

Applications using Fumaric Acid

Fumaric Acid has been used in food and beverage products since 1946. It is currently used in wheat and corn tortillas, sour dough and rye breads, refrigerated biscuit doughs, fruit juice and nutraceutical drinks, gelatin desserts, gelling aids, pie fillings and wine. Food research shows that **Fumaric Acid** improves quality and reduces costs of many food and beverage products. It is also used in animal feed.

Bakery

Tacos

Fumaric Acid lowers the pH of tortilla dough, thereby improving a mold inhibitor's effectiveness. Shelf life of dry tortilla mixes is extended because **Fumaric Acid** does not absorb moisture during storage and distribution. In wheat flour tortillas, **Fumaric Acid** accelerates the cleavage of disulphide bonds between gluten protein molecules during dough kneading. The result is more easily machined dough and faster production rates. Added cost savings are realized since leavening acids can be replaced with **Fumaric Acid**.

Breads

Fumaric Acid acts as an instant flavoring agent for rye and sourdough breads. **Fumaric Acid** is added to dough ingredients during the dry blending step. Flavor intensity is easily controlled by the amount of **Fumaric Acid** added to the recipe. In English muffins, **Fumaric Acid** significantly increases porosity. Dough machinability is improved and more sourness is provided per unit weight.

Beverages

Fruit Juice Drinks

Fumaric Acid provides more sourness per unit weight than other acidulants used in fruit juice drinks. This substantially reduces the acidulant cost. In fruit juice drinks, **Fumaric Acid** provides more buffering capacity than other acidulants when the pH is near 3.0. Using **Fumaric Acid** helps to stabilize the pH of a fruit juice drink, which in turn stabilizes color and flavor.

Fumaric Acid in combination with Sodium Benzoate was shown to have a bactericidal effect against E.Coli O157:H7 in apple cider at pHs 3.2-3.4.

Fumaric Acid would help juice processors achieve the mandated 5-log pathogen reduction.

Wine

Fumaric Acid can economically acidify wine with no detectable difference in flavor. The replacement ratio of three pounds of **Fumaric Acid** to five pounds of Citric acid can significantly reduce acidulant cost. **Fumaric Acid** also prevents secondary fermentation after bottling and can act as a clarifier when low concentrations of copper and iron are present.

Confectioneries

Fumaric Acid extends the shelf life of acid coated candies because it does not absorb moisture during storage and distribution. Maintaining a low moisture level retards sucrose inversion. Acidulant cost is also reduced as **Fumaric Acid** provides more sourness per unit weight than other acidulants used in dry form.

Jellies and Jams

Fumaric Acid can cut food acid costs when used as an acidulant for jams, jellies and preserves. As little as two pounds of **Fumaric Acid** can be used to replace every three pounds of Citric, Malic or Tartaric acid. At the 2:3 replacement ratio, **Fumaric Acid** does not produce significant differences in gel strength or pH.

Desserts

Alginate Based Desserts

Fumaric Acid is an economical acidulant that liberates calcium. It improves smoothness and optimizes setting times. Also, the non-hygroscopicity of **Fumaric Acid** means that dry dessert mixes remain free flowing, even in



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high humidity. **Fumaric Acid** can be added directly to dry dessert mixes during the manufacturing process without causing degradation of flavor ingredients because of its non-hygroscopic nature.

Gelatin Desserts

Fumaric Acid significantly reduces acidulant costs in gelatin desserts. Depending on the product recipe, each pound of Citric acid can be replaced with 0.6 to 0.7 pounds of **Fumaric Acid**. Reducing moisture pick-up improves flavor stability and lengthens shelf life. **Fumaric Acid** maintains non-caking and free-flowing qualities. By keeping the moisture content low, **Fumaric Acid** helps to maintain the stability of flavor components and markedly decreases inversion of sucrose in the packaged dry mix. It may also be possible to use less expensive packaging if other moisture-sensitive ingredients are not being used in the product formulation. **Fumaric Acid** also increases gel strength, so food processors may reduce normal gelatin content by about 2%.

Pie Fillings

In pie fillings, **Fumaric Acid** can be mixed directly with the starch and sugar ingredients, as it is non-hygroscopic. **Fumaric Acid** lowers costs by reducing the quantity of food acid needed in product formulations. **Fumaric Acid** also improves smoothness and extends the critical cook times for optimum gelation.

Egg White Foams

Fumaric Acid can promote maximum volume in both egg-white foams and end products based on egg-white foams. **Fumaric Acid** can replace the more expensive cream of tartar to control egg-white volume. With **Fumaric Acid**, egg whites can be overbeaten for as much as double the customary optimum time. Well suited for continuous flow processes, **Fumaric Acid** can be added to both liquid and dried egg whites.

Cleaning Agents for Dentures/Bath Salts

The carbon dioxide generating compounds containing NaHCO_3 , K_2CO_3 and powdered **Fumaric Acid** can be tableted with other ingredients to make cleaning agents for dentures and bath salts.

Animal Feed

Fumaric Acid has proven to be a particularly effective additive to piglet feed during the post-weaning period. The inclusion of **Fumaric Acid** and the resultant adjustment of the pH value demonstrate improved weight gain, food consumption and feed conversion ratio.

Industrial Uses

Industrial uses of **Fumaric Acid** include:

- Unsaturated Polyester
- Alkyd Resins
- Printing Inks
- Paper Sizing