



Centre for Food Research & Analysis (CFRA), NIFTEM

An Accredited Food Testing Laboratory
A component of International Center of Excellence in Food Safety & Quality
with Integrated accreditation from:-



Quality is Not Optional !

**National Institute of Food Technology, Entrepreneurship and Management
Plot No. 97, Sector-56, HSIIDC Industrial Estate, Kundli, Sonapat, Haryana**

ABOUT NIFTEM

National Institute of Food Technology Entrepreneurship and Management (NIFTEM) is a Deemed-to-be University under the De-novo category. It is an autonomous institution setup by the Ministry of Food Processing Industries, Government of India to cater to the needs of various stakeholders of the food sector i.e. entrepreneurs, industry, exporters, regulators, policy makers, the government and the existing institutions and for the development of skilled human resource in the country. NIFTEM plays a pivotal role as a one stop solution provider related to various aspects of food processing (products, technologies, food safety management practices, entrepreneurship development, food quality and safety, commercialization etc.). NIFTEM with its five pilot plants provides incubation facilities to enable entrepreneurs to develop sustainable business.

International Centre of Excellence in Food Safety & Quality (ICEFSQ)

During the present era of globalization and global food trade, it is essential to address the present day issues of food safety and quality and to enable and facilitate our agri-produce and the processed food products. NIFTEM has established an International Centre of Excellence in Food Safety & Quality.

Objectives of Centre of Excellence

1. Serve the industry by providing an accredited state of art Food testing laboratory for certification of food products for ensuring their quality and safety.
2. Undertake Projects related to Analytical studies for providing solutions to the food industry.
3. Conduct training programs for up gradation of skills for :
 - Upgradation of skills for the use of various sophisticated analytical techniques for analysis of food products
 - Quality management systems, audits and implementation
 - Food laws and food regulations etc.
 - CODEX activities for harmonization of food standards and setting up of MRL values.
4. Serve as Center for CODEX and support for FSSAI.
5. Serve as Centre for Regulators and Policy makers for undertaking studies for Risk Assessment.
6. Serve as one of the referral laboratory for the country.

Centre for Food Research and Analysis (CFRA), NIFTEM

CFRA, NIFTEM is an accredited state-of-art well established analytical laboratory with integrated assessment from NABL, APEDA & FSSAI has the capabilities of not just carrying out quality control and certification of food products at different stage of supply chain but also provides technical support related to analytical studies to food processing industries and help in developing standards and test protocols for various quality parameters essential for both raw and processed products for the domestic and international market. The CFRA undertakes projects to provide solutions to the problems being faced by the food industry related to their requirements.

Objective of CFRA, NIFTEM

- ❑ Studies for quality certification of raw and processed foods for Physico-chemical, Nutritional, Microbiological and Sensory Parameters.
- ❑ Safety evaluation of food products w.r.t. residues of various toxicants & contaminants and presence of adulterants.
- ❑ New Analytical Method development and Validation.
- ❑ Residual and Persistence studies of Agrochemicals in crops, water and soil.
- ❑ Shelf life and enhancement of shelf life.
- ❑ Development and characterization of new packaging material and studies on food packaging interactions and compatibility.
- ❑ Analytical data related to development and improvements/modifications of products and processes.
- ❑ Studies related to development of nutraceuticals and functional foods.
- ❑ Studies for food fortification.

Categories of Products for Studies

- ◆ Milk and dairy products
- ◆ Meat, marines and poultry
- ◆ Cereals, Grains and Pulses
- ◆ Ready-to-eat food
- ◆ Spices and nuts
- ◆ Tea & Coffee
- ◆ Oil and Fats
- ◆ Alcoholic and non-alcoholic beverages
- ◆ Honey, Sugar and confectionery
- ◆ Pickles, Jams & Condiments
- ◆ Animal Feed
- ◆ Water & Waste Water
- ◆ Raw and processed fruits and vegetables.
- ◆ Food packaging materials
- ◆ Snacks & Bakery products
- ◆ Food additives
- ◆ Starch and Starch products
- ◆ Functional foods, nutraceuticals and food supplements

Details of the Services Provided by CFRA, NIFTEM

1. Analysis for Residues of Toxicants & Contaminants

CFRA with its present expertise and highly sensitive and sophisticated analytical equipment can undertake the analytical work related to the presence of residues of various types of toxicants and contaminants in food products as give below:

