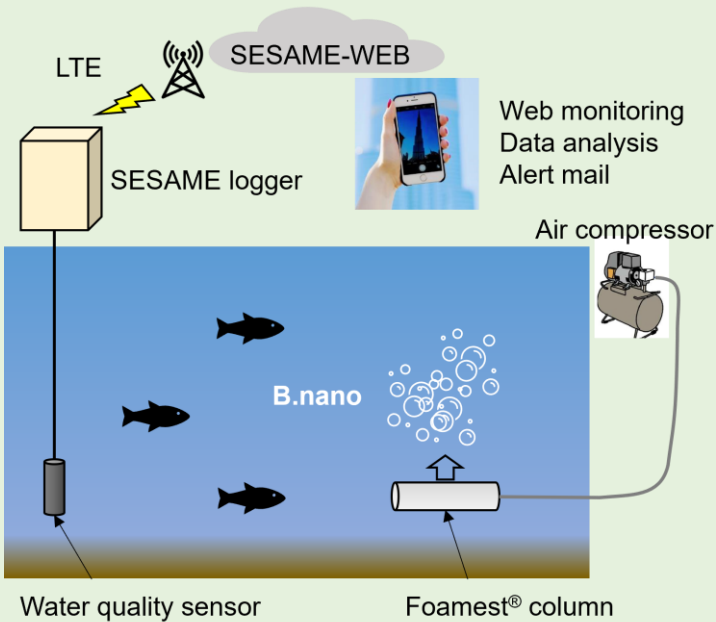


# New Solution with Nano-bubble

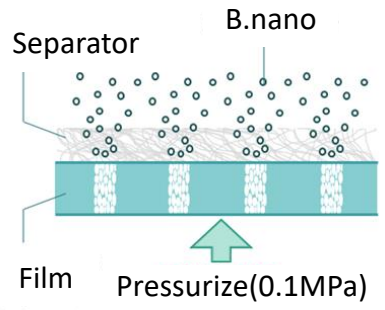
# SESAME-AQUA/AGRI & B.nano®

Water quality management system with micronano-bubbles to conserve water quality in fishponds and to increase DO concentration in irrigation water

- SESAME-AQUA/AGRI is a remote monitoring system that connects sensors to a field data transmission unit that integrates a data logger and a communication module.
- Data is transmitted to the cloud server, accessible anytime, anywhere.
- B.Nano® is a micronano-bubble generated by Foamest® column.
- Effective in preventing oxygen deficiency in fish, promoting microbial decomposition of organic matter, supplying oxygen to plant roots, and activating soil microorganisms.



Example of SESAME-AQUA & B.nano



### Mechanism

Micro-bubble	: 1 to 1000µm
Nano-bubble	: 1 to 1000nm
Micronano-bubble	: Micro-bubble and nano-bubble



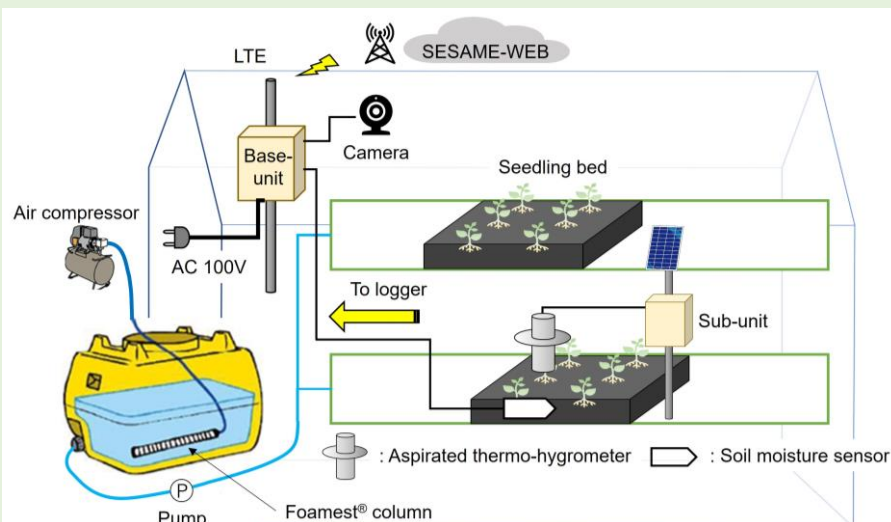
Bubbles generated from column



Fish tank



Irrigation tank



Example of SESAME-AGRI & B.nano

For water quality management in fishponds & soil quality management with automatic irrigation control in a greenhouse

