THERMAL METHODS IN FOOD ANALYSIS

Thermal methods play a significant role in food analysis to determine various characteristics and properties of food products. Some common thermal methods in food analysis include:

Differential Scanning Calorimetry (DSC): DSC measures the heat flow into or out of a sample as it is heated or cooled, revealing phase transitions, such as melting or crystallization points, which can help assess the quality and composition of food products.

Thermogravimetric Analysis (TGA): TGA monitors the change in a sample's weight as it is subjected to controlled temperature changes. This can be used to determine moisture content, fat content, and other compositional information.

Thermomechanical Analysis (TMA): TMA measures dimensional changes in a sample as it is subjected to temperature variations. This is useful for studying the thermal expansion or contraction of food materials.

Texture Analysis: While not a traditional thermal method, texture analysis often involves thermal components, like testing the hardness or softness of food products using a texture analyzer at specific temperatures.

Rheological Analysis: Rheological tests can assess the flow and deformation properties of food materials under temperature variations, helping to determine the consistency and behavior of food products during processing or storage.

DIFFERENTIAL SCANNING CALORIMETRY

It is a thermoanalytical technique in which the difference in the amount of heat required to increase the temperature of a sample and reference is measured as a function of temperature.[1] Both the sample and reference are maintained at nearly the same temperature throughout the experiment. Generally, the temperature program for a DSC analysis is designed such that the sample holder temperature increases linearly as a function of time. The reference sample should have a well-defined heat capacity over the range of temperatures to be scanned.

TEXTURE ANALYSIS OF FOODS

Texture testing is a well-established technique for evaluating the mechanical and physical properties of raw ingredients, food structure, and designs, and for pre- and post-quality control checks. Texture testing has applications across a wide range of food types, including baked goods, cereals, confectionaries, snacks, dairy, fruit, vegetables, gelatins, meat, poultry, fish, pasta and even pet food. Since texture is a property related to the sense of touch, it can be measured easily by mechanical methods in units such as force.

In food texture testing, standard tests such as compression, tension and flexure are used to measure hardness, crispiness, crunchiness, softness, springiness, tackiness, and other properties of food. Comparing the results from mechanical texture analysis with trained human sensory panels has shown that the measurements have a high correlation with the various sensory attributes associated with textural quality.

.In production, food texture analysis is used for the measurement and control of process variations such as temperature, humidity and cooking time.