Milk's composition is chemical maze

The solids of cow's milk constitute about 13 percent of its weight. Even though milk is a liquid, it is not a dilute food. It is more concentrated, for example, than squash, cabbage, or tomatoes. In addition to minerals and vitamins, milk contains approximate amounts of the following:

Protein 3.5 percent
Carbohydrate 4.9 percent
Fat 3.25 percent (minimum)

Its energy value derived from carbohydrate, fat, and protein is 150 Calories per eight-ounce glass of whole milk.

Milk as a Source of Calcium

Although calcium is almost synonymous with healthy teeth and bones, the body's needs for this mineral are not confined to the years of growth. Contemporary research has shown that the replacement of calcium in bones with calcium from the diet is an ongoing process. Calcium will be removed from bones whether or not this mineral is consumed in the diet. Consequently, an adequate supply, most readily obtained from milk and milk products, is necessary to maintain skeletal health.

Besides the maintenance of bones, calcium performs other functions throughout life — contraction of muscles, excitation of nerves, and clotting of blood.

Some segments of the U.S. population may be deficient in calcium. It is estimated that three-fourths of the calcium in our food supply is now provided by milk. Studies with human subjects show that calcium from milk is better utilized by the body than that from vegetable sources. In world areas where milk is not so readily available, it is difficult to plan a diet to contain calcium in the recommended amounts.

A daily intake of 360 milligrams (mg) and 540 mg of calcium is recommended for infants under six months and one year, respectively. The allowance levels of 800 mg for children 1-10 jump to 1200 mg for the "growth spurt" years between 11 and 18. For expectant and nursing mothers, the daily calcium allowance climbs to 1200 mg; for all other adults it is 800 mg.

Another important mineral is phosphorus. With calcium, it is deposited in bone in a ratio of 1.3-2 (Ca) to 1 (P). However, the ratio between calcium and phosphorus in the U.S. diet today may more nearly approximate 1 (Ca) to 4 (P). This may be attributable to increased consumption of meat, which contains phosphorus, and soft drinks, which contain phosphoric acid. Of the more common foods, milk most closely approximates the ratio of calcium and phosphorus found in bones.

The Protein of Milk . . . and Its Amino Acids

Casein and lactalbumin are the two principal proteins in milk, with casein being present in larger amounts. Proteins, including those in milk, are composed of smaller chemical units, the amino acids. There are about 20 amino acids, of which at least eight are essential in the diet because the body cannot produce them in sufficient quantities. Proteins of high nutritive quality, such as those present in milk, contain these essential amino acids in amounts balanced for use in the body.
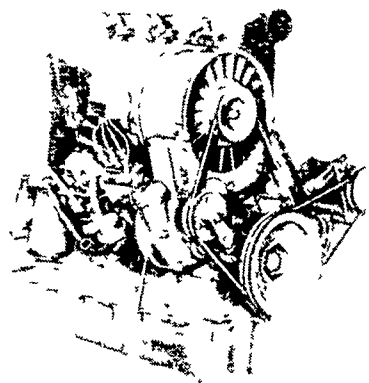
Lysine and tryptophan are among the essential amino acids abundant in milk protein. Cereal proteins are generally deficient in these two amino acids. This explains why milk improves the total nutritional value of the diet when used with cereal foods. The high nutritive value of milk protein makes it of special value in the treatment of kwashiorkor, a type of protein malnutrition found among young children in areas where people subsist largely on plant foods.

The amount of high quality protein in one quart of milk supplies 54 to 67 percent of the daily recommended allowance of protein for the 11-18-year-olds; one pint supplies about one-fourth to one-third of the adult allowance.

The Fat-Soluble Vitamins

Fat-soluble vitamins A, D, E, and K are present in milkfat. Probably vitamin A is best known; good health requires an adequate supply of it. If the diet is poor in this nutrient, rough, dried (keratinized) surface tissues may develop in the eye (xerophthalmia),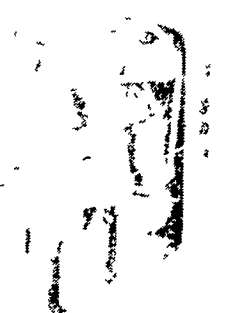 respiratory tract, and skin. Night blindness can occur in