Functionality of High-Potency Sweeteners

Joe Bell
Kraft Foods

Sweeteners can be classified into two main categories, bulk sweeteners (such as sucrose, sorbitol and fructose) and high-potency sweeteners. High-potency sweeteners are those that have sweetness intensity at least 30 times greater than that of sucrose. This discussion will focus on high-potency sweeteners.

The regulatory approval process for any new direct food additive can require 10 years or more. Therefore, the scope of this paper will be limited to those sweeteners that have been approved, or have already filed for approval with the FDA.

We will first examine individual sweeteners, including their chemistry and functional properties. They will be considered in order of their chemical similarity. Afterwards, the functionality of all high-intensity sweeteners and their blends will be reviewed as a group. Following are the sweeteners and the order in which they will be examined:

- Aspartame (trade name NutraSweet)
- Acesulfame-K (trade name Sunnett)
- Aspartame-acesulfame (a salt sold under the trade name of Twinsweet)
- Neotame, which has no trade name
- Alitame (trade name Aclame)
- Saccharin, which also has no trade name.
- Sucralose (trade name Splenda)

Of these ingredients, alitame is the only one that has not yet been given FDA approval. A petition for alitame was filed with the FDA in 1992. That petition is still pending. Since approval of alitame could potentially be granted at any time, it will be included in this discussion.

The vast majority of the public domain studies on sweetener functionality have been done in aqueous model systems, including beverages. These studies provide useful direction for confectionery applications.

**ASPARTAME**
Aspartame (APM) is approximately 200 times sweeter than sucrose. In order for a sweetener to function well, it must dissolve in the mouth, though not necessarily in the finished product. All that is necessary is that it disperses completely. However, the rate at which it dissolves in the mouth relates to the rate of sweetness onset, and the sweetness duration.

The solubility of aspartame is given in Figure 1. Like any protein, its solubility is significantly affected by the pH of the sys-