Sensory of Chocolate

M. Voltz and S.T. Beckett
Nestlé R&D Centre, York

There are five senses: sight, touch, smell, taste and hearing. Sensory evaluation is the use of senses to study a food or other substance. In confectionery the first four senses are critical to the consumer’s appreciation of its products.

CRITICAL SENSES

Sight. If a chocolate does not look glossy or worse still if it is bloomed, it is unlikely to be purchased. Vision can even affect taste, with lighter colored chocolate sometimes appearing to taste creamier than darker ones.

Touch. Touch is related to how a chocolate breaks and also its behavior in the mouth. Therefore this includes the snap of a chocolate bar as well as whether it melts away smoothly or is harder to swallow.

Smell. The smell/aroma of chocolate is very attractive to most people, but if it is contaminated by burnt odors or chemical taints the product can become totally unpalatable.

Taste. This is of course the most important sensorial quality. The cocoa, milky, sweet, acidic etc., flavors combine to give a unique tasting experience. But what happens if they become out of balance?

This paper looks at three aspects of the sensory of chocolate. First, there is a brief review of the ways a manufacturer can adjust the sensorial properties of his products. The next section looks at the methods used in the sensory evaluation of chocolate and how different countries within Europe have differing preferences. Finally some results are given of a study carried out to determine how dark chocolate deteriorates when stored under different temperature conditions.

MANUFACTURING PROCESSES AND SENSORIAL QUALITY

Jackson compared chocolate formulas from around the world and “could find no definitive differences in percentage compositional terms.” Many different types of chocolates do exist however, and their distinguishing characteristics must in this case be largely due to their processing.

When reviewing chocolate making, it is usual to study each of the processes in turn. It can, however, be useful to take the sensorial characteristics individually then look at the different processes which can be used to control the finished quality.

Sight/Appearance

The two main visual characteristics of chocolate are its color and gloss. Figure 1 shows factors affecting appearance.

Milk chocolate is normally a much lighter color than plain chocolate, and it is obviously possible to make a chocolate lighter by adding more milk powder. However, it is also possible, by choosing the correct cocoa and roasting conditions, to produce a plain chocolate with the same color as a milk one. The color of most cocoa powders is controlled by the alkalizing process. Although the majority of cocoa liquor used in chocolate making is unalkalized some products do contain alkalized liquor in order to achieve the desired color and flavor.

The eye detects color according to how the light is reflected from the surface, thus the size of the particles—both non-fat solids and crystalline fat—will affect the color.

This reflected light also determines the gloss. If the surface is flat with a lot of small crystals, as happens with correct tempering and cooling, the product appears shiny. If the fat sets against the smooth surface of a mould, it will normally have a much more glossy surface than when a product is enrobed. The fat crystals will, however, change their form with age, so the gloss, too, will tend to deteriorate with time.

Touch/Texture

The texture of chocolate is unique among foods, being solid and able to be snapped at ambient temperatures, yet melting smoothly in the mouth. This is largely due to the melting properties of the cocoa butter, but is also affected by processing. Factors affecting texture include:

- fat composition—amount and type