Tharp & Young

Coloring for Consumer Appeal

What needs to be considered when coloring ice cream?

Appearance is the characteristic of ice cream that first influences consumer perception. Evaluation of the other sensory properties (aroma, taste, texture) must wait. As a major contributor to appearance, color is important to overall sensory appeal.

Most ice cream flavors other than chocolate are produced from a white base mix without added coloring. Whiteness is due to light reflecting off insoluble components, primarily casein micelles and fat globules. The smaller those particles and the larger their number, the more light reflection there will be and the lighter the apparent color. Depending on the level and color of the fat used, there may an off-white or cream tinge. The whiteness of ice cream without added color is also influenced by the reflection of light by air cells and ice crystals.

The color contribution of the base mix to uncolored ice cream can also be affected by the nature of ingredients and processing. Overheating dairy ingredients and sweeteners can cause browning, caramelization or other darkening reactions. These can also occur during processing of the mix itself. Homogenization tends to lighten mix color by reducing the size of fat droplets and increasing their number. Air volume (overrun) and air bubble size can further influence color. The more air and the smaller the air cell size, the lighter will be the color. So, composition and processing can contribute to ice cream's color.

Without added color, the "whiteness" of many ice cream flavors would be stark and unappealing. Added color that is compatible with the characterizing flavor creates visual appeal. While some flexibility is possible with regard to shade, it is important that the tone produced is pleasing. Inappropriate color such as a heavy purplish tone in strawberry or by deep shades of yellow or other colors in vanilla are not appetizing.

Additional color is rarely added to chocolate-based ice cream flavors. Instead, chocolate base mix color is dominated by the color of the cocoa used for flavoring. A broad range of chocolate color and shades exists, from very light to very dark, sometimes with various degrees of a red tinge. The selection of the cocoa is usually based on its flavor rather than its color contribution.

It is important that the color of ice cream be uniform. When two product streams are combined upstream of packaging, an irregular or mottled appearance can be produced by slight differences in the intensity of color or even the level of overrun.

There are no specific regulatory provisions in the frozen desserts standards of identity related to the nature of color that can be added. Colors that can be added to ice cream are either exempt from regulation – so-called "natural" colors – or non-exempt, which are those colors that need regulatory approval for their use. The latter are typically labeled as "artificial" colors.

Exempt colors are so designated because they are exempt from regulation and are typically declared by the common and usual name of the GRAS ingredient from which they are derived. Exempt colors produce a range of color depending on the chemical environment (oxidation, microbial history, acid/base reactions, light and heat) in which they are used. Thus, they vary in both intensity and quality. Exempt colors can vary based on use rates, purity and concentration. Non-exempt colors are true additives and must be pre-approved for each use. Unlike many exempt colors, non-exempt colors yield extremely accurate, precise and stable colors.

Special considerations for coloring ice cream include mix color as it affects whatever color is added, the nature and amount of the colorant, overrun and chemical and microbiological influences that can change oxidation/reduction potential and modify or bleach any given color. The latter can occur when packaging allows for exposure to damaging light wavelengths.

The color of any given ice cream depends heavily on consumer expectations. No one color may drive acceptability. Note, for example, the number of colors of vanilla ice cream in any given market. On the other hand, offering distinct coloring is one of many ways of to differentiate ice creams from others in the same flavor category sold in the same market.

When ice cream is colored properly, consumer appeal is maximized. You can then color us "happy." ■

For more on managing heat shock, cost reduction, and product quality join Bruce Tharp & Steve Young at Tharp & Young On Ice Cream, December 2-4, 2009, Las Vegas, Nevada. For more go to www.onicecream.com or call 610-975-4424 or 281-782-4536.

In our last column related to package downsizing (February 2009), the number of standard servings in a traditional half gallon was incorrectly noted. That number should have been 16. We regret this error and apologize for it. We have been reporting to you in this column for nearly 10 years, and we sincerely hope our next mathematical mistake doesn't come for at least another 10!