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| **Food Composition and Analysis** |
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| An Assignment PresentedTo The Academic DepartmentOf The School Of Science AndEngineering in Partial Fulfillment Of TheRequirements for the Bachelor Degree in Nutrition |
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# Introduction

Food composition analysis is an important research field in the food industry. It involves analyzing the chemical composition of food in order to understand its nutritional content and potential health benefits. This analysis can be used to determine the nutritional value of food, as well as to identify potential contaminants and allergens. It can also be used to determine the shelf life of food products and to assess their safety for consumption. There are several methods of food composition analysis, which vary in complexity and accuracy. This essay will discuss the different methods of food composition analysis and their applications.

# Different methods of food composition analysis

**1.** Chemical Analysis: This is one of the most common methods of food composition analysis. It involves analyzing the chemical components of food in order to determine its nutritional value and safety. This method can be used to measure the levels of vitamins, minerals, and other nutrients in food, as well as to identify potential contaminants and allergens. Chemical analysis is often used in the food industry to ensure the safety and quality of products.

**2**. Spectroscopic Analysis**:** This method of food composition analysis involves using spectroscopic techniques to analyze the chemical composition of food. This technique can be used to measure the levels of vitamins, minerals, and other nutrients in food, as well as to identify potential contaminants and allergens. Spectroscopic analysis is often used to monitor the shelf life of food products, as well as to assess their safety for consumption.

Nuclear magnetic resonance (NMR) spectroscopy

NMR spectroscopy uses the magnetic properties of atomic nuclei, usually hydrogen, carbon-13, phosphorus-31 and deuterium, to analyze liquid and solid samples. As a non-destructive method, it’s ideal for analyzing 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.** Microscopic Analysis**:** This method of food composition analysis involves using a microscope to examine the physical structure of food and its components. This technique can be used to identify the presence of bacteria, fungi, spores, and other microorganisms in food. Microscopic analysis can also be used to measure the levels of vitamins, minerals, and other nutrients in food.

## 4. Chromatographic Analysis: This method of food composition analysis involves using chromatography to separate and analyze the components of food. This technique can be used to identify potential contaminants and allergens in food, as well as to measure the levels of vitamins, minerals, and other nutrients in food. Chromatographic analysis is often used in the food industry to ensure the safety and quality of products.

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).

**5**. Polymerase chain reaction (PCR)

While PCR testing has become a widely recognized 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 publicized 2013 horsemeat scandal. [PCR testing](https://ilmt.co/PL/a90m) is also used to detect harmful pathogens and other microorganisms, as well as the presence of genetically modified organisms (GMO).

## 6. Enzyme-linked immunosorbent assay (ELISA)

From product manufacturers to quality control agencies, [ELISA](https://ilmt.co/PL/PpAO)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.

## 7. LFD (lateral flow device)

LFD testing is another method that’s been popularized 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.

Find out more about the advanced technologies being used to analyze food in [‘Ultra-low Level Analysis of Dioxins in Food using a triple quadruple mass spectrometer (MS/MS) with Boosted Efficiency Ion Source’.](https://www.labmate-online.com/article/mass-spectrometry-and-spectroscopy/41/shimadzu-scientific-instruments/ultra-low-level-analysis-of-dioxins-in-food-using-a-triple-quadrupole-mass-spectrometer-msms-with-boosted-efficiency-ion-source/2964)

# Steps of food analysis

* Sample collection. Sample collection refers to the extraction of a representative sample for analysis and testing. ...
* Sample treatment. The sample preparation step is one of the most critical in the analytical process.
* Analysis and detection. ...
* Recording and processing of analytical results.

# Conclusion

Food composition analysis is an important research field in the food industry. It involves analyzing the chemical composition of food in order to understand its nutritional content and potential health benefits. There are several methods of food composition analysis, which vary in complexity and accuracy. These methods can be used to determine the nutritional value of food, as well as to identify potential contaminants and allergens. They can also be used to determine the shelf life of food products and to assess their safety for consumption.

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