IMPROVING FOOD QUALITY THROUGH TEXTURE ANALYSIS

Texture analysis is the science of objectively measuring subjective characteristics of food products, their intermediate components, and their functional ingredients. In a scientific sense, texture can be described as an expression of the rheological and physical properties of a food. Research has shown that the texture of a food product determines and influences both customer selection and preference. The desired texture also affects the processing and handling procedures in the preparation of food products. Hence, consistently replicating the optimum texture for any individual food product is crucial for success.

Characterisation of food texture commonly falls into two main groups, based on sensory or instrumental methods of analysis. Sensory analysis includes use of the senses of sight, smell, taste, sound and touch. Evaluation of food texture by touch includes the use of the fingers, as well as the lips, tongue, palate and teeth in the mouth. Often sensory methods of analysis can be subject to wide variability, though using trained assessors can reduce this variability. It is often preferable to combine sensory with instrumental methods of assessing food texture because the latter can be more cost effective and have higher throughput.

The Texture Analyser (see Figure 1) is used to measure how a food feels when we eat it. It can also quantify how the food product performs during processing or handling. When using instrumental texture analysis, problems of variability are more likely to be caused by sample heterogeneity than by instrumental imprecision. The obvious reasons for using instrumental texture analysis are that this approach is cost effective and time efficient.

WHAT IS A TEXTURE ANALYSER?

The Texture Analyser is a mechanical device that quantifies how a food item responds when we touch or hold it, bite into it, and chew it in our mouth before we swallow it. The Texture Analyser has been used by academia for the last 70yrs to investigate the behavioural characteristics of foods. The food industry’s requirement for a quick but sophisticated, cost effective, and objective method of assessing the texture of their products resulted the development of the texture analyser through the Leatherhead Food Research Association (now known as Leatherhead Food International).

The Texture Analyser acts like an upside down laboratory balance. During a compression test, when the sample surface is detected by the probe (point of initial contact), the measurement is “triggered” thereby giving a consistent start point to the texture test. (See Figure 2) The Texture Analyser moves the probe in either an up or down direction at a defined rate of speed in order to compress or extend the food sample. The travel
beam is fitted with a load cell that measures the food’s response to the applied conditions as a force measurement. The Texture Analyser deforms the sample to either a defined distance (for example, 5 or 10mm) or % change in height (for example, 50%) while continuously recording the force load acting on the food sample. The travel beam then returns to the start position during which time the force load response of the sample is continuously monitored by the instrument during the upstroke. Parameters such as “stickiness” are measured during this phase by quantifying the force load required to break the probe sample contact. Characteristics such as hardness, stickiness, springiness, chewiness, cohesiveness, resilience, snap strength, extrusion force, cutting force, biting force and many more can be quantified and correlated to sensory test panels.

The Texture Analyser can be used in several environments including Q/C & R&D.