- Visualization of aquaculture pond environment with DO meter + camera (optional)
- Proper irrigation by monitoring soil moisture and fertilizer conditions
- Check data anytime, anywhere on your mobile device
- Alert e-mail in emergency
- Reduced patrol monitoring



## Features of B.nano<sup>®</sup>

- High internal pressure → Hard to crash and merge
- Small diameter → Get into small gap and stay under water
- With negative charge → Adhere to organic matters and nutrients with positive charge, and adsorb to dirt
- Large specific surface area → High reaction efficient

## Aquaculture

- Prevent oxygen deficiency in fish
- Activate aerobic microorganisms → facilitate decomposition of mud and residue → rise of amount of catch

## Agriculture

- Activate soil microorganisms → soil aggregation
- Supply soil with oxygen
- Plant roots absorb oxygen more → rise of amount of crop

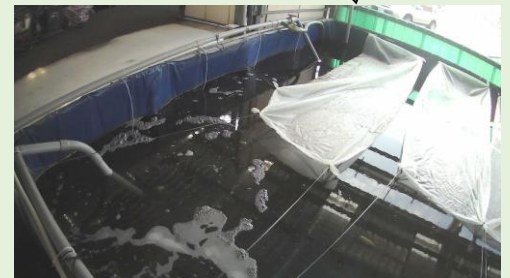
## Previous cases

- Aquafarm of shrimp, catfish, and oyster
- Farm of tomato, asparagus, cucumber, and strawberry

## Graphs on SESAME-WEB2



Click on the data to pop-up the camera image



System Specifications		
Product Name	SESAMEIII-RC	SESAMEII-02q
Communication	3G·4G (LTE)	
Operating temperature	-20 to 50°C	
Power Supply	AC100/200V (Standard specifications) or 30W solar panel + DC12V 22Ah deep cycle battery	AC100/200V (Standard specifications) or 20 to 30W solar panel + DC12V 12Ah deep cycle battery
	※Some additional materials (such as additional solar panel, batteries, special connectors, and, so on) will be needed depending on the field situation.	
Sensors	Digital output Communications standard: RS485 [DO sensor] RDO Blue (In-Situ, Inc.) Optical type 4 sensors are connectable Measuring oxygen partial pressure, dissolved oxygen, dissolved oxygen saturation, and water temperature [Soil moisture sensor] LT5007 (Murata Manufacturing Co., Ltd.) Measuring data: Soil temperature, soil moisture, and soil EC	Analog output [Water quality meter] MM-42DP (DKK-TOA Corp.) 2 probes are connectable Connectable probes: DO probe (MM4-DDO), ORP probe, EC probe, pH probe [Turbidity sensor] TC series (OPTEX CO., LTD.)
	Sensor Cable	DO sensor : 10m, Soil moisture sensor : 30m
Box	Material: Polycarbonate and ABS resin, Equipment: Data logger, controller, communication module, battery inside	
Weight	About 10 kg	About 15 kg
Box Size	W300 x D400 x H180 mm (Standard)	W500 x D400 x H165 mm

Camera Specifications	
Sensor Type	CMOS
Interface	USB2.0/USB Video Class
Shooting Interval	1 min to once a day
Effective Pixels	Maximum 2 megapixels
Resolutions	1280 x 720
Min Illuminance	Less than or equal to 0.05 lux (color)
External IR Light	Range: 30m Irradiation angle: 60°
Endurance	For about 5 years continuous operable
Camera Size	φ9 cm x Height 7 cm



Camera

Foamest<sup>®</sup> column is micronano-bubble generator with MONOTORAN<sup>®</sup> film (nano-porous film)  
B.nano, Foamest, and MONOTORAN have undergone trademark registration of NAC Co., Ltd.

Foamest <sup>®</sup> Column Specifications KFP Series					
Model	KFP20-150	20-300	40-300	40-670	40-1000
Size (mm)	φ 62 × 150	φ 62 × 300	φ 96 × 300	φ 96 × 670	φ 96 × 1000
Discharge (cc/min)	100 to 200	250 to 450	800 to 2000	1800 to 3500	3500 to 5500
Weight (g)	410	480	2200	3270	3500

Temperature range: 0 to 40°C (No freezing)

Target gas: Dry compressed air, oxygen, carbon dioxide, nitrogen, etc.



Column KFP40-670 (NAC Co., Ltd.)



DO sensor (In-Situ, Inc.)



DO sensor (DKK-TOA CORPORATION)



Soil moisture sensor (Murata Manufacturing Co., Ltd.)

