



## FUMARIC ACID, Food Grade, Kosher, Halal

### TO KEEP WHEAT & CORN FLOUR BASED PRODUCTS FRESH

Fumaric acid is unsaturated dicarboxylic acid that melts at 287. CAS Number: 110-17-8  
Chemical Formula: C<sub>4</sub>H<sub>4</sub>O<sub>4</sub>  
Molecular Weight 116.07

Fumaric acid is an organic (carbon-containing) food acid. It is one of the most common acids found in nature where it acts as a key ingredient in organic acid biosynthesis (the Krebs cycle).

It is found in small amounts in a variety of plants and is essential to the respiration of animal and vegetable tissue.

This chemical is used as a substitute for tartaric acid in beverages and baking powder. It is used as a mordant in dyeing and in the manufacture of synthetic resins and polyhydric alcohols.

### Functions and Applications

This product is added to a variety of foods for the **functions** of :

- an acidifier,
- curing accelerator and
- flavoring agent.

Specific **applications** include;

- breads,
- refrigerated doughs,
- fruit juice drinks,
- pie fillings, poultry
- wine.
- Tortillas

Fumaric acid can take the place of cream of tartar in chemically leavened breads and can reduce the mixing requirements for yeast doughs. The salts of Fumaric acid (in the form of sodium, potassium, and magnesium salts) help slow down the rates at which yeast bread goes stale.

In pastry doughs where layers of butter or shortening are interspersed between sheets of dough, Fumaric acid can assist proper dough expansion by regulating the rate at which the dough produces carbon dioxide. In rye breads,

Fumaric acid provides instant sour flavoring. For refrigerated doughs containing the phosphates, Fumaric acid helps prevent the formation of crystals.

Wheat flour and corn masa flour based products are prone to microbial spoilage due to their high water content. The moisture content can range from 26-46%. Sodium and calcium propionates, as well as potassium sorbates are used alone or in combination to extend the tortillas' shelf life by inhibiting mold growth. Propionates and sorbates are most effective under acidic conditions when a high percentage of acidic molecules are undissociated.

Fumaric acid, an acidulant, is added to lower the tortillas' pH, to around 5.8, where the antimicrobial agents are still effective.

Beyond its acidification abilities, Fumaric acid showed a reducing effect due to the double bond configuration in its molecular structure. This double bond is not present in other common food acids.



# Profood International, Inc.

*Reducing Agents* improve dough machinability in wheat flour tortillas. These ingredients break or block wheat gluten disulfide bonds. The decrease in the quantity of intact disulfide bonds results in a softer, more machinable dough. *Reducing Agents* used in wheat flour tortillas or other doughs include L-cysteine, bisulfites, metabisulfites, and ascorbic acids.

Reducing agents also improve the color of wheat and corn flours based products..

As the corn tortilla's pH is related to the amount of lime used, corn tortillas have a neutral or slightly alkaline pH, (6.9-7.8). Acidulants like fumaric acid are used at much higher percentage (about 4.5%) to reduce the corn tortilla pH to 5.5-6.0, as most antimicrobials work more efficiently at pH 5.5-5.8.

Acidified tortillas containing antimicrobials have an extensive shelf life, up to 60 days.

## Summary

Fumaric acid **Synergies with Antimicrobial Agents**, by lowering the dough or tortilla pH, enhances effectiveness of antimicrobials.

Fumaric acid improves dough machinability by blocking or breaking wheat gluten disulfide bonds.

Fumaric acid **Lower cost**, for being a stronger than all other organic food acids on a unit cost basis.

Fumaric acid **provide Better flavor stability** in dry-mix products, for not absorbing moisture which degrades flavor ingredients.

Fumaric acid **guards against moisture pick-up**, functioning as anti-caking, so that dry-mix products will not cake or harden, even during high humidity storage conditions.

Profood fumaric acid **remains stable** chemically under normal processing and can be stored indefinitely at room temperature under clean and dry conditions.