SENSORY EVALUATION IN QUALITY CONTROL

Consumer researchers are well aware of the quality of products. The food industry constantly faces the demand to maintain both quality and profitability simultaneously. Quality, however, is an elusive concept and as such must be operationalized and measured in order for it to be maintained.”—H. R. Moskowitz (1995).

OBJECTIVES AND CHALLENGES

It goes without saying that food and consumer product manufacturers are concerned with ensuring the quality of the products they sell. Lately, quality has become a corporate rallying cry. A whole industry of quality specialists has sprung up to introduce popular quality assurance programs with catchy names like “total quality management.” Beyond the cheerleading, corporate buzz-words, and maze of consultants lies an honest concern with the delivery and appeal of finished products that will produce consumer satisfaction, brand loyalty, repurchase, and low incidence of consumer complaints.

Product quality has been defined in a variety of different ways (Lawless, 1995). Most researchers focus on issues of consumer satisfaction as a measure of quality (Cardello, 1995; Moskowitz, 1995), although there is a historic tradition of using expert judges, commodity graders, or government inspectors to be the arbiters of product quality (York, 1995; Bodyfelt, Tobias, and Trout, 1988). This tradition is tied to use of the senses for detection of well-known defects or expected problem areas. The approach was well
suited to standard commodities where minimum levels of quality could be ensured, but excellence was rarely the issue. Another strong tradition has been the emphasis on conformance to specifications (Muñoz et al., 1992). This approach is useful in the manufacturing of durable goods whose attributes and performance could be measured using instrumental or objective means. Another popular definition of quality has been “fitness for use” (Muñoz et al., 1992). This definition recognizes that quality does not exist in a vacuum, but only in a context or frame of reference for the consumer. Finally, the reliability or consistency in sensory and performance experiences with a product has been recognized as an important feature of product quality. Consumer expectations arise out of experience, and maintaining the constancy of that experience does a lot to build consumer confidence.

There are a number of challenges and problems that face a sensory evaluation program when one tries to provide sensory information for quality control (QC). Difficult situations occur in the manufacturing environment where sensory assessment is needed during the processing itself. Such on-line sensory quality testing is likely to be done under tight time constraints—for example, while the product is cooling and before a decision is made to bottle or pack a production run. Only a few qualified judges may be available on third shift in the middle of the night when these decisions have to be made. There is little luxury involved in terms of time, and a detailed descriptive evaluation and statistical analysis may not be possible due to time and resource constraints. At the same time, a flexible and comprehensive system may be desired, one that is also applicable to raw materials testing, finished products, packaging materials, and shelf-life tests (Reece, 1979).

A basic requirement of any sensory QC system is the definition of standards or tolerance limits on a sensory basis for the product. This requires a calibration study. If the sensory QC program is new, management may be surprised to learn that some research needs to be done before the QC panel can be trained and begin to operate. Sometimes the identification of standard products and tolerance limits may incur more expense than the sensory panel operation itself, especially if consumers are used to define the limits of what is acceptable quality. Maintaining reference standards for a standard quality product may also present difficulties. Foods and consumer products may have short shelf-lives, and even with optimal storage conditions the standards will need to be replaced sooner or later. It is difficult to prevent some drift in the product over time. Multiple references including both optimally stored and fresh products may be needed (Wolfe, 1979). Some products simply change with age, and this is a desirable feature like the proteolysis in ham or in cheese ripening (Dethmers, 1979). Furthermore, the frame of reference of the panel and of consumers used in a calibration study can drift or change.