

Introduction:

The Food Safety and Standards Authority of India (FSSAI) has been established under the Food Safety and Standards Act, 2006 which consolidates various acts and orders that have, up till now, handled food related issues in various Ministries and Departments. FSSAI was created for developing and upholding science based standards for articles of food and to regulate their manufacture, storage, distribution, sale and import to ensure safe and wholesome food is available for human consumption.

The Act also aims to establish a single reference point for all matters relating to food safety and standards, by moving from multi-level, multi-departmental control to a single line of command. To this effect, the Act establishes an independent statutory Authority – the Food Safety and Standards Authority of India, headquartered in Delhi. Food Safety and Standards Authority of India (FSSAI) and the State Food Safety Authorities shall enforce various provisions of the Act.



Figure 1. NexION® 2000 ICP-MS recently installed at ARBRO Pharmaceuticals Ltd., Analytical Division.



A market leader in food testing
with PerkinElmer ICP-MS

ARBRO Pharmaceuticals Ltd, Analytical Division

ARBRO is a multi-disciplinary contract research organization and food testing lab in India. ARBRO Analytical Division was established in 1990 in New Delhi. Subsequently, two additional state of the art laboratories were added one in Baddi and another in Bangalore. They specialize in pharmaceutical testing, food testing, herbal testing, water testing and more. ARBRO offers analytical method development, method validation, stability testing, product testing, product development, chemical testing and microbiology testing lab services along with pre-shipment inspection. They are one of the largest food testing labs in India, accredited by NABL as per ISO/IEC17025 and authorized by FSSAI for chemical and biological testing of food, beverages and agricultural products. Having more than 20 years of experience as a food testing lab, ARBRO offers a single point solution to all the food testing needs of the industry for both domestic and export markets. They have a team of over 300 professionals backed by an ultramodern food testing lab infrastructure and state of the art equipment. They analyze foods and agricultural products as per FSSAI, BIS, EIC/EIA, APEDA and European (EU) standards and FSSA (Food Safety and Standards Act). The testing carried out complies to national and international standards using globally acceptable methods laid out by AOAC, ASTA, AOCS, CODEX, PFA, BIS, EU and USFDA.

Investment in ICP-MS

A critical component of ARBRO's mission is to determine heavy metal content in different food samples such as grains, fruits, vegetables, water, cereals, milk, dairy products, herbal products, edible oils, honey, beverages and spices. They were looking for a fast throughput analytical tool or instrument to meet their demand of over 50 samples per day to determine heavy metal content to meet various regulations including FSSAI and AOAC. Seven years ago, they decided to invest in the PerkinElmer ELAN® ICP-MS model and recently they installed PerkinElmer NexION® 2000 ICP-MS. The criteria for selecting this instrument was its unique reaction and collision cell technology, robustness, less user maintenance, local support, long term stability and precision. The ICP-MS has become an integral part of ARBRO's testing for various food samples. Before they invested in this technique, they adopted other methods like AAS with graphite furnace and ICP-OES. Using the ICP-MS, they are able to analyze 10-20 times as many samples per day as they did before. ARBRO says, "the PerkinElmer instruments are the most important pieces of equipment we own, particularly to help us conform to various regulations like FSSAI and AOAC for the determination of metal impurities like lead, cadmium, arsenic, mercury, selenium, tin, copper, zinc, nickel and chromium".

A typical ICP-MS analysis for a few samples was carried as per ARBRO's standard internal protocols and validated methods as laid out by the AOAC. Samples of honey and rice were analysed for heavy metals like arsenic, lead and cadmium using the PerkinElmer ICP-MS.

Honey

Approximately 1 gm of honey was taken in a volumetric flask and 5 ml of Supra pure grade nitric acid was added. Digestion was carried out on a hot plate until brown fumes were no longer seen. After cooling to room temperature, the volume was increased up to 50 ml with deionized water and aspirated into the spectrometer.

Rice

Same procedure as honey, but approximately double the amount of sample was digested each time.

Results

Honey			
Sample	As (ppb)	Pb (ppb)	Cd (ppb)
Honey-1	56.379	24.777	1.385
Honey-2	60.831	15.875	1.484
Honey-3	58.717	27.190	1.462
Honey-4	58.381	16.015	1.068
FSSAI Limit	1100	2500	1500
EIC Limit		250	1000
Rice			
Sample	As (ppb)	Pb (ppb)	Cd (ppb)
Rice-1	65.343	7.515	7.737
Rice-2	34.169	3.226	4.888
Rice-3	21.963	1.657	3.413
FSSAI Limit	1100	2500	1500
EIC Limit		200	200

Conclusion

In all samples, the levels of heavy metals were far below the limits specified by FSSAI and EIC.

Analytical Solutions

For the last seven years, ARBRO has analyzed various food samples like honey, milk, cheese, namkeen, cooked foods, beverages, juice and water using a PerkinElmer ICP-MS. Being a NABL accredited lab, ARBRO are receiving samples from different parts of the country to comply with FSSAI regulations. They are following various global standard methods as mentioned above to analyze these food matrices. They have a team of chemists and scientists to develop and validate robust methods, check accuracy, precision and recovery. These data produced can also be used in the court of law. Today, ARBRO has analyzed more than 50,000 samples catering to different clients throughout the globe.

ARBRO is a very customer focused organization due to their quality service and loyalty to their clients and have grown multi fold over the last 10 years. Today, ARBRO has become one of the largest food testing labs in India. By having high quality analytical equipment like the PerkinElmer ICP-MS, they are a market leader in food testing.

PerkinElmer feels proud to be associated with ARBRO as they have shown the trust in this partnership to achieve their goals. ARBRO has, "always found the technical and service support of PerkinElmer and its partners to be nothing less than extraordinary.

Whether it is a new installation or preventative maintenance, PerkinElmer service engineers always conduct themselves in a very professional manner. We've also found PerkinElmer's technical and application support specialists to be equally impressive".

Thank you, Dr. Saurabh Arora for acknowledging PerkinElmer's support to help ARBRO become one of the highest quality leading global testing labs. PerkinElmer looks forward to continue supporting you in the future as you continue to grow.

References:

1. ARBRO website <https://testing-lab.com/2012/05/arb-ro-authorized-by-fssai-for-testing-of-food-samples/>
2. FSSAI website www.fssai.gov.in/

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