

Descriptive Analysis of Meat Texture

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The term "texture" encompasses many rheological properties in foods. Many of these properties can be measured by instruments such as the Instron and Warner-Bratzler devices. These instruments can provide information about a product's shear force, penetration, compression and many other properties. Each of these measurements is a single observation and may or may not relate to what is perceived by a person actually chewing the product. For example, a measurement of shear force may or may not correlate to consumers' evaluation of tenderness. The advantage of having people evaluate texture is that they can integrate several perceptions in order to determine whether they like the texture of a product. In other words, when consumers evaluate the texture/tenderness of meat, they are integrating their perception of hardness, connective tissue, juiciness and fat content in order to evaluate the texture of the meat sample.

Panel – Trained or Consumer?

The decision as to whether to use a trained panel or a consumer panel to evaluate products depends on the objectives of the test and what data you would like to generate. A consumer panel is used to measure personal opinions about a product regarding overall acceptability, preference of one product over another or opinions about specific attributes; whereas a trained laboratory panel can be used to obtain analytical information about a product by measuring the intensities of specific attributes. Training involves having the panelists develop terminology which encompasses the whole range of flavor or textural characteristics for a particular product category. Terminology which is used for trained panel evaluations is generally more specific than for consumer evaluations. A general term, such as tenderness, is often referred to as an integrated term because the perception of tenderness includes perceptions of hardness, connective tissues, juiciness and fat. When using a descriptor such as tenderness with trained panelists, there may be some confusion because panelists may be making evaluations based on different specific attributes. To avoid this type of confusion, it is better to evaluate the individual attributes, such as hardness, connective tissue, juiciness and fat, using reference standards for each of these char-

acteristics. After all the descriptors are defined, then reference standards are used to illustrate the characteristics and intensities of the descriptors.

During the first part of the session, it was demonstrated how a panel develops a list of descriptors for evaluating texture of a product. The attendees were served four products and they listed all the textural characteristics they observed. The textural descriptors were defined. It was discussed how some people used different terms to describe the same textural characteristic. The final lists of descriptors for a trained panel need to be defined and clearly understood by all the panelists.

During the second part of the session, the group was shown how a panel can be trained to evaluate hardness of meat products. A set of reference standards (Meilgaard et al, 1991) was given to each person and they used those references to scale the intensity of hardness for four meat products. It should be noted that panelists who are trained to evaluate specific attributes should not be used to obtain consumer liking information because the trained panelists are no longer typical consumers and biases may influence their evaluations.

Variation Issues

During the demonstration and the discussion that followed, several issues were brought to the attention of the group. One issue of concern was the variation inherent in muscle meat products and what the proper method is for sampling these muscles. It was suggested that the muscles be oriented in the same direction when cooking the sample and that the panelists be served the same portion of the muscle from each treatment. Even with this approach, it is not possible to eliminate entirely the effect of the variation in a muscle product. Other sources of variation may be the cooking method, how the samples are served and holding time. All of these conditions need to be uniform for all of the samples. Another issue discussed was that, in order to obtain consistent texture evaluations from the trained panelists, it is important that the size of the meat samples are uniform and that the panelists bite into the sample in the same manner regarding the orientation of the meat fibers.

When muscle meat or processed meat products are evaluated, it was discussed that the texture characteristic should be evaluated in the order of appearance. For example, the initial characteristic of a hot dog may be the skin texture followed by the internal texture characteristics, such as firmness, mealiness, perceptible particles or fat, and lastly the residual mouth feel. With a muscle product, the initial characteristics may be hardness and juiciness followed by number of chews, connective tissues and moisture of the bolus.

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Reciprocal Meat Conference Proceedings, Volume 47, 1994.

The primary objective of this session on descriptive analysis of meat texture was to demonstrate how a trained panel can be used to obtain intensity evaluations of specific meat texture attributes, using reference standards to calibrate the panelists.

Reference

Meilgaard, Civille and Carr. 1991. Sensory Evaluation Techniques, 2nd Edition. CRC Press, Inc., Boca Raton Florida. p 178.