

### Introduction

Maintaining consistent flavor and odor in foods and consumer products ranging from fruit juices to toothpastes is crucial for guaranteeing brand quality.

Process deviations and accidental taints can lead to sub-standard flavor or aroma, and deliberate actions such as contamination or counterfeiting can also negatively affect brand perception.

Standard analytical techniques such as GC/MS are expensive, time consuming, not real-time and require trained operators. Using Owlstone's proprietary FAIMS technology, Lonestar overcomes these problems, providing real-time chemical monitoring in a portable, easy-to-use unit capable of rapid, sensitive and selective analysis.

This makes it a valuable analysis tool for applications ranging from inline process and taint monitoring to product authentication and brand protection.

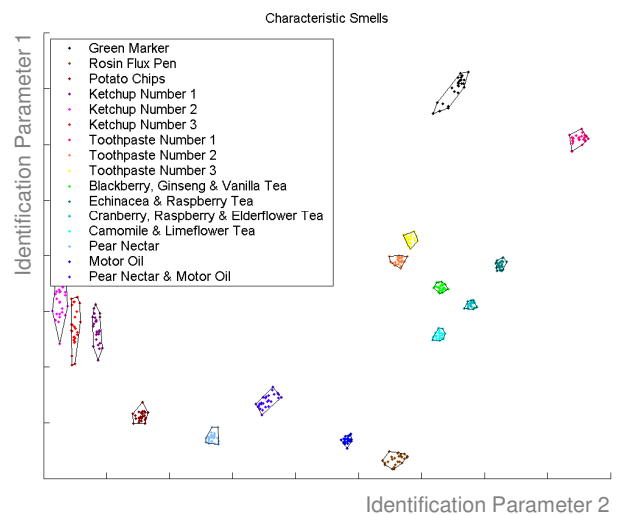
### Lonestar Setup

A range of experiments were performed in which samples were placed in a 20mm glass sample vial. Clean, dry air was flushed through the vial while the Lonestar unit directly sampled the headspace at a flow rate of 90ml/min. The instrument ran continuously and algorithms were used to classify the sample product aroma with two identification parameters (Figure 1).

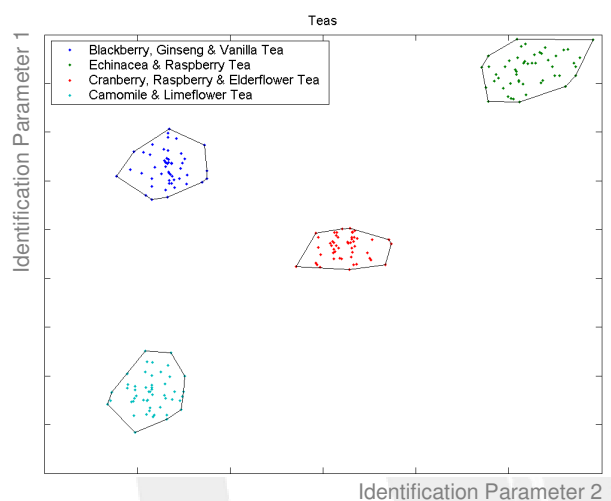
### Flavor and Aroma Monitoring with Lonestar

In process and product QC monitoring the odor of foodstuffs can be used to ensure consistency. Tests were carried out with various flavors of teas and toothpastes and Lonestar was capable of accurately classifying the product family (Figures 2 and 3).

*Lonestar can be used for rapid and accurate characterization of odors and aromas in a range of foodstuffs, beverages and consumer goods. Exceptional sensitivity combined with simple sample introduction and the ability to reprogram the detector for different compounds makes Lonestar suitable for a broad range of online and lab-based analysis applications in the food and drink industry*



**Fig1: Odor detection of broad range of products**



**Fig 2: Odor detection of different flavored teas**

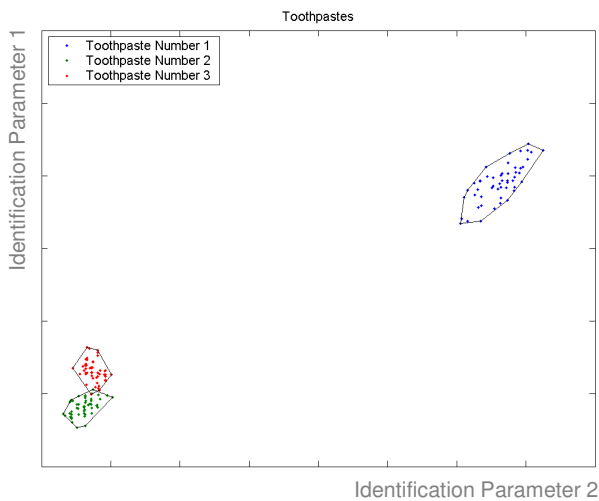


Fig 3: Quality Control- Odor detection of toothpastes

#### Product Authenticity and Brand Protection

Verification of authenticity is a key element of quality control. A number of high quality brands, in particular alcoholic beverages have been the target of adulteration schemes by counterfeit producers. A simple, rapid method of detecting inauthentic products can help tackle this problem.

