

Goodsam

Authentic Ultra Fine Bubble

Ultra Fine Bubble (UFB) Generator



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Profile

2008.

- Foundation SB Water Co.,Ltd. In January
- Distributor Contract with Star-Oddi
- Distributor Contract with In-Situ, HACH Korea

2012.

- M&A Green Solution in October
- Establishment of research institute affiliated with SB Water Co., Ltd. (Donghae City)

2015.

- Changed company name to SBNE Co., Ltd.

2017.~2018.

- Relocation of head office and technology research center (Incheon Environmental Industry Research Complex)
- Registered a patent for microbubble generator

2020.

- Registered trademark for ultra-fine bubble generator (Goodsam)
- Registration of information and communication construction business,
- Acquired Innobiz confirmation
- Acquired factory registration certificate (Namdong-gu, Incheon)
- Registered for manufacturing other water quality analyzers and groundwater level gauges

2021.

- Patent registration for ultra-fine bubble generator

2022.

- Remote monitoring system by field (all fields such as water quality, water level, odor, etc.)
- Automatic measurement sensor installation, monitoring and automatic control
- Environmental Industry and Technology Institute commercialization project in progress
- Smart farm research (AI application) in progress
- Korea Rural Community Corporation, Water Resources Corporation, Nuclear Power Plant, Jeju Research Institute, etc.

Products

Water Quality Monitoring System



In-Situ



Convergence



Strathkelvin



HF Scientific



HACH



Star-Oddi

Odor Monitoring/NanoBubble



AIRWORKS : BASELINE



Goodsam

Patents

Patents



Trade Mark



Development of UFB (nano bubble) generator

"Excellent UFB for agriculture, aquaculture, cleaning, water quality control, and odor reduction!"

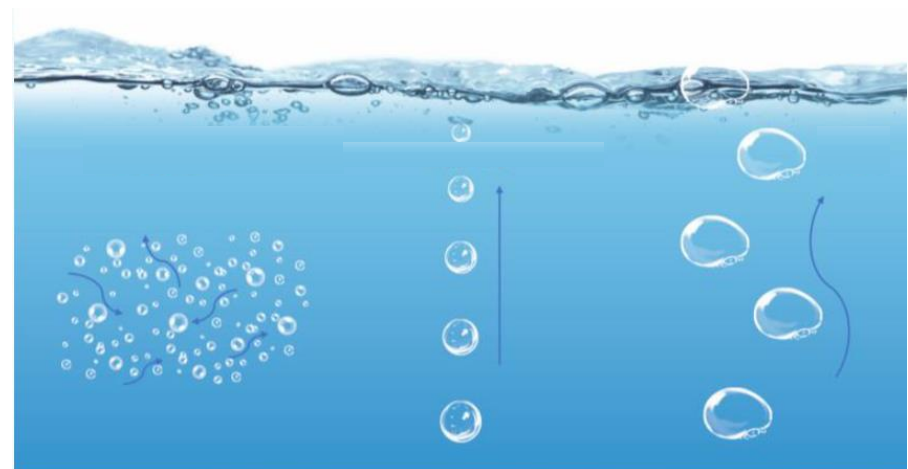
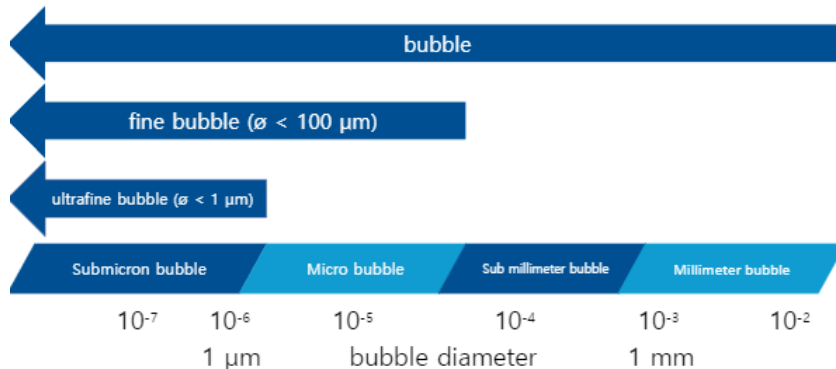
- Developed a technology that generates hundreds of millions of 200 nm UFB per 1 mL and keeps the generated bubbles in water for about 3 months.
- As a result of grafting it into agriculture using the properties of UFB, the effect of increasing the yield, size, and weight during the same period was demonstrated (strawberry, cucumber, ginseng, etc.)

