

In recent years, the trend toward consumption of foods away from home and increased utilization of convenience and processed foods, coupled with the wide variety of snack foods available, have all affected a person's ability to obtain balanced meals. These changes in our nation's food habits have led to what has been described as a form of affluent malnutrition (1). This problem, although subclinical in nature, has become a matter of increasing concern to both nutritionists and consumers.

developed nutritionally balanced candy bars using nonfat dry milk and protein from other sources (2).

India and Pakistan have a long history of utilizing milk in the manufacture of various confections. The base for several of these products such as rasogullah and sandosh is a whole milk cheese called panir or chhana, which is made by adding lemon juice or other acids to boiling milk. We have carried out studies to determine if these nutritious sweetmeats could be adapted to American tastes.

nutritious candies

Candy has long been one of the most popular snack foods for young and old alike, regardless of economic status. Not only is it a good source of quick energy, but it is low in price, it tastes good and is eaten primarily for enjoyment. Many children, given the opportunity, will consume candy almost to the exclusion of other foods. Unfortunately, it provides mostly carbohydrate calories and very little of the other nutrients generally considered essential for good health.

One of the major functions of the U.S. Department of Agriculture (USDA) is to improve the quality of the nation's food supply. Laboratories of the Agricultural Research Service (ARS) have been interested in the fortification of snack foods and the development of new nourishing and appealing products of this type. Researchers at the Dairy Products Laboratory have been investigating ways to utilize valuable milk nutrients to fortify chocolate candy centers, while researchers at another ARS laboratory in Pasadena, California, have

PANIR CANDIES

Panir may be readily made using conventional dairy plant equipment. Pasteurized homogenized milk is heated to boiling in a jacketed pasteurizing vat and acidulated to pH 5.7 with one part of fluid cottage cheese whey to two parts of milk in order to set the curd. The coagulated mixture is returned to the boil and then permitted to cool slowly to 50°C; the curd is then drained through cheesecloth to a moisture content of 55-65% over a period of 16 hours. The drained curd is then kneaded in a Reeves candy kettle or a Hobart mixer² to a smooth, slightly oily, stiff paste which can be easily flavored. Cottage cheese whey was selected as the acidulant because large quantities are readily available and it makes the panir much creamier in texture than that obtained by use of other acidulants.

After kneading, the panir was sweetened with sugar or honey and flavored with vanilla, peanut butter or coconut. It was then shaped into centers and coated with chocolate. The finished candies were mellowed for several days before eating.

Because of the perishable nature of the panir, we found it necessary to refrigerate the chocolates. Although

¹Agricultural Research Service, U.S. Department of Agriculture.

²Use of trade names does not constitute an endorsement by the Department of Agriculture over others not mentioned.

the candies stored well in the refrigerator for up to two weeks, after that time moldy spots developed between the center and the chocolate coating. Because of the mold problem, the candies were frozen immediately after fabrication. They have kept well for over three months.

Trained taste panels gave the thawed panir candies flavor and texture scores which compared very favorably with those given to the conventional commercial candies they simulated. They compared equally well to commercial candy bars sold at a premium price as high protein products.

One of our objectives was to produce an appealing candy which would supply high quality protein when consumed. Panir itself contained 16% protein, 15% fat, 5% milk sugar, 62% moisture, 0.5% calcium and 1% phosphate. Nutritional analysis of the candies containing panir showed that the coconut flavored panir candy, for example, contained 2.5 times more protein than a coconut cream candy and twice the protein of a coconut high-protein bar.

In addition, the coconut panir candy contained 0.2% calcium compared to trace amounts in the other candies. Vanilla panir candies contained five times the protein and seven times the calcium of vanilla creams. Although protein levels of the peanut butter flavored candies were equivalent, the panir candy contained significantly more calcium. No attempt was made to fortify any of the panir candies with additional proteins from vegetable sources or with added vitamins and minerals. In all cases, we attempted

to reduce the sugar content to minimal amounts.

NUTRITIONALLY BALANCED CANDY BARS

Researchers working at ARS's laboratory at Pasadena, California, have developed a nutritionally balanced candy bar. Although this product, which contains 28% protein, utilizes nonfat dry milk and peanuts as the protein sources, soy protein isolates and other bland tasting protein concentrates could also be employed. Vitamins and minerals were added, either from synthetic or natural sources. Vitamins A and C had to be added directly since sufficient amounts were not found in the ingredients used. These candies did not require refrigeration.

Consumer reaction to this product was uniformly favorable. Because of the nutritional value, this candy would normally cost two or three cents more than conventional candy

bars. However, when offered for sale in competition with other candy bars at the same price, the nutritionally balanced candy sold out rapidly.

The main purpose of these new snack foods is to increase the options available to people, particularly those in vulnerable groups, for improving their diets not only esthetically, but nutritionally as well. We at the Dairy Products Laboratory and the researchers at Pasadena have successfully demonstrated that high protein candies can be acceptable and appealing. All signs point to the fact that the candy industry is rising to the challenge to develop products that are as "good for you" as they are "good to eat."

Literature Cited

1. ALTSCHUL, A. M., ed. *New Protein Foods*. Volume 1A. Technology. Academic Press, New York. 1974.
2. ANONYMOUS. Candy—with protein. *Agric. Res.* 22(4): 12. 1973.