Gum Potential

Gums offer a broad range of functions including that of binder, thickener, flavour carrier and gelling agent. Gum Arabic is an excellent choice due to its low viscosity which makes it's application possible to very high concentrations.

"Gum Acacia [Gum Arabic] exhibits multiple functions in confections. It inhibits sugar crystallisation, emulsifies the fat and oil components in caramel, toffee, etc. In panning confections, the core ingredients are glazed by spraying gum acacia syrups in revolving pans and the multilayered coating is dried intermittently between spray drying operations.

For faster hydration, gum acacia is available in prehydrated or agglomerated form. Gum Acacia has unusually low viscosity (about 150cps at 30%) and is soluble in water up to 50% gum level", says Dr. Florian Ward at TIC Gums.

Future Confectionery

Confectionery is growing in Europe at the same momentum as in the rest of the world. The Global Confectionery Report predicted the global volume to reach 113 billion dollars by 2007 compared to 97 billion dollars in 2002, with per capita consumption to be highest in Western Europe and North America. However, the changing trends in confectionery are also driving the future of this market. According to Euromonitor, improvements in existing non-nutritive sweeteners and development of new sweeteners will further expand the market whereas fortified confectionery will move in the upward direction.

Manufacturers need to be highly innovative to compete in this mature and dynamic market.♦

Acidulants in Chewing Gum

by Daniel R. Sortwell

Acidulants have unique taste and flavour effects. Citric and malic acids, the acids naturally present in most fruits, are used in fruit flavoured chewing gum to provide the sourness reminiscent of fruit. Malic acid provides more persistent sourness than citric acid and complements high intensity lingering sweeteners such as aspartame. Malic acid also blends together discordant flavour notes, creating a smoother, more rounded flavour profile. This is especially useful when acesulfame K or saccharine is used.

Combinations of acidulants are now commonly used in chewing gum. There are two benefits to using acidulant combinations. First, more sourness per unit weight results from acidulant combinations than from a single acidulant. Sourness is a power function with an average exponent of about 0.8 (each acidulant has a different exponent). This means that if we double the level of acidulant, the sourness intensity does not double, it only increases by 74%. For this reason, acidulant combinations provide more sourness than single acidulants.

The second benefit to using acidulant combinations is that sourness will be perceived over a longer time period, since acidulants differ in their rate of sourness release in chewing gum systems. The rate of release is influenced by the hydrophobicity of the acidulant, usually measured by the partition coefficient. The octanol/water partition coefficients (expressed as their log values) for the organic food acidulants is shown in table 1. The higher the partition coefficient, the more hydrophobic, or 'water fearing' is the acidulant. Since gum base is hydrophobic, acidulants that are more hydrophobic associate more strongly with the gum base and release more slowly. The hydrophobicity of the gum base itself or of other ingredients in the chewing gum may also be adjusted to strengthen its association with a particular acidulant in order to delay its release.

Table 1: Log (Octanol/Water Partition Coefficient) of Undissociated Organic Acids

Fumaric	0.28
Adipic	0.08
Lactic	-0.62
Malic	-1.26
Citric	-1.72
Tartaric	-2.02
	Source: (Leo et al., 1971)

The most hydrophobic of the food acidulants is fumaric acid. Powdered fumaric acid is used in some chewing gums to prolong sourness. Fumaric acid is allowed in chewing gum at levels up to 0.2% w/w in the EU. In the manufacture of compressed chewing gum tablets, process yields and efficiencies are improved by using more hydrophobic acidulants, since these are more effective tablet lubricants.

Daniel R. Sortwell is a Senior Food Scientist at Bartek Ingredients Inc. Additional information about acidulants and their application in confectionery is found in the Self Teaching Guide for Food Acidulants, which is at Bartek's web site: www.bartek.ca.