Patents

- Ultra-fine bubble generating system with coil-type nozzle
- High density including gas dissolving device for generating microbubbles

□ Ultra Fine Bubble?

- Ultra Fine Bubble called Ultra Fine Bubble(UFB) or Nano Bubble
- Ultra Fine Bubble or Nanobubble is defined as diameters smaller than $1\mu\text{m}$ and larger than 1nm
- It has many properties such as sterilization, cleaning, bioactivity, and growth promotion.

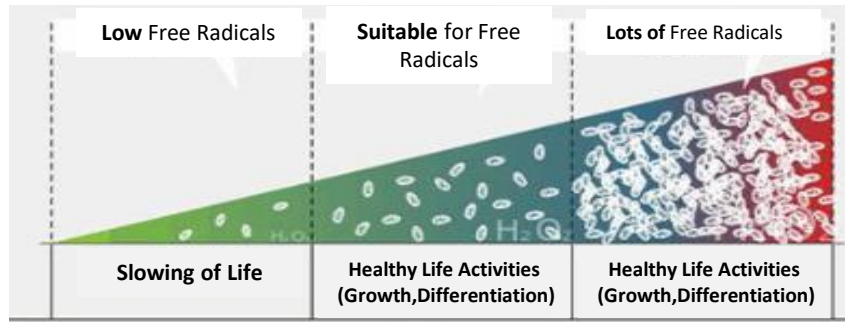


Ultra Fine Bubble [UFB]	Micro Bubble [MB]	Milli/Submilli Bubble
Depth of water $\text{nm} \sim 1\mu\text{m}$ ▶ Virus ($\sim 100\text{nm}$) ▶ Cigarette Smoke ($\sim 500\text{nm}$)	$1\mu\text{m} \sim 100\mu\text{m}$ ▶ Pollen ($\sim 100\text{nm}$) ▶ Dust ($\sim 500\text{nm}$)	$100\mu\text{m} \sim$ ▶ Normal Bubble ($\sim 100\text{nm}$) ▶ Hair ($\sim 500\text{nm}$)
colorlessness (Transparency)	Cloudiness (Foggy)	Foggy
Long time preservation in Water	After ascending in water, extinction	After ascending, extinction

