**2nd International Symposium on Application of High-voltage, Plasmas & Micro/Nano Bubbles**

Template example

**to Agriculture and Aquaculture (ISHPMNBⅡ017)**

**Ultra-Fine bubble generators for advanced versatile applications**

**to agriculture, aquaculture and food safety**

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An emerging technology of Ultra-Fine bubbles(UFB) of micro and nano sizes called fine (<100μm), and ultra-fine(<1μm) bubbles is a very innovative technology for rapidly expanding versatile applications to such as, agriculture, aquaculture, food safety, sterilization, waste water treatment, automobile gas mileage improvement, cancer treatment and so on.

Those UFB have very unique characteristics which are vastly different from conventional simple macro bubbles with larger diameters. UFB float-up speeds are proportional to diameter square, and electrically charged up negative.

This enables nano bubbles of, for example, 100nm dia. having almost 30 bars inside the bubble to stay pretty long in the water without any merging into micro or macro bubbles.

By making use of these characteristics, UFB water of such as air, oxygen, nitrogen, ozone and so on can have versatile outstanding effects in various applications, for example, oxygen free water produced by nitrogen UFB injection into water can preserve fish for one week as fresh without any chemicals by suppressing activity of aerobic bacteria, which is now being used at Tokyo Tsukiji fish market.

RMUTL has prepared commercially available micro and nano bubble generators imported from Aura Tec, Japan, and developed by ourselves various kinds of less-expensive, but high performance UFB generators based on the high pressure gas dissolution methods. According to the analyses by UFB analyzer, NanoSight, measured at Kyoto University, the density is found favorable, as high as approx. 108/cm3 as shown in Fig.1.

With almost 20 micro/nano bubble genrators of several kinds now possessed by RMUTL, RMUTL is planning to expand more innovative researches in various application fields, in particular, food safety.

In the presentation, more applications will be presented relating to micro/nano bubble generators.

Reference

1)nano-bubble water from Japan; https://www.youtube.com/watch?v=mvBiHcWT1B8

Fig.1

RMUTL micro/nano bubble generator, version 5