- | | |
|---|--|
| <input type="checkbox"/> Toxic metals | <input type="checkbox"/> Residual Solvents |
| <input type="checkbox"/> Pesticides & Plant growth regulators | <input type="checkbox"/> Mycotoxins |
| <input type="checkbox"/> Dyes and Colourants | <input type="checkbox"/> Pathogens |
| <input type="checkbox"/> Antibiotics & Veterinary drugs | <input type="checkbox"/> GMOs |
| <input type="checkbox"/> Environmental contaminants | <input type="checkbox"/> NOTS |

2. Analysis for Nutritional Labeling

Nutritional labeling is mandatory as per the various national and international regulatory requirements. CFRA has the facilities of certification for labeling of nutritional facts as per the guidelines of FSSAI and other international regulatory authorities in different processed and packed foods

| Nutritional information | | |
|--------------------------------|--------------------|---------------|
| Total fats | Saturated fats | Cholesterol |
| Mono & poly unsaturated fats | Trans-fats | Dietary Fiber |
| Proteins | Total Carbohydrate | Added Colours |
| Sugar | Energy | Minerals |
| Antioxidants | Trace elements | Vitamins |

3. Quality Evaluation and Certification of Raw and Processed Food products for Various Physical, Chemical, Biological, Sensory and Rheological Parameters

| Physical and Rheological Parameters | | |
|--|--------------------|---------------------------|
| Insect infestation | Admixture | Colour on lovibond scale |
| Bellier turbidity temperature | Refractions | Optical rotation |
| pH | Refractive index | Specific gravity |
| Microscopic examination | Scorched particles | Falling number |
| Texture profile | Viscosity | Water absorption capacity |
| Elasticity and Extensibility of Dough | Flash Point | Conductivity |



| Chemical Parameters | | |
|----------------------------|---------------------------|-----------------------------------|
| Moisture | Amino acid profile | Water & Oil soluble Vitamin |
| Starch | Ethyl alcohol | Acid insoluble ash & Suphated ash |
| Organic Acid | Methyl alcohol | Gluten |
| Sugar Profile | Higher alcohol | Alpha amylase activity |
| Soluble fiber | Esters | Phosphatase activity |
| Crude fiber | Flavonoids | Food Additives |
| Dietary fiber | Volatile Organic Compound | Food Colors |
| Insoluble fiber | Phytosterols | Flavours & Fragrances |
| Fat/Oil content | Tannins | Artificial Sweeteners |
| Fatty Acid Profile | Phyto-chemicals | Antioxidants |
| Tri halo methane | Sulphated ash | Emulsifiers, Colors |
| Uric Acid | Aldehyde/furfurals | Cations/Anions |
| Terpineol | Cellulose | HMF |

| Biological Contaminants | Chemical Contaminants and Adulterants |
|--------------------------------|--|
| E.coli | Urea, Detergents etc. |
| Salmonella | Mineral Oils |
| S.aureus | Starch in diffeient food product |
| Shigella | Preservatives (Fomaldehyde, hydrogen peroxide) |
| Campylobacter | Sugars in Honey |
| Bacillus cereus | Argemone, Gossypol, Kesri Dal etc. |
| Pseudomonas | Melamine |
| Clostridium sp. | Animal Fat in ghee/vegetable Oil |
| Total Bacterial Count | Banned / Non-permitted dyes, Melamin etc. |
| Yeast and Mould Count | Tri ortho cresyl Phosphate (TOCP) |



4. Food Packaging Materials

CFRA conducts various tests on packaging materials and offers a wide range of R & D and consultancy services with respect to:

- ◆ Improvement in quality of packaging products
- ◆ Characterization of Packaging Material
- ◆ Suitability of packaging material for different types of food products i.e., container compatibility studies
- ◆ Migration studies for different components e.g., monomers, additives, stabilizers, material etc from packaging materials

5. Quality Evaluation of Food Additives

Food additives, often present in ppm or ppb range perform a diverse range of functions in foods. The CFRA has adequate facilities to evaluate the quality of food additives before use and determine their residual levels in foods by adopting national and international standard methods as well as state-of-the-art technology. The range of capabilities include tests for artificial sweetness (aspartame, saccharin, acesulfame K, benzoate, sorbate), food colours, preservatives, emulsifiers, stablizers, antioxidants, etc.