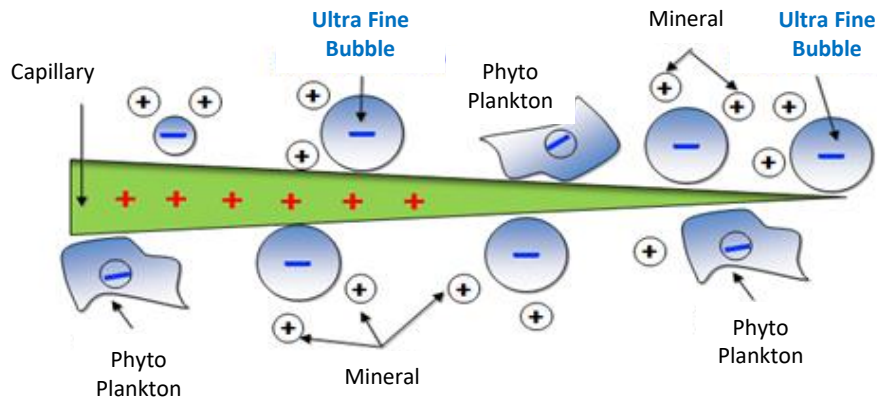
Advantages

Animal/Plant Growth

Cell Growth

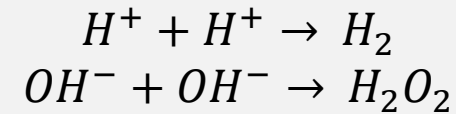


Promote Plant Growth



Natural Oxidizer Effect

Production Principle of Oxidizing Agent



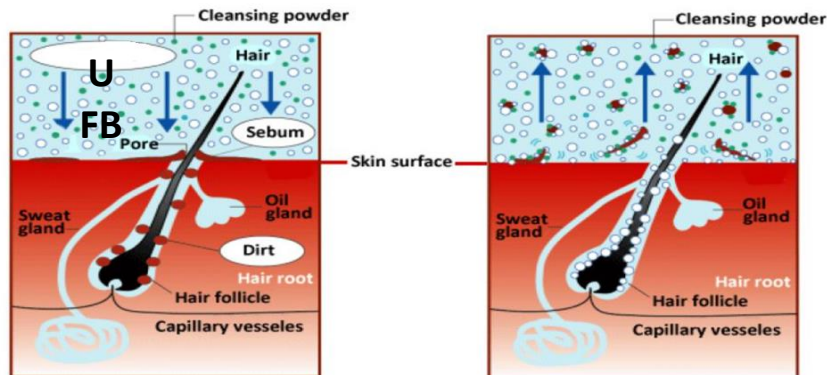
- Water molecules are separated into OH radicals and hydrogen ions through a UFB generator.
- Separated water molecules exist in five forms in water.
- Of these, OH^- and OH_2O_2 are used to break molecular rings.

Advantages

Beauty

Cleansing & Moisturizing

1. EXcellent in absorbtion into the skin and sucked into the pores.
2. Removal of matrix, sebum, waste, etc. in pores
3. Smooth oxygen supply by removing waste materials (Excellent effect on skin aging and prevention and various skin diseases)



