

FOOD ANALYSIS AND TESTING

Food product testing is considered as the most important step despite being the last process of the food manufacturing chain. Food product testing is vitally necessary, to assure that the food is free of physical, chemical, and biological hazards and also determines the safety of the food for use. Examples of potentially hazardous food contaminants include metals, pathogens, cleaning agents, additives, preservatives, pesticides, adulterants, and more. Food product testing also refers to the scientific analysis of food and its contents to provide information about characteristics of food like its structure, composition, and Physico chemical properties.

In India, regulations set up by FSSAI are most vital and should be followed and monitored regularly.

Food testing is crucial for food industries for many reasons as it covers wide range of requirements like

- Testing the quality of a product
- Quality control
- Food inspection and grading
- Food authenticity check
- Testing for adulterants
- Nutritional labelling
- Food nutrient content analysis
- Shelf-life analysis
- Sensory evaluation

Food Testing can benefit food production business

1. **Customers:** Protects and guaranteed prevention to customers from food-borne diseases.
2. **Manufacturers:** Assures product safety, approval to enter the market, and aids in brand reputation which in turn, leads to an increase in business ventures.

Techniques that take place in a food testing laboratory:

3. **Analytical chemistry testing:** This helps to identify, separate and even find the quantity of the chemical components of natural and artificial materials in the food product such as pH, additives, nutrients, preservatives, contaminants, minerals and much more.

4. **Microbiology testing:** This food testing helps food manufacturers identify the microorganisms that inhabit the food and understand the safety of the raw materials used in food production, ingredients as well as the final product. This is also used to test and examine spoiled pathogens to prevent food poisoning outbreaks that are generally caused by the products and the ingredients used in the products. This is also a necessity otherwise the whole supply chain can be contaminated and disrupted in the process of food production, leading to not only a danger to the general public but also a hefty loss of money.
5. **Food allergen test:** Food allergens are proteins that appear in huge quantities. It helps to find the main target allergen in the ingredients and finished food product. Normally allergens are tested in food products such as peanuts, gluten in grains, eggs, nuts and milk, etc.
6. **Nutritional analysis:** This area in food testing provides accurate information on the nutritional content of food products. This gives manufacturers the required details to include it on food packaging and ensure that they are following all compliances and labelling regulations.

Eurofins -Analytical Food Testing Laboratory

Eurofins is the world leading **Food Testing** laboratory group, deploying a comprehensive range of state-of-the-art analytical techniques in order to support its clients' increasingly stringent quality and safety standards. In India as **Eurofins Analytical Services India Pvt Ltd** and provide a comprehensive and one-stop testing service to businesses and organizations involved in food and feed processing, Agro products, Export, Hospitality and Retail chains.

The Eurofins Advantage

- Competence Centers with state-of-the-art equipment such as high-resolution GC, HPLCs, GCMSMS, FTIR, ELISA, HR-MS, GC-MS, HPLC, LC-MS/MS, ICP-MS, Real-time PCR and NMR systems
- Fast turn-around time (TAT)
- Local contact with a Global Network
- Participation in industry associations and regulatory bodies allowing early advice on potential food scares and legal obligations
- Expert advice - testing schemes, on-site-check for hygiene and allergens, labelling advice and traceability
- Results you can rely on
- International presence

Refer some applications of food testing s

<https://www.eurofins.in/food-testing/blog/importance-of-food-testing/>

FSSAI Food Testing Procedure

To ensure the quality and safety of any food products, food sampling or food analysis can be ordered and carried out by an FSSAI Office. As per the Food and Safety Standards Act, testing of food articles is to be conducted once in six months through NABL accredited or FSSAI-notified lab. For a food analysis, a sample food product would be drawn, packed, sealed, and sent to an authorized lab to analyze the quality and safety of the food product. This article looks at the procedures followed during an FSSAI food testing procedure.

Importance of Laboratory testing Under FSSAI

Food testing and analysis are essential for the safekeeping of the food ecosystem. Food laboratory tests ensure that the food is safe for consumption.

- Food testing ensures that the products comply with the Food and Safety Standards Act;
- Lab testing Protect the brand equity and loyalty of consumers by delivering healthy food;
- Protects consumers from contaminated, modified, and healthy food;
- Ensures proper storage, packing, and distribution of food commodities; and
- Laboratory testing under FSSAI provides services in all areas of food testing, including-
 - Food adulterant testing
 - Chemical Contaminant testing
 - Microbial Testing
 - Drug Residue Testing

Procedure Involved in FSSAI Testing

If an FSSAI officer draws a food sample, the following procedures must be followed during the sample collection process:

Signature of Witnesses

The Food Safety officer should call for one or more witnesses while taking the sample piece and obtain a signature on all related forms and documents.

