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How important is extra solids-not-fat in your milk?

H.A. Roberts

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Abstract

Milk with high solids-not-fat is valuable to the consumer for its flavor and nutritional value and to the manufacturer of milk products, especially relating to cheese yield. Solids-not-fat consists of all solids in milk other than fat. Protein is the most important component of milk because of its nutritional value and its functional properties. Other components, such as milk fat and lactose, also contribute to milk quality and impart certain characteristics to milk products but to a lesser degree.; Dairy Day, 1987, Kansas State University, Manhattan, KS, 1987;

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HOW IMPORTANT IS EXTRA SOLIDS-NOT-FAT IN YOUR MILK?

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Introduction

Milk with high solids-not-fat is valuable to the consumer for its flavor and nutritional value and to the manufacturer of milk products, especially relating to cheese yield. Solids-not-fat consists of all solids in milk other than fat. Protein is the most important component of milk because of its nutritional value and its functional properties. Other components, such as milk fat and lactose, also contribute to milk quality and impart certain characteristics to milk products but to a lesser degree.

Milk Composition

The average composition of whole raw milk is:

Protein	3.5%
Lactose	4.9%
Fat	3.5%
Ash	0.7%
Water	87.4%
Total	100.0%

NOTE: The composition values vary depending upon the source of information.

Milk Fat

The major advantage of milk fat is the delicate, pleasant flavor it imparts in fluid milk and other dairy products. Milk fat percentage shows a greater variation than any other constituent in milk. There is a direct relationship between the amount of fat and the amount of solids-not-fat in milk. As milk fat increases, solids-not-fat also increases; however, this relationship is not in direct proportion. In general, an increase of 1% in fat is accompanied by an increase of about 0.4% in solids-not-fat of mixed, whole, raw milk.

Protein

Protein is an important element of the solids-not-fat portion of milk. Approximately 80% of the protein in milk is classified as casein. Casein has many functional properties in dairy products, such as cheese, and many other food and non-food products. The remainder of the protein (approximately 20%) is whey protein (lactalbumin), which remains in the serum after casein is precipitated.

This protein is found in whey during the cheese making operation. Both of these proteins are of excellent quality, although we hear more about casein than whey protein. It has been calculated that the protein in one quart of milk is approximately equivalent to the protein in 5 ounces of meat or fish, 5 large eggs, 4 ounces of cheese, or 16 slices of bread. Milk protein contains most of the essential amino acids needed for growth and maintenance of life.

Lactose

Lactose (milk sugar) is the principle carbohydrate and a major component in milk. Lactose differs from other sugars, such as sucrose, in functional properties because it has a low relative sweetness. It is about 20% as sweet as sucrose. A number of benefits are derived from lactose in milk and milk products, but they are not as well defined as those of milk fat and protein. It does play a significant part in the overall good flavor of milk.

Ash (Minerals)

The mineral content of milk, especially calcium, is important nutritionally. It is reported that milk and milk products provide about 75% of the calcium in the human diet. Other minerals include phosphorus, magnesium, iron, iodine, sodium, and potassium.

Importance of Components of Milk

Today greater emphasis is being placed on the solids-not-fat in milk, especially protein. Therefore, more and more areas of the United States are utilizing component pricing of milk from the producer, which considers fat and solids-not-fat or protein. The importance of components of milk varies with the planned usage for that milk.

Fluid Milk

The promoters of high-solid fluid milk look at the nutritional value and the preference for the taste of fluid milk that has a high content of solids-not-fat. Today, greater concern is placed on nutrition than ever before. In milk and other dairy products, calcium and protein are the major constituents. Over the past few years, there has been a gradual trend to consume less whole milk and more lowfat milk. The need for calcium has been well documented because calcium deficiency has been linked to the bone disease known as osteoporosis. Calcium also has been suggested as a possible factor in the prevention of high blood pressure. The need for protein is well established as a body-cell building block and an essential component of overall nutriton. It is generally accepted that extra solids in fluid milk, especially skim and lowfat milk, make a richer tasting drink. Proponents of more solids in milk also support the opinion that high-solids milk sells better. Opponents feel that the extra cost of fortified-solids milk would have a direct effect on consumption.

Manufactured Milk

For milk used in manufactured dairy products, a greater and more direct effect can be realized by using high solids milk in most cases. Butter production is the exception, since only butterfat is used. In cheese making (hard and cottage cheese), protein (casein) is the most significant milk component used. However, in making hard cheeses, milk fat is also important. In the manufacturing of nonfat dry milk and ice cream, all the solids-not-fat portion of the milk is used. Quality and yield of cheese are the two most important concerns of any cheese maker to maximize his profits. Cheese yields (or the amount of cheese manufactured from a given weight of milk) are directly related to the amount of protein (casein) in raw milk. Thus, the cost of producing a pound of cheese is reduced if high-solids (protein) milk is used, since fixed costs remain unchanged.

Read More About It

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