

Lactose Ingredients

Food-grade lactose is produced from fresh sweet whey by crystallizing an oversaturated solution of whey or permeate and drying it into a powder. Special processes of crystallization, grinding, fractionation and sifting produce types of lactose that differ from each other in particle size and distribution. The industry offers several types of lactose, ranging from superfine to extra-coarse crystals for all applications. Lactose is commercially available as spray-dried lactose and crystalline lactose. Following are typical compositional breakdowns of several grades of lactose.

Typical Composition of Lactose Powder (%)

Grade	Moisture	Fat	Protein	Lactose	Ash
Food	4.5-5.5	0.0	0.1-0.6	99.0	0.1-0.3
Industrial	4.5-5.5	0.1	0.5-1.0	98.0	0.1-0.5
Pharmaceutical	4.5-5.5	0.0	0.01	99.8	0.03

Beneficial Features

Lactose is a carbohydrate and contributes approximately 4 calories per gram. Lactose does not contribute any other nutrients to the diet; however, it stimulates the intestinal absorption of calcium, independent of the presence of vitamin D. Because digestion of lactose is much slower than that of glucose or sucrose, lactose is considered relatively safe for diabetics. It does not cause a sharp increase in blood glucose levels like other sweeteners, giving it a nutritional advantage in the diabetic diet.

Functionality

Many desirable properties are attained by the addition of lactose to food formulations. Common applications are in bakery, confections, snacks, frozen desserts, diabetic products, dietetic products, infant formula, baby foods, jams and preserves, sweeteners, instantized powders, meat products, savory mixes, soups and sauces, beer production and nutraceuticals.

Browning/Color—Lactose can be used in food formulations to provide a desirable brown color. Heating lactose initiates a browning process that may be caused by a caramelization and/or Maillard reaction. Lactose, as a reducing sugar, promotes the controlled browning in foods by reacting with proteins, peptides and amino acids to form compounds that are highly flavored and golden brown in color.

Crystallization—Lactose alters the crystallization behavior of other sugars and is largely used to control crystallization in food formulations. With the addition of lactose, both

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lactose and sucrose crystals remain smaller and the tendency of sucrose crystals to combine together is reduced. This reduces sandiness and yields a softer, smoother crystalline mass.

Flavor/Sweetness—Synergistic effects of lactose with other food ingredients include sweetness enhancement and sweetness suppression. This is beneficial in masking the bitter aftertaste of saccharine or enhancing the milky flavor in caramels.

Solubility—The relatively low solubility of lactose at 25°C limits the amount that can be used in certain applications, yet it provides significant advantages in others. Lactose is very useful in instantizing, or increasing the dispersibility of certain foods such as microwavable products. This function allows lactose to crystallize, agglomerate, and become free-flowing and capable of dispersing rapidly.

Whipping/Foaming—Lactose improves whipability in marshmallows and other products by substituting as little as 10% of sucrose.



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