Removal of Odors

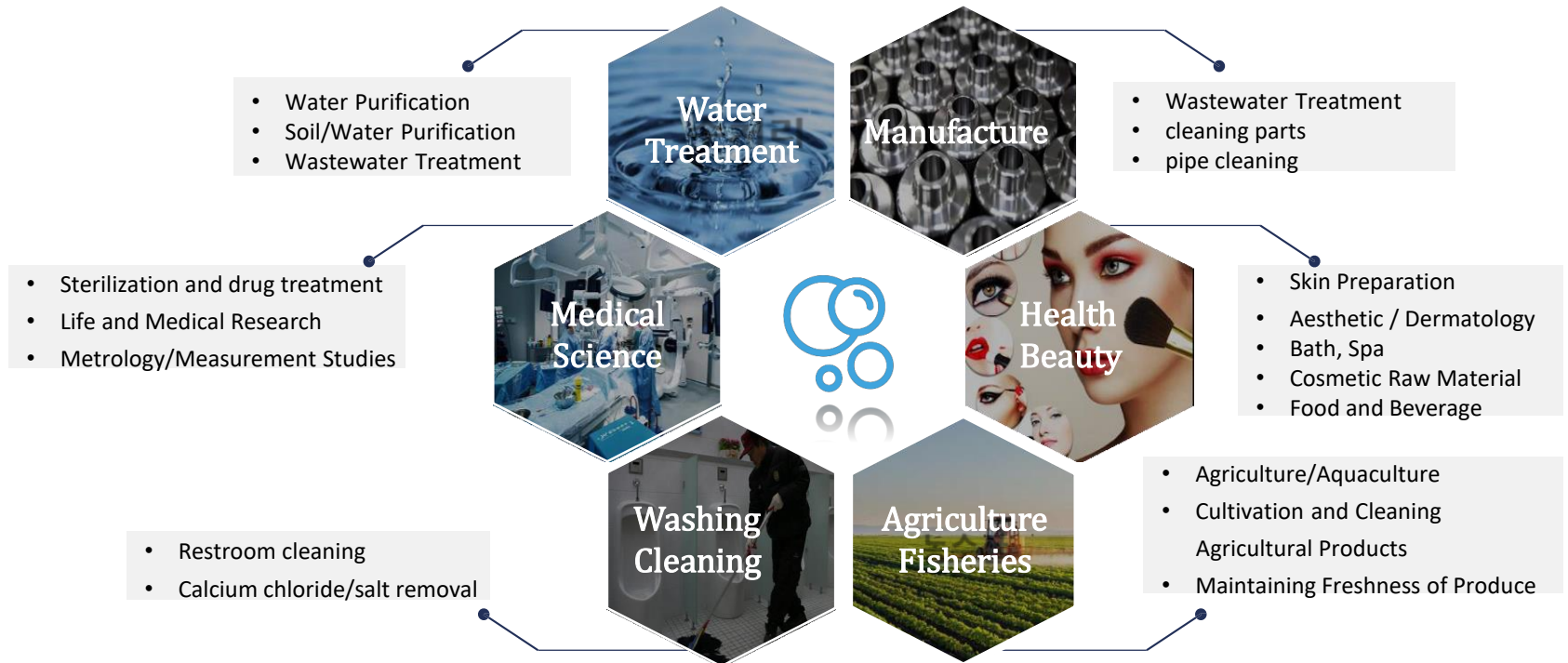
Wet Scrubber

A representative method of odor removal that absorbs impurities in the air while spraying water.

1. Due to the weak surface tension of UFB, impurities generating odors in the air are dissolved in UFB bubbles, destroying odorous substances by UFB
2. UFB in the air that absorbs odor molecules is removed by being oxidized with aerobic microorganisms



Utilization in Field



- Algae and Environmental Purification Technology

- Water Purification, Home Bathroom Shower, Washing Machine, Removal for pore waste in Beauty Field

- Hydroponics, Fish Farming, Car Washing, etc.

- Wastewater Treatment, Sewage Field

Plant Growth

Japan (Kyoto University)

● Small-scale Hydroponics for Green Onion



● Hydroponics for Mini Tomato

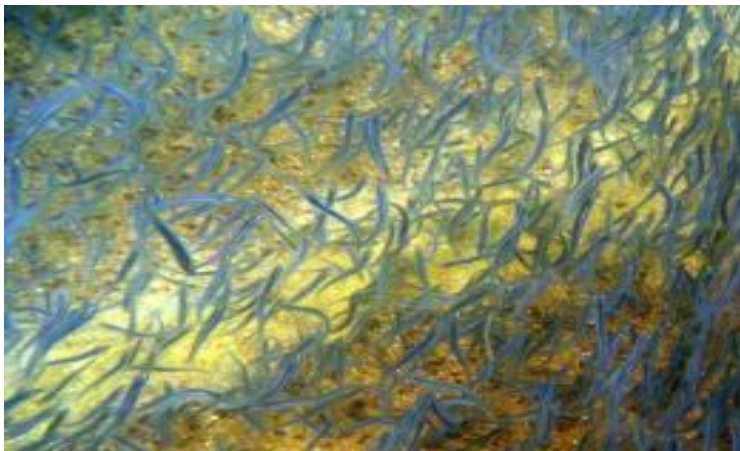


- Growth Promotion by increasing the absorption rate of nutrients in the culture medium
- Reduced occurrence of pests and pests due to sterilization effect
- In the case of tomatoes, sugar content improvement was confirmed.

Fish Farm

Japan (Kyoto University)

● Rainbow Trout & Sweet Fish Fry



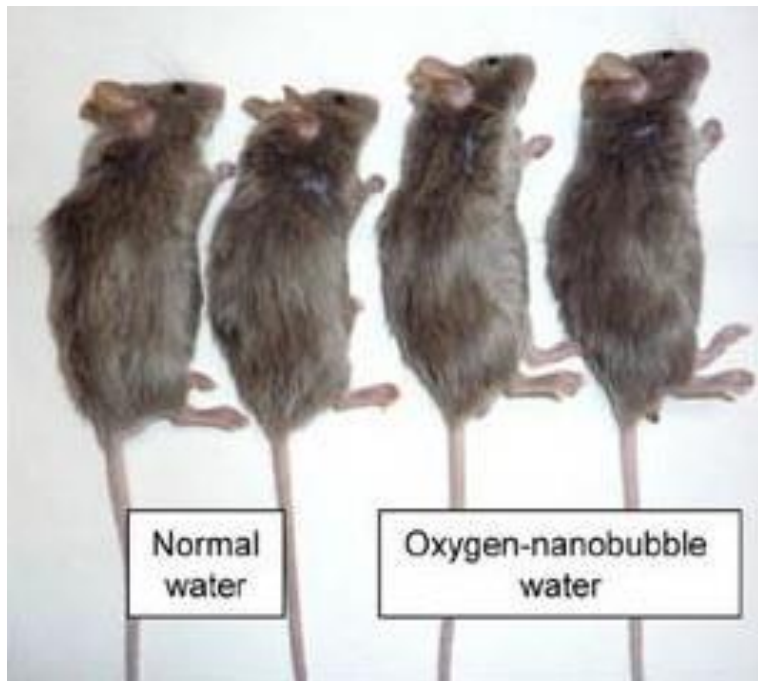
- Increased Fish Growth Rate.
 - Rainbow Trout: 14% increase
 - 59% increase in Sweet Fish Fry
- Significant decreased in the number of dead fish

