

## Texture Analysis of Surimi Products: Gel Strength (Stiffness) Estimation

Surimi is now spreading from Japanese to Western processed foods and is used to form extruded, shaped or cooked simulated shell-fish meat products such as crab, lobster, scallop or shrimp. To gain consumer acceptance of imitation shell-fish, the texture, flavour and appearance of fresh shell-fish must be matched as closely as possible. This has successfully been achieved by Japanese processors who produce surimi as an economic alternative to fresh fillets and imitation shell-fish which are barely distinguishable from the real thing.



However, in the emulation of this success and creation of products with an authentic shell-fish texture, especially using surimi from non-Japanese species of fish, European food manufacturers are challenged. Europeans have not had the history to develop their skills in discrimination sufficiently to equal the quality. At each stage in surimi product development, production and quality control, food manufacturers can quantify textural parameters using the TA.XT2i or TA.XTplus texture analyser and Windows-based software. This equipment can provide accurate data about, for instance, the effects of gel moisture content, salt concentration, cooking temperature and length of time heat is applied during processing which cuts out the guess-work. Texture analysis is applicable both near-line and in individual laboratory tests for surimi manufacture, measuring specific toughness, elasticity and gel strength of surimi-type products.

**The importance of the gel forming ability in surimi is vital especially in the Japanese food Kamaboko.**

Strong gels can hold in water and maintain succulence and juiciness of the end-product. Loss of product quality, in the form of decreased gel-forming and water-holding capacity of surimi is attributable to two factors: temperature of heating and the addition of the incorrect level of cryoprotectants (added for the prevention of protein denaturation during freezing).

The “punch” or penetration test, although considered an empirical test, is the single most popular gel measurement technique used in the surimi industry for evaluating “gel strength” or stiffness. The test imitates the large deformations to failure involved in mastication.

Many studies have been reported that correlate puncture or penetration methods with the sensory properties of surimi gels. This attribute of the test, coupled with its convenience, has made it popular for quality control within the surimi industry.

The TA.XTplus texture analyser is part of a family of texture analysis instruments and equipment from Stable Micro Systems. An extensive portfolio of specialist attachments is available to measure and analyse the textural properties of a huge range of food products. Our technical experts can also custom design instrument fixtures according to individual specifications.

**TA.XTplus texture analyser**



**Frozen surimi blocks**



**Fish-meat gel samples prepared from thawed surimi**