

Bartek Malic and Fumaric Acids in the *Nutraceutical Evolution*

Health Focus

Consumers believe food and nutrition, vitamins and minerals offer ways to prevent disease and improve their health.¹ Because consumers are embracing the idea of disease prevention and control of their health destiny; the market is now ready for the mainstreaming of fortified foods and nutraceuticals.²

Global Market

Japan gave birth to functional foods in the 1980's. Europe in 1995 launched new products with high interest in fortification and probiotic cultures. The estimated global market size for functional foods is US \$100 billion.³ Today, 55% of food, 36% of pharmaceutical and 90% of biotech firms are actively researching nutraceutical products.⁴

Functional Foods/Nutraceuticals

Over the past decade, the concept of foods with an extra dimension has evolved. This new dimension is a specific physiological function produced by these foods, thus the term, "physiologically functional foods" (PFF). Some claims ascribed to functional foods are to: lower cholesterol, release stress, boost immune systems, antagonize cancer and aid brain function.⁵ In 1989, the *Foundation for Innovation in Medicine* coined the term "nutraceutical" which is defined as "any substance that may be considered a food or part of a food and provides medical or health benefits, including the prevention and treatment of disease".⁶

Probiotics⁷ - are functional foods containing live and beneficial organisms with abilities to produce specific or general health effects through their positive contribution to the intestinal balance of the host.

Prebiotics⁸ - are non digestible food ingredients (oligosaccharides) that beneficially affect the host by selectively stimulating the growth and/or activity of one or a limited number of bacteria in the colon.

Why Bartek Malic Acid improves overall taste of nutraceuticals:

- imparts tartness and adds a subtle character to the overall flavour system making it taste more natural,
- intensifies the flavours used, often reducing the amount of flavours needed,
- has blending capabilities that produce uniform taste effects from unrelated flavours, creating a well balanced taste sensation,
- prolongs sourness and extends other flavours which can mask undesirable bottom notes from nutrients or high intensity sweeteners, and
- provides tartness that compliments and enhances fruit flavours without imparting its own characteristic flavour.

Some important functional ingredients:

Dietary fibres: - reduce colonic cancer

Oligosaccharides: - fructo oligosaccharides (FOS), galacto oligosaccharides (GOS) and inulin are non digestible oligosaccharides that promote indigenous bifidobacteria

Vitamins: - B-complex

Minerals: - Calcium, Iron

Antioxidants: - Vitamins A, C, E, and β -carotenes protect against free radical damage

Fatty Acids: - omega 3, eicosapentanoic acid (EPA), docosahexanoic acid (DHA) reduce heart disease

Phytochemicals:

- **carotenes (alpha & beta)**
 - protect against cancer and heart disease
- **lycopenes**
 - reduce incidence of prostate cancer
- **isoflavones (soy)**
 - protect against certain cancers, lower cholesterol and reduce osteoporosis
- **polyphenols (tea) and flavonoids**
 - reduce cholesterol and platelet activity
- **allicins (onion & garlic)**
 - antifungal and antibacterial

Bartek Malic Acid enhances the flavour and palatability of functional beverages:

- β-carotene soft drinks
- calcium juice drinks
- fibre juice drinks
- oligosaccharide yoghurt flavoured milk drinks or soft drinks
- whey protein juice drinks
- soy protein juice drinks
- herbal drinks (ginseng, elderflower, mint, ginger, or berries)
- flavoured oolong teas
- lemon iced green teas
- smart drinks (caffeinated)

*“Health” beverages fortified with a blend of vitamin C, calcium, fibre, soy protein, herbs or combination can benefit from the addition of Malic acid, which can mask the distinct flavours while boosting the pleasant flavour notes. **Changing the acidity can help the overall flavour profile.***

Bartek Malic Acid can modify flavour systems in functional foods:

- omega-3, energy, snack or breakfast bars
- yoghurts containing bifidus, Lactobacillus caseii, or Lactobacillus acidophilus cultures
- β-carotene yoghurts, desserts, breads or confectioneries
- calcium and vitamin C confectioneries
- ice cream with vitamins & energy supplements
- fizzy vitaminized soft-drink ice creams
- frozen herbal or tea novelties
- snack fruit-beverages (diced fruits blended with nutrient enhanced juices)
- ginseng soups, sauces, or salad dressings

Suggested Malic Acid Usage Ranges

	Application	Malic Acid Range
<i>Beverages</i>	Carbonated	0.03-0.9%
	Powdered	0.5-5.0%
	Fruit Juice	0.1-1.0%
<i>Confectioneries:</i>		0.5-3.0%

Bartek Fumaric Acid also can be used in functional beverages because it:

- has more buffering capacity than other food acids at pHs near 3.0.
- is a stronger acid than Malic or citric, so less acid is needed, making it more economical
- has a non-hygroscopic character which means it can be used in preblends

For example, a carbonated, sugar free calcium supplement beverage uses Fumaric acid to control pH and calcium solubility.

Taste Challenge

Functional foods and beverages are **loaded** with ingredients that have distinct tastes. The food technologist must develop good tasting products that will be accepted by consumers globally. **Bartek Malic and Fumaric acids are economical aids which can be used in flavour systems to create good tasting healthy products. Adjusting the pH of flavour systems can enrich the taste outcome of the end product.** If properly managed, the distinct flavours of functional foods can be used to differentiate products from their competitors.

Even in the processing of legumes like peanuts and soya beans, the use of organic acids like Malic acid can reduce their distinct tastes.⁹

Target Markets

Once the palatability of functional foods and beverages has been met, various target markets such as the elderly, young, diet conscious, or busy individuals who can not always have balanced meals can benefit from the availability of tasty, nutritious functional products.

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