● Comparison of Normal Water and UFB Water

Fish	Period		Normal Water	UFB Water
Sweet Fish	3 weeks	Initial	3.0	3.0
		Final	6.4	10.2
Rainbow Trout	6 weeks	Initial	50.0	50.0
		Final	129.5	148.0

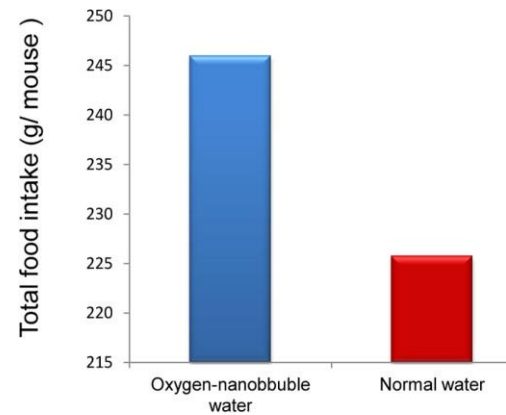
Animal Growth

● Mice Growth

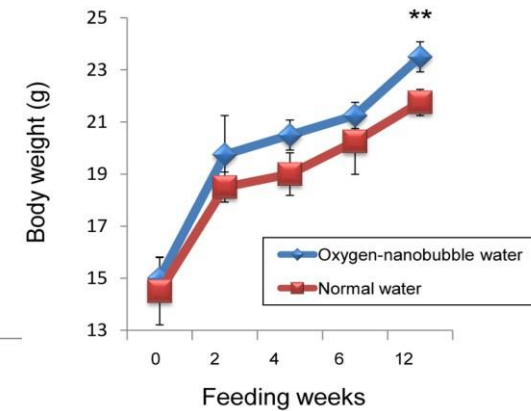


- Change in size as food intake
- Increased growth rate according to cell activity

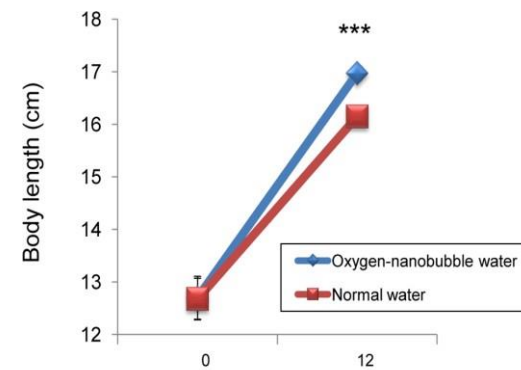
Japan (Kyoto University)



[Food Intake]



[Weight Change]



[Change of Body Length]

IV. Case Study | Ultra Fine Bubble

Case Study by SB

● Strawberry



Normal Water

UFB

Increased Yield
Healthier Roots
Enhanced Growth Rates



Normal Water

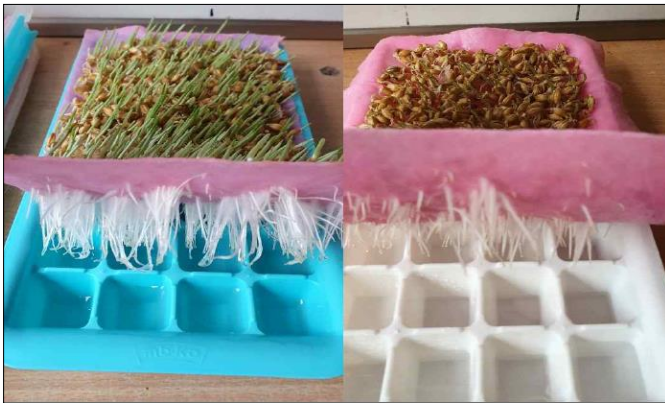
UFB

- Increase the weight of strawberries by 32 g
- High-quality strawberry cultivation possible during the same period
- Same Sugar Content
- Increase in Hardness