6. Method Development and Validation of Analytical Techiniques

Analytical method development and validation, a mandatory requirement as per ISO 17025 guidelines, forms an important aspect of quality analysis. CFRA has the desired knowledge and the trained expertise for developing new analytical methods and validating them as per the various International protocols (ICH, AOAC, SANTE EU etc.) for different components in food and herbal products.

7. Studies on Product Differentiation

Today, the consumer has become more demanding about the quality, purity and value addition of the products. In this regard, CFRA, NIFTEM can undertake product differentiation studies with respect to :

- ◆ GM and Non-GM products
- ◆ Inferior & superior quality cereals and pulses
- ◆ Organic and Non-organic products
- ◆ Inferior and superior quality oilseeds
- ◆ Adulteration of food products
- ◆ Food Safety

8. Shelf life / Stability Studies of Raw & Processed Food Products

CFRA with its existing facilities can undertake studies for shelf life at both ambient and accelerated storage conditions to establish the validity of the product with respect to physico-chemical properties, water activity, microbial stability, sensory properties, rheological properties etc.

9. Studies on Enhancement of Shelf life

These days several technologies are being used for enhancement of shelf life of the food products such as modified atmosphere packaging, use of chemical preservatives, Gamma irradiation etc. CFRA, NIFTEM has the desired expertise for conducting studies related to shelf-life enhancement of food and herbal products.

10. Quality Evaluation of Animal Feed

CFRA has the adequate facilities for undertaking feed analysis and provide information related to :

- ◆ Level of nutrients in animal feeds
- ◆ Evaluation of nutritive value of new varieties of crops and fodder
- ◆ Formulation of policies, guidelines for standard and quality criteria of animal feeds

11. Quality Evaluation and Characterization of Herbal Products

Today one of the major concerns associated with the herbal products is identification of the right species of raw herbs; quality, efficacy, safety and toxicity of the product; synergistic effects with other components and quantification of the labelled ingredients.

With the facilities available at NIFTEM, the following studies can be undertaken :

- ◆ Chemical profiling and fingerprinting of different phyto-components.
- ◆ Determination of various bio-actives (Saponins, Alkaloids, Flavonoids, Polyphenols, Polysaccharides, Phyto-sterols, etc.)
- ◆ Evaluation for sanitary and phytosanitary aspects related to microorganisms and residual contaminants of pesticides, heavy metals, mycotoxins, etc.

12. Organic Certification

Organic certification involves a) Farm Certification and b) Product Certification.

CFRA with its existing facilities can play an important role in certifying products from organic farming by carrying out analysis of water used for irrigation, soil from the fields, crop during the stages of its growth, feed for live stock and product of organic produce for the following contaminants : Pesticides, herbicides & fungicides, Heavy metals, Certain nutrients, Minerals and Fertilizers, Additives etc.

List of major State of Art Analytical Equipment at CFRA

1. Liquid Chromatograph-Mass Spectrometer
2. Gas chromatograph-Mass Spectrometer with head space analyzer
3. Inductively Coupled Plasma-Optical Emission Spectrometre
4. High Performance Liquid Chromatograph with all detectors
5. Gas Chromatographs with ECD, FID, NPD, TCD, FPD, head space analyzer
6. Atomic Absorption Spectrometer (AAS) with FIAS and GTA
7. Differential Scanning Calorimeter (DSC)
8. Thermogravimetric Analyzer
9. UV/Visible Spectrophotometer
10. Spectrofluorometer
11. FT-IR Spectrophotometer
12. Texture Analyzer
13. Kjelttech for Protein Estimation
14. Polarimeter
15. Rancimat
16. Elemental Analyzer
17. Lovibond Tintometer
18. ELISA Reader
19. Gel Electrophoresis
20. Soxhlet Extraction Unit
21. Microwave Digestor
22. Karl Fisher Automatic Titrator
23. Glutamatec System
24. Fibretech for Fibre Estimation
25. Viscometer
26. Digital Abbe Refractometer
27. Water Activity Meter
28. Conductivity Meter
29. Nephelometer/Turbidity Meter
30. Electronic Colony Counter
31. Bio Safety cabinet
32. Biological Oxygen Demand Incubator (BOD)



For further queries please contact

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