Notice to the Business Operator

If the product has been obtained from the manufacturer or supplier, a notice in Form V-A shall be issued to them. When a product is drawn from an open container, the person drawing the sample should draw another sample from a container in its original condition bearing the same declaration and intimate the same to the Food Analyst.

Payment for the Sample

The Food Safety Officer should pay the cost of the sample to the person from whom the sample drew it. The price should be calculated at the rate at which the product is sold to the public.

Packing of Sample

The sample food for the analysis should be taken in clean, dry bottles or jars or in a container that should be adequately sealed to prevent leakage, and evaporation and to avoid the entrance of moisture. When selecting an already packed product as a sample, no further sealing is required.

Labeling the Package

The package should be properly labeled and should bear the following requirements:

- Code of the sample
- Name of the sender with his official designation
- Date and place of collection
- Nature of the product that has been sent for analysis
- Nature and quantity of preservative added to the sample

Sealing of package

The sample should be divided into four parts, and each piece should be sealed and wrapped using strong paper. The ends of the form should be folded and affixed. Further, a paper slip that covers the bottom to the top of the container, bearing the signature of the designated officer, should be pasted on the wrapper.

The signature or thumb impression of the person from whom the sample has been taken should be affixed so that the paper slip and the wrapper bear part of the signature or the thumb impression. The paper cover should be further protected by means of a strong thread above and across the jar. The knots of the thread should be covered by wax bearing the impression of the sender's seal.

Dispatch of the Package

The containers of the samples shall be dispatched in the following manner:

- The sealed container of one part of the sample, along with the memorandum in Form VI should be sent to the ***Food Analyst***.
- The second and third parts of the sample along with two copies of the memorandum in Form VI should be sent to the ***Designated Officer***.
- The fourth part of the sample along with a copy of the memorandum in Form VI should be sent to an ***accredited laboratory*** along with the prescribed fee.

On receipt of the food sample, the authorized FSSAI lab would analyze the quality and safety of the sample food product and pass the final decision.

Food Testing Laboratories in India

There are around 600 Food Testing Laboratories in India including all NABL-accredited laboratories, those owned by the private sector, FBOs, state/central government, FSSAI-notified laboratories, etc.

Other than these labs, there is another group of Food Testing Laboratories, which includes small players and a larger pool of food testing labs that exists with the FBOs to carry out tests for raw materials and finished goods.

5 Methods for Food Analysis

From detecting pathogens to driving research and development, food analysis is a multifaceted discipline with a wide range of applications. Scientists rely on state-of-the-art methods to carry out food analysis, both in laboratories and on site in ingredients processing plants, production factories and supermarket storerooms.

Here's a closer look at some of the most popular methods used for food analysis:

1. Mass spectrometry (MS)

MS is one of the most common analytical methods used in food analysis laboratories. The technique is often paired with liquid (LC) or gas chromatography (GC) to enhance results. Depending on the application, MS can also be coupled with capillary electrophoresis (CE) and infrared spectroscopy (IR).

2. Nuclear magnetic resonance (NMR) spectroscopy

NMR spectroscopy uses the magnetic properties of atomic nuclei, usually hydrogen, carbon-13, phosphorus-31 and deuterium, to analyse liquid and solid samples. As a non-destructive method, it's ideal for analysing complex food samples and offers the scope to simultaneously detect and quantify multiple compounds. Scientists also covet NMR for its versatility and high reproducibility.

3. Polymerase chain reaction (PCR)

While PCR testing has become a widely recognised term in the wake of the COVID-19 pandemic, food analysis scientists have been relying on the method for decades. The technique analyses specific DNA sequences and has proved especially useful for identifying animal species in meat products. This helps to prevent food fraud and avoid situations like the highly publicised 2013 horsemeat scandal. [PCR testing](#) is also used to detect harmful pathogens and other microorganisms, as well as the presence of genetically modified organisms (GMO).

4. Enzyme-linked immunosorbent assay (ELISA)

From product manufacturers to quality control agencies, [ELISA](#) is one of the most widely used methods in the food industry. Tests are used to detect hidden allergenic proteins in food products, including hormones, antibodies and peptides. As a highly-sensitive technique, ELISA is also used to detect peanut traces in raw, processed and cooked foods.

In the dairy industry, ELISA is used to identify pathogens such as E. coli, Salmonella and listeria in milk and cheese products. The testing method is also capable of detecting mould spores before they begin to grow.

5. LFD (lateral flow device)

LFD testing is another method that's been popularised during the pandemic. In the food industry, this immunological assay technique is a fast and efficient way to detect gluten in products, with an antigen-antibody reaction used to identify the protein. The latest LFD testing kits are compact and easy to use, making them ideal for on-site testing.