

Nutrients Available in Milk Protein Concentrate

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Perspective

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ABOUT THE STUDY

Milk Protein Concentrate (MPC) refers to any type of concentrated milk product that contains 40-90% milk protein. MPC is officially defined in the United States as any complete milk protein concentrate that is 40 percent or more protein by weight. The MPC classification includes concentrates made through other processes, such as blending non-fat dry milk with highly concentrated proteins, such as casein, in addition to ultra-filtered milk products.

Processing

Whole milk is separated into cream and skim milk before being processed into milk protein concentrate. The skim milk is then fractionated using ultrafiltration to produce a lactose-free skim concentrate. This method separates milk components based on their molecular size. The milk is then passed through a membrane, which allows some lactose, minerals, and water to pass through. However, due to their larger molecular size, casein and whey proteins will not pass through the membrane. Spray drying is used to remove the proteins, lactose, and minerals that did not pass through the membrane. The remaining materials are concentrated further by spray drying and evaporation to form a powder. Different heat treatments can be used to process ultra-filtered or blended varieties of MPC depending on the final product's purpose. A low-heat processed MPC product will retain more nutritional value.

Functionality in food

MPC is used in nutritional beverages, nutritional and dietary products, aged care products, infant formulas, protein bars, yoghurts, recombined cheeses, cultured products, frozen desserts, bakery and confection applications, among others. MPC can be financially advantageous to milk manufacturers for cheese production because it increases the protein level of the product, resulting in higher cheese yield for less capital investment.

MPC has the same ratio of micellar casein, whey proteins, and bioactive proteins as milk. Lactose levels decrease as MPC protein content increases. Because of its high protein-to-lactose ratio, MPC is an appealing ingredient for protein-fortified beverages and foods, as well as low-carbohydrate foods.

When used, MPC can make products more heat stable and provide solubility and dispensability. Because of this solubility, MPCs are useful in dairy-based mixes. MPC can help with foaming and whipping. MPC proteins form a stable film of air bubbles at the water interface. Meringues, mousses, cakes, ice cream, whipped cream, and soufflés are all stabilized with this. MPC proteins form and stabilize fat emulsions at the water interface in sausages and other processed meats, dairy drinks, soups, vinaigrettes, sauces, and bakery products. Because of its interior protein, an MPC can increase the viscosity of a food product, which is useful in many applications structure. Maillard browning occurs in MPC's lactose and proteins, resulting in an appealing color for bakery products such as pastries, cakes, and muffins. MPC has almost no taste, which allows the other flavors of a food to fully develop.

Proteins

Normal bovine milk contains 30-35 grams of protein per litre, with approximately 80% of that protein arranged in casein micelles. Milk's total proteins account for 3.2% of its composition.

Salts, mineral and vitamins

Minerals, also known as milk salts, are traditional names for various cations and anions found in bovine milk. Calcium, phosphate, magnesium, sodium, potassium, citrate, and chloride are all included, and they typically occur at concentrations ranging from 5 to 40 mm. The milk salts, particularly calcium phosphate, strongly interact with casein. It is present in excess, and often in much greater excess, of solid calcium phosphate solubility. Milk contains a variety of vitamins in addition to calcium. Milk contains vitamins A, B6, B12, C, D, K, E, thiamine, niacin, biotin, riboflavin, folates, and pantothenic acid.

Sugars and carbohydrates

Lactose, glucose, galactose, and other oligosaccharides are among the carbohydrates found in milk. Lactose gives milk its sweet taste and accounts for approximately 40% of the calories in whole cow's milk. Lactose is a disaccharide formed by the combination of two simple sugars, glucose and galactose. Bovine milk contains 4.8% anhydrous lactose, which accounts for approximately half of the total solids in skimmed milk. Lactose levels in milk vary depending on the type of milk, as other carbohydrates can be present in higher concentrations than lactose.