

Sensory Evaluation of Food Characteristics and Quality

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Ashley Walther
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Introduction

While objective tests of food quality are important, subjective tests based on sensory perception are also an integral part of measuring differences in food quality. Subjective tests take into account personal preferences and the ways in which a food affects the senses, which is often the most important factor in the selection of foods (Brown, 2015). The sensory characteristics typically studied include the food's appearance, texture and flavor, which include both taste and odor. All of these factors determine the perceived quality of a given food (Walter & Beathard, 2015).

In understanding sensory testing of food quality, it is important to understand the specific characteristics to be evaluated. The first quality typically observed is the appearance of a food. This alone can determine whether or not a food is consumed and includes color, size, shape and physical condition of the food. Flavor is equally important and encompasses the qualities of taste, aroma and mouthfeel. Taste buds respond to five basic tastes, including sweet, salty, bitter, sour and umami, which, in combination, produce all of the flavors perceived in foods. The aroma of a food is equally important; without being able to smell a food, it is more difficult to perceive the flavors within the food. The final component of flavor is mouthfeel, which refers to the sensations perceived by the lining of the mouth, including temperature, astringency and pain. The last major characteristic evaluated in subjective testing is the texture of a food, which involves the response to physical characteristics of a food as a result of the food's structure and ability to resist the forces applied to it (Walter & Beathard, 2015).

There are a variety of subjective tests designed to evaluate the sensory characteristics of foods. These include descriptive tests, which use specific descriptive terms to indicate the flavor and texture of specific foods. Difference tests are also frequently used. These include the paired

comparison test, in which panelists are asked to select the food sample in which a specific characteristic is more detectable. Another important difference test is the triangle test, in which panelists are given three samples and ask to determine which of the three is different from the other two (Walter & Beathard, 2015). The purpose of the current experiment was to evaluate a variety of foods based on their sensory characteristics using these specific tests.

Methods

A. Evaluation of Food Products Using Descriptive Terms

1. Individual samples of corn chips, Fig Newtons, sweet pickles and dried cherries were prepared prior to testing.
2. The sensory characteristics of appearance, aroma, flavor, texture and consistency were evaluated and noted based on the descriptive terms provided by Walter and Beathard (2015, p. 3).

B. Paired Comparison Test

1. One ounce samples of unsweetened and sweetened apple sauce were prepared in two ounce cups labeled A and B.
2. Each sample was tasted and evaluated to determine which sample had the greatest intensity of sweetness.

C. Triangle Test

1. Two one ounce samples of fat free milk and one sample of a similar fat free milk product with added nutrients were prepared in two ounce cups and labeled with a code.
2. Each participant was blindfolded and then tasted each of the three samples one at a time to determine which sample differed from the other two.

3. The sample codes were changed and the trial repeated.

Results

After tasting each of the four samples in the descriptive test, a variety of terms were used to describe the sensory characteristics of each item. The results are listed in the table below.

Table 1- Evaluation of Food Products Using Descriptive Terms

Product	Appearance	Aroma	Flavor	Texture	Consistency
Corn Chips	Light brown, grainy, dry	Fried	Salty	Crunchy	Mealy, dry
Fig Newton	Golden brown	Fruity, sweet	Sweet	Chewy	Crumbly
Sweet Pickles	Shiny, wet	Pungent, sweet	Sweet, sour	Crunchy, soggy	Wet, crunchy
Dried Cherries	Rough, sunken	None detected	Sweet, bitter	Gummy, chewy	Chewy

In the paired comparison test, it was determined that Sample B had a greater intensity of sweetness than Sample A. Results from this test are listed in the table below.

Table 2- Paired Comparison Test

Sample Code	Intensity (Lesser or Greater)	Characteristic Evaluated
A	Lesser	Sweetness
B	Greater	Sweetness

In the triangle test, there was some confusion as to which sample differed from the other two. In each trial, one person determined that the incorrect sample was different. However, the majority of testers indicated that Sample 2 was different in trial 1, and that Sample 1 was different in trial 2. Results of the triangle test are listed in the table below.

Table 3- Triangle Test

Sample Code	Identify as Different or Same	
	Trial 1	Trial 2
1	Same	Different
2	Different	Same
3	Same	Same

Discussion

As noted in Brown (2015), there are five basic tastes perceived by human taste buds, which interact to produce all the flavors we experience. Interestingly, despite the fact that a variety of different words were provided to describe the different foods in the descriptive test, all of the flavors that came to mind were one of the five basic tastes. This experiment also indicated that describing foods accurately and precisely is more difficult than it would seem. The results of the paired comparison test were relatively straightforward, with all participants determining that the correct sample was sweeter. However, not all participants were able to identify which sample was different from the other two in the triangle test. This could be due to a variety of factors, including individual differences in taste perception or what each person had eaten earlier in the day. This highlights the importance of using a large number of participants when conducting subjective tests of food quality (Brown, 2015). Based on the results of these experiments, it is clear that although the qualities of foods may be similarly perceived by people, individual differences and preferences will affect these perceptions.

References

- Brown, A. (2015). *Understanding food principles and preparation*. California: Thomson Wadsworth.
- Walter, J.M., & Beathard, K. (2015). *Lab manual for Understanding food principles and preparation*. California: Thomson Wadsworth.