IV. Case Study | Ultra Fine Bubble

Case Study by SB

● Rice Seeding



UFB

General Water

Increased Yield
Healthier Roots
Enhanced Growth Rates



UFB

General Water

UFB in water is efficient as a medium to deliver nutrients to plant roots than general water.

IV. Case Study | Ultra Fine Bubble

Case Study by SB

● Flowering



Enables plants to mature more quickly and begin their fruiting and flowering cycles earlier.

Increased Yield
Healthier Roots
Enhanced Growth Rates



UFB helps set up a good root system so they will pick more flowers in the winter

Case Study by SB

● Fish Farm



- **Stocking Density**
An oxygen saturation level of 85% and above is ideal for aquaculture
- **Disease Prevention**
A lack of DO can lead to a build-up of fish and mollusk waste on the sea floor, creating conditions that are ideal for bacteria and fungus to thrive
- **Efficient Oxygen Transfer**
Delivering the highest oxygen-transfer efficiency, over 90%

Case Study by SB

SK Petrochemical

● Pipe Cleaning

- Foreign substances and rust from the inner surface of the pipe causes plant defects and quality problems of raw materials
- Cleaning Power of high-pressure cleaning or chemical treatment is lowered and secondary contamination occurs, lack of satisfaction with the cleaning quality.
- A method in which high-density (cloudy) UFBs are generated in a water tank, and surface anion UFB separate contaminants with positive ions from the surface of the product and adsorption flotation
- A method of physically separating foreign substances on the surface by generating a shock wave by high-pressure spraying of UFB