As an example, Lonestar was used to quickly analyze and distinguish between different brands of ketchup, which have similar chemical composition (Figure 4).

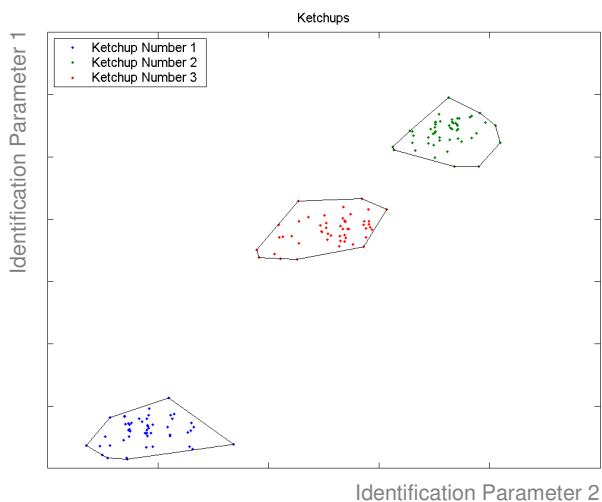


Fig 4: Brand Protection - Odor detection of ketchups

#### References

- 1) Ion mobility spectrometry for food quality and safety  
W. Vautz a; D. Zimmermann a; M. Hartmann a; J. I. Baumbach a; J. Nolte a; J.Jung ba Department of Metabolomics, ISAS - Institute for Analytical Sciences, D-44139 Dortmund, Germany
- 2) Mossoba, M. M. (Ed.). (1999). **Spectral Methods in Food Analysis: Instrumentation and Applications**. CRC Press.

#### Taint Detection – A Case Study

The following is a real-world example of taint and the economic impact to the producer<sup>2</sup>.

“At one point, a number of consumer complaint samples were received in connection with an off-odor in pear and apricot nectar products, whose consumption was sometimes followed by nausea. The odor noted was similar to natural gas... Inspection of the plant indicated that oil might be leaking from an overhead motor above the filling line... When the oil was heated in the laboratory in the acidic pear nectar in the presence of zinc, t-butyl mercaptan was liberated... An improperly lubricated breather valve was determined to be at fault. Lubricating oil applied to the valve had been dripping into some of the unfilled cans on the filling line. The firm recalled 225,000 cases of affected product.”

Tests conducted with Lonestar (Figure 5) showed that it could correctly distinguish pear juice tainted with used motor oil from unadulterated pear juice. Its use in inline monitoring could prevent contaminated product from being shipped.

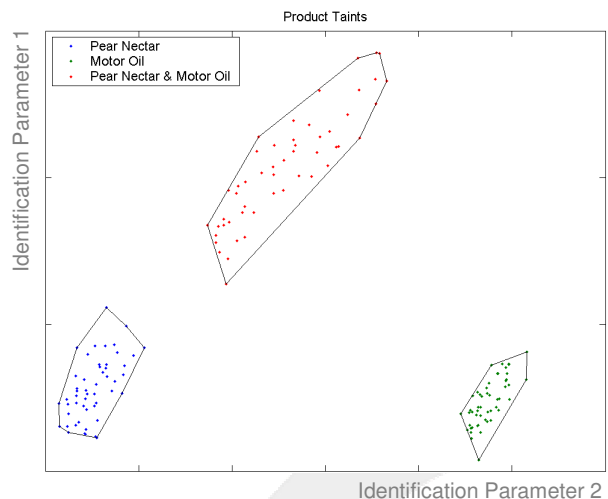


Fig 5: Identification of motor oil taint in pear juice

#### Conclusions

Lonestar is a powerful chemical monitor suitable for a broad range of flavor and aroma analysis applications. For further information on how Lonestar may help in your application, please contact [sales@owlstone.co.uk](mailto:sales@owlstone.co.uk)

**US Office:**  
Park 80 West  
Plaza II  
Saddle Brook NJ 07663  
Tel: +1 201-880-4400  
Fax: +1 201-880-4894

**UK Office:**  
St Johns Innovation Centre  
Cowley Road  
Cambridge CB4 OWS  
Tel: +44 (0)1223 422415  
Fax: +44 (0)1223 422414