

# MAXIMIZE TASTE, ADD NEW DIMENSIONS TO YOUR CONFECTIONS, USE BARTEK MALIC & FUMARIC ACIDS!

## Why Bartek Malic & Fumaric Acids make a difference!

### Malic Acid's Unique Attributes:

- prolongs sourness & extends flavours
- tastes more sour, so a higher pH can be used for the same flavour
- taste-blending characteristics
- aftertaste masking abilities
- flavour-fixing qualities
- high solubility rate
- less hygroscopic than citric or tartaric acids
- low melting point, 130°C versus 153°C for citric acid
- good chelating properties
- calcium malate is more soluble than calcium citrate

- Acids provide tartness that compliments and enhances fruit flavours without imparting their own characteristic flavours.

### Acid Blending

- In nature, one acid is rarely found alone. Using multiple acids provides acidified confections with more natural flavours.<sup>2</sup>
- Using a blend of organic fruit acids can produce a more natural, longer lasting flavour in confections by enhancing and fixing the flavours.
- For instance, to extend the sourness in candy or chewing gum, use citric acid for the initial sour boost, Malic Acid for a lingering sourness, and Fumaric Acid to sustain the tartness even longer.

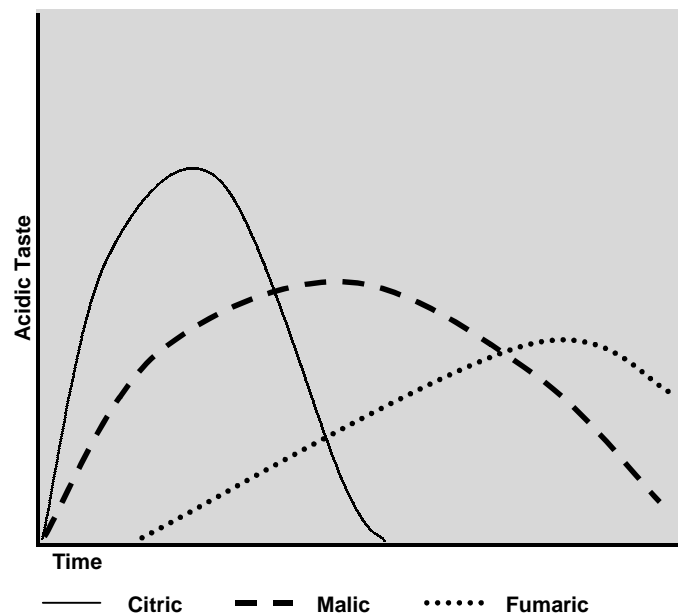
### Benefits of Fumaric Acid:

- stronger acid than citric, Malic, or lactic (more economical)
- stable sourness taste profile
- non-hygroscopic
- low solubility

### Sugar-Acid Balance<sup>1</sup>

- Fruit acids like citric (lemon), malic (apple) or tartaric (grape) characterize the taste of most fruits.
- Confectioneries made without fruit acids have incomplete flavour profiles that are sickly sweet or tasteless.
- Appropriate sugar/acid balance produces natural tasting fruit flavours in confections.
- Artificial flavours are neutral in pH, hence appropriate food acids must be added to achieve a true fruit flavour.

### Taste Retention of Acids



## Shades of Sour<sup>2</sup>

Citric	- Tart. Early high impact. Brightens up flavour
Malic	- Smooth tart taste that builds up & diminishes without a burst
Fumaric	- "Clean" tartness
Acetic	- Very sharp and pungent
Adipic	- Delayed acid impact and lingering high tartness
Lactic	- Mild acid taste, does not enhance or mask flavours
Tartaric	- Strong tart taste

Because each organic acid imparts a unique sourness taste, one can improve the natural taste of confections by combining a number of acids into one flavour system.

## Fruit Acid Solubility Rates

- The different solubility rates of fruit acids provide sequential acid release.
- When multiple acids are used, prolonged juiciness and/or tartness is achieved because of the overlap of the acid release times.

<u>Acid</u>	<u>Comparative Release Time<sup>3</sup></u>
Citric	Earliest
Malic	Intermediate/Transitional
Tartaric	Intermediate/Transitional
Fumaric	Late
Adipic	Late

## References:

1. Minifie, B.W. 1989. Chocolate, cocoa and confectionery: Science and technology, 3<sup>rd</sup> ed., p.556.
2. Hatchwell, L.C. 1995. "A holistic approach to flavoring foods and beverages" Workshop, IFT, Anaheim, L.A.
3. Glass, et al. Jan 24, 1989. Chewing gum compositions having sequential acid release. US Patent: 4,800,091.
4. Aldrich, D. et al. May 15, 1979. Sugarless candies. US Patent: 4,154,867.

## Sugar-free Confections<sup>4</sup>

- Citric acid providing the sour note to the fruit flavour suppresses the sweetness and masks the fruit flavour. Imparts distinct citrus overtones in the case of non-citrus flavours such as cherry and pineapple. Imparts a bland taste in the case of citrus flavours such as lemon, lime, orange and grapefruit.
- Replacing citric acid with Malic Acid resolves the flavour dilemma.
- Malic Acid's lingering and unusual taste-blending and flavour-fixative qualities enhance and sustain fruit flavours in sugar-free confections.

## Jelly and Gum Confections

- Fumaric Acid's low hygroscopicity makes it the appropriate acid to reduce sweating problems which can arise from sugar inversion in "sanded" products.

## Sugar Inversion

- Minimize sugar inversion in confections by adding fruit acids at the end of the process.

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