



November 1, 2022

Yanai Electric & Machinery Co.,Ltd

Ball Wave Inc.

## **Yanai to commence sales of palm-sized high-performance gas chromatograph (Sylph)**

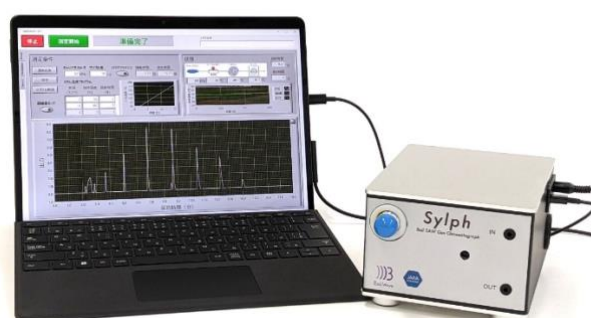
Ball Wave Inc. (headquarters: Sendai City, Miyagi Prefecture (Japan); CEO: Shingo Akao; hereinafter “Ball Wave”) and Yanai Electric & Machinery Co.,Ltd (headquarters: Oita City, Oita Prefecture (Japan); President: Tomo Yanai; hereinafter “Yanai”) have entered into a sales representative agreement for the palm-sized gas chromatograph <sup>\*1</sup> (product name: Sylph) that was developed, manufactured, and sold by Ball Wave.

### **■ Background**

Ball Wave has developed the world’s first palm-sized gas chromatograph weighing around 1 kg through joint research with the Japan Aerospace Exploration Agency (JAXA) by utilizing the innovative “Ball SAW <sup>\*2</sup>” high-sensitivity sensor. The palm-sized ultra-miniature gas chromatograph (Sylph) was developed as an industrial application of the ultra-small high-reliability technology that was obtained through this joint research. Yanai starts selling this revolutionary product as a distributor.

One of the applications of Sylph is in the field of fermentation and brewing.

Fermented and brewed products include Japanese sake, distilled spirits, miso, and soy sauce, for which 80% of the deliciousness is said to come from the aroma. The aroma components of Japanese sake, in particular, are said to exceed over 100 types, and the aroma of the sake is determined by their balance. Although there are already devices for measuring these aroma components (odor components), since Sylph is ultra-miniature, exhibits high performance, and is light-weight and portable, it can be carried to a site and perform measurements of odor components on-site. By using this technology, it is possible to control changes in the odor components depending on the temperature, yeast used, and amount of koji added. This is expected to contribute to developing new fermented and brewed products unlike any before.



## ■ About Yanai Electric & Machinery Co., Ltd

We combine the practical expertise we have cultivated over many years with cutting-edge technology such as IoT and AI to develop products that cater to on-site needs in fermentation and brewing.

By systematizing burdensome manufacturing steps in fermentation and brewing that can be streamlined by automation, and digitizing evaluations that rely on the human senses of smell and taste, we endeavor to enable the transmission of craftsmanship infused with technology that adds new value, and to contribute in various other ways to bring about exciting innovations in the fermentation and brewing scene, a traditional culture of Japan.

## ■ About Ball Wave Inc.

Ball Wave is a deep-tech startup that was span out from Tohoku University. The company aims to bring about a safe, secure, clean, and sustainable society through the use of the ball SAW sensor, a super chemical sensor<sup>\*3</sup> developed in a research collaboration between the university and industry. The ball SAW sensor is capable of rapid, highly sensitive detection of trace amounts of moisture and various different gases. It combines the high resistance to temperature, pressure, and corrosion of quartz balls with approximately 100 times the sensitivity and response speed of conventional sensors. Ball Wave is currently working on the development, manufacture, and sale of trace moisture analyzers and gas chromatographs equipped with ball SAW sensors.

## ■ Applications of Sylph

The palm-sized high-performance gas chromatograph (Sylph) has many applications in a variety of fields including fermentation and brewing, semiconductors, and the environment.

- Fermentation and brewing fields: Brewing process control and new product development by aroma analysis of products such as Japanese sake and soy sauce, and maintenance and improvement of factors such as product quality.
- Energy/industrial fields: Constituent analysis for evaluating the calorific value of natural gas, constituent analysis of gases discharged from binders and electrolytes during the fabrication and use of lithium batteries, VOC analysis, abnormal odor screening, etc.
- Agriculture, forestry, fisheries fields: Reduction of food losses by early detection of deterioration of foods such as fresh fish, fruits, vegetables, and food oils, as well as fermentation process monitoring by aroma analysis of alcohol products and soy sauce, etc.
- Semiconductor fields: Analysis of gas components in semiconductor manufacturing process equipment, environment analysis inside clean rooms, etc.
- Environment fields: Monitoring of atmospheric pollutants, earthquake prediction through release of radon gas that exists in the Earth's crust and in magma, etc.



**Monitoring of broth fermentation state**



**Thermal management on koji manufacturing**



**Gas constituent analysis of manufacturing**



**Screening for hazardous gases and abnormal**

\*1 A gas chromatograph is an analytical instrument that measures a wide range of species and concentrations by the phenomenon in which a mixed gas becomes temporally separated as it passes through a flow channel (called a column) in which a hollow tube is wound around a reel.

\*2 Ball SAW is a special kind of Surface Acoustic Waves (SAWs) which propagates along the surface of a spherical object or a ball. The beam of Ball SAW does not spread while it propagates so that a collimated tight beam is realized which propagates along the equator of the ball more than hundred times. The phenomenon was discovered by Professor Emeritus Yamanaka of Tohoku University and his collaborators.

\*3 Chemical sensor: a device for determining chemical changes in a substance.

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