Crystalline Maltitol in the Manufacture of Chocolate

The development of a quality chocolate product without sugar has long presented a challenge to the confectionery technologist. In the past when other bulk sweeteners have been evaluated in sugarless chocolate, the end product was found to be somewhat lacking.

For many years mannitol was the product of choice among sugarless chocolate manufacturers. While mannitol had the favorable properties of a high melting point and low hygroscopicity, its sweetness and solubility were far below that of sucrose. When other sugarless bulk sweeteners were evaluated, they often required that certain process changes needed to be made to deal with issues such as hygroscopicity or crystalline form. These process changes ranged from the incorporation of additional cocoa butter into the chocolate mass, to reducing refining or conching temperatures.

In any case, confectionery technologists have long had to sacrifice quality in lieu of a “sugarless” label.

Maltitol (α-1,4-glucosylsorbitol), a relatively new sugarless bulk sweetener, has eased the challenges to the sugarless confectioner. In fact, over the last three years, maltitol has become the dominant sweetener for the manufacture of sugarless chocolate in the U.S., virtually eliminating the use of mannitol in this application.

DESIRED CHARACTERISTICS

When choosing a sweetener to replace sucrose in chocolate, it is appropriate to examine those characteristics of sucrose which are most important. These characteristics include:

- High sweetness
- Low cooling effect
- High melting point
- Low hygroscopicity
- Anhydrous form

These properties cannot be compromised if one is to develop a sugarless chocolate with the quality and consumer-acceptability of traditional sucrose chocolate. Maltitol has been shown to closely mimic these properties, allowing the production of high-quality sugarless chocolate with relatively few process changes.

Maltitol belongs to a family of bulk sweeteners called sugar alcohols. These ingredients, which many times are found in nature, are typically manufactured by the catalytic hydrogenation of reducing sugars. Maltitol is manufactured by the hydrogenation of maltose (Figure 1). Through this reaction, the aldehyde or ketone group of the parent sugar is replaced by a hydroxyl group. This slight change in chemical structure yields ingredients with very interesting characteristics. Typically, sugar alcohols, when compared to their parent sugars, exhibit lower cariogenicity, lower insulin demand, lower caloric value and higher chemical, thermal and microbiological stability.

ORGANOLEPTIC PROPERTIES OF MALTITOL

Sweetness

Maltitol exhibits a sweetness which is approximately 90 percent that of sucrose (Figure 2). This allows the production of most sugarless chocolate products without the need for high-intensity sweeteners.

Cooling Effect

Sugar alcohols, as well as some sugars, yield a cooling effect as they are dissolved in the mouth. This cooling effect can best be thought of as a sensation of freshness often associated with mints. Each of the