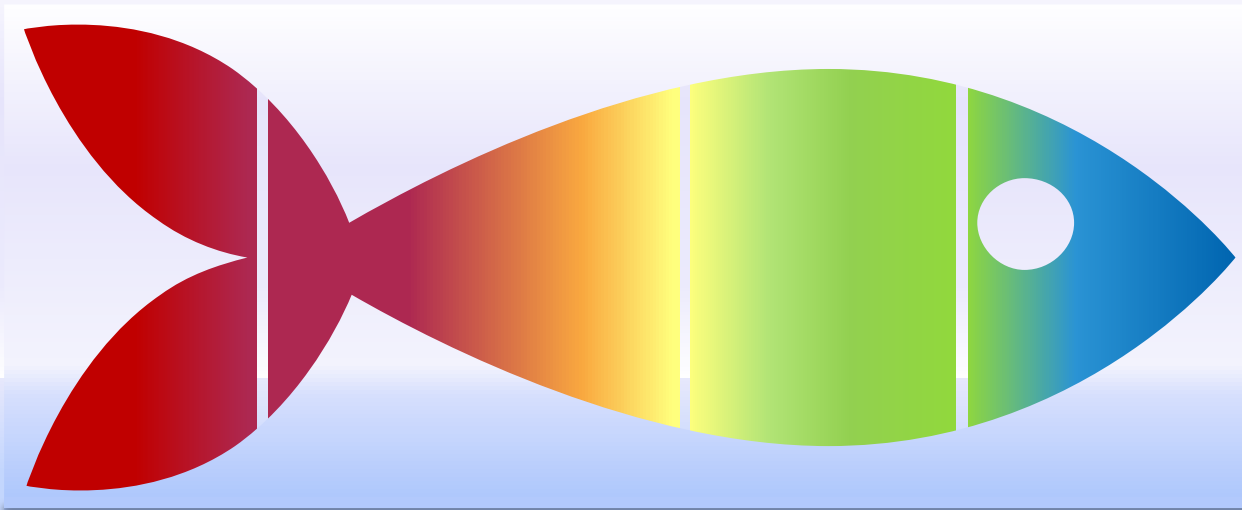
# ULTRA-FINE BUBBLES – SATURATION BY AIR



**DO** SATURATION  
DISSOLVED OXYGEN (O<sup>2</sup>) IN WATER (H<sup>2</sup>O)

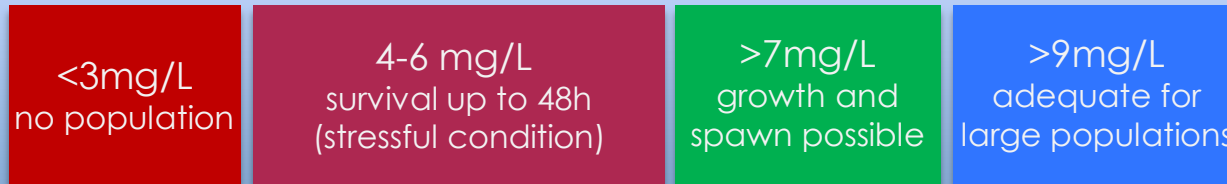


# ULTRA-FINE BUBBLES - SATURATION BY NANOBUBBLES



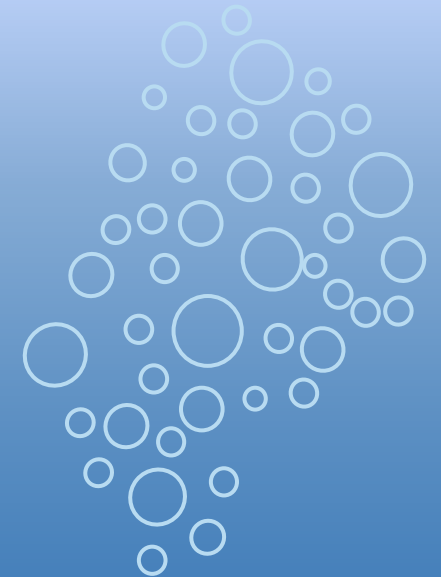
The oxygen-to-water transfer efficiency for ultra-fine bubbles exceeds 85% for both fresh and sea water, regardless of temperature!

Together with other beneficial effects such as - water purification, increased transparency of water, odor reduction, reduction of harmful algae and bacteria, as well as the general improvement of the water reservoir, - using ultra-fine bubbles for water saturation is the most efficient, modern, and most importantly, environmentally friendly solution for any aquaculture enterprise!



Low level of dissolved oxygen are especially detrimental to cold-water fish species. Trout, salmon, sturgeons - all are very sensitive to the lack of DO. Even if adults could endure at DO=6.5-7mg/L, levels below 11mg/L delay eggs hatching and levels below 8mg/L impair growth and reduce the percentage of survival of young species.

When the dissolved oxygen concentration falls below 6mg/L, although it is normal condition for most of the warm-water fish species, the vast majority of trout, salmon and sturgeon eggs die.



# ULTRA-FINE BUBBLES - AQUACULTURE APPLICATIONS

Decreased dissolved oxygen (DO) levels are considered as a major cause of poor quality of water.

Oxygen in the water is not only vital for fish and other aquatic animals, but also for aerobic bacteria that help decompose organic matter.

The implementation of the ultra-fine bubbles (nanobubbles) technology to aquaculture facilities could be done at every stage: from hatching and breeding to the transportation of final products.

Ultra-fine bubbles improve water quality and clarity, reduce dirt and odor, increase dissolved oxygen level and keep fish healthy without the use of any chemicals.

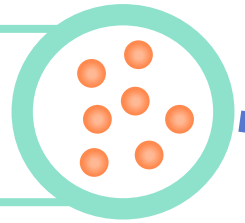
Using nanobubbles also increase the efficiency of other technological solutions at every step of the production chain.

From fish and seafood farming to algae farming, nanobubbles are the perfect solution for any kind of aquaculture!

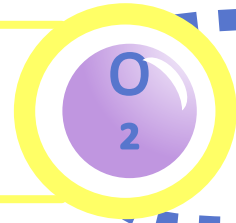


The introduction of nanobubble system may significantly reduce or even completely eliminate the need of use of harmful substances in aquaculture

**Incubation, Hatching,  
Fish Breeding**



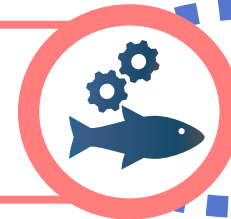
**Growth Support,  
Ensuring The Prosperity  
Of The Population**



**Water Improvement, Reduction Of  
The Environmental Impact**

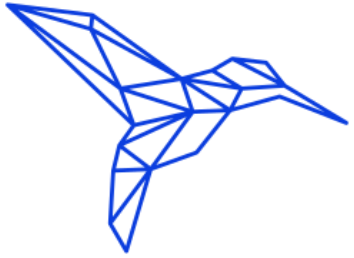


**Cleaning,  
Preservation**



**Live Fish Transportation,  
Preservation For  
Transportation**





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SCIS group is a distinguished leader in international Business Development, specializing in strategic entry strategies and implementations, corporate finance and IT outsourcing. Our accomplished team boasts over 30 years of individual expertise, having previously held key positions in BIG 4 and major corporations. With a robust track record of successful projects with top-tier companies and banks, we bring unparalleled experience to every endeavor. Headquartered in Hong Kong, SCIS Ltd. extends its global reach with offices in the USA, France, UK, Czech Republic, UAE, and Japan. Elevate your business aspirations with our seasoned professionals and comprehensive services.



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