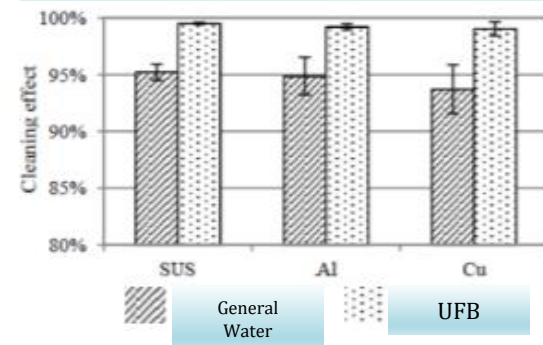
Cleaning by UFB Shock Wave



Cleaning by Jet Spray



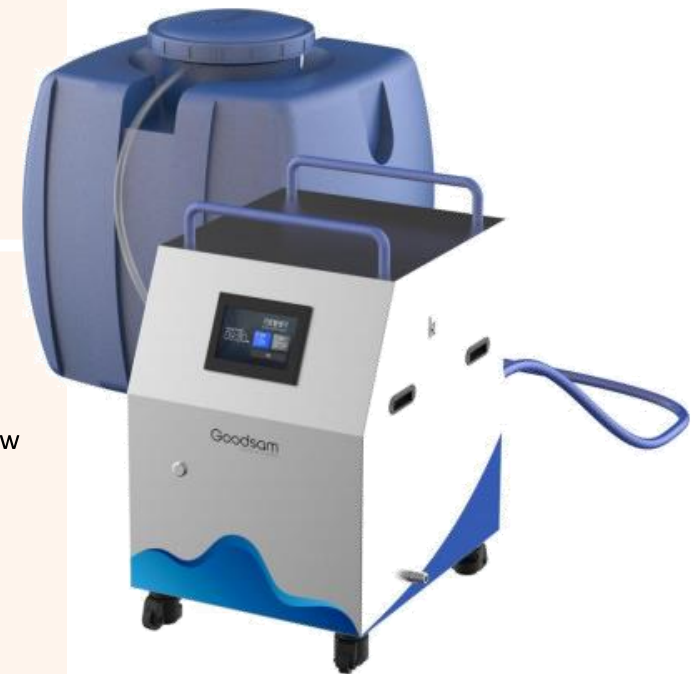
UFB Cleaning Test by Materials



V. Specification of Goodsam

Specification

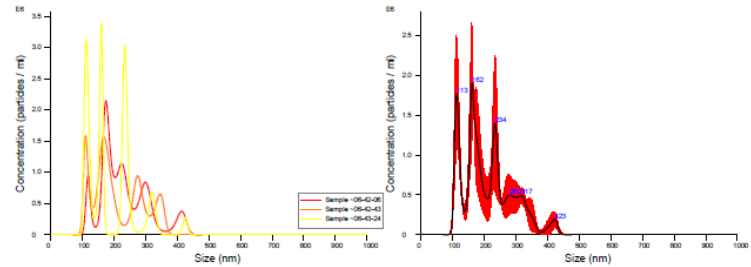
<p>Source</p>	<p>Air Injection Type UFB Generation Type Bubble Production, Voltage, Current Size and Weight Generation Method Control Fuction</p>	<p>Self Suction/parallel with Venturi Pressurized Hydrodynamic, Cavitaion, Screw Miz, Nozzle Spray Type 1 m³ / 5hr / 220V Single/ 2KW(Related Current) 700mm x 500mm x 660mm, 60kg Tank Circulation Type Pump Running Control, Stop Timer</p>
<p>Smart System</p>	<p>Tank for UFB Water Connecting Nozzle (Including Filters) Storage and Consumables</p>	<p>Stable for the Entire System 1ton size Tank (more than 3) Easy to connect with each Tank Filtration System based on Water Quality of Water Inflow Stable Power Supply Storage of UFB Generator and Easy Maintenance, Generator Cleaning, Advancement Progress Advancement by correcting erro through Test Run On/Off by Mobile Phone IcT and Automatic Control System for Smart Farm</p>



Characteristic of Goodsam

NANOSIGHT

Sample 2 2020-04-07 06-41-54



FTLA Concentration / Size graph for Experiment:
Sample 2 2020-04-07 06-41-54

Averaged FTLA Concentration / Size for Experiment:
Sample 2 2020-04-07 06-41-54
Error bars indicate +/- 1 standard error of the mean

Results

Stats: Merged Data

Mean: 211.1 nm
 Mode: 161.5 nm
 SD: 78.6 nm
 D10: 115.0 nm
 D50: 192.9 nm
 D90: 322.5 nm

Stats: Mean +/- Standard Error

Mean: 211.2 +/- 11.0 nm
 Mode: 148.5 +/- 19.4 nm
 SD: 77.1 +/- 0.4 nm
 D10: 125.5 +/- 13.2 nm
 D50: 187.6 +/- 14.7 nm
 D90: 324.5 +/- 6.2 nm

Concentration (Upgrade): 1.93e+08 +/- 6.40e+06 particles/ml
 27.9 +/- 1.0 particles/frame

Bubble Q'ty

29.7 +/- 0.6 centres/frame

Included Files

Sample 2 2020-04-07 06-42-43
 Sample 2 2020-04-07 06-43-24

Details

NTA Version: NTA 3.4 Build 3.4.003
 Script Used: SOP Standard Measurement 06-37-12AM 07A-
 Time Captured: 06:41:54 07/04/2020
 Operator: MPK
 Pre-treatment:
 Sample Name: Sample 2
 Diluent:
 Remarks:

Capture Settings

Camera Type: sCMOS
 Laser Type: Blue488
 Camera Level: 14
 Slider Shutter: 1259
 Slider Gain: 366
 FPS: 25.0
 Number of Frames: 749
 Temperature: 25.2 - 25.3 °C
 Viscosity: (Water) 0.883 - 0.885 cP
 Dilution factor: Dilution not recorded

Analysis Settings

Detect Threshold: 5
 Blur Size: Auto
 Max Jump Distance: Auto: 9.8 - 10.6 pix

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