

## THE UTILIZATION OF DAIRY BY-PRODUCTS

ERNEST KELLY

*Dairy Division, United States Department of Agriculture*

Since the beginning of history, the blast of the horn has been a signal for action. The trumpet call of freedom leading our country into the world war upon the side of justice sounds again an appeal for action. And it must be concerted action in all fields of endeavor. We who stay at home must omit no action that will strengthen and comfort our people and their Allies.

War time needs have called our attention to many existing uneconomic practices which should be eliminated not only during the conflict, but in times of peace as well. Thrifty methods necessitated during this period should become a national routine. No country is rich enough to habitually practice wasteful methods and continue successful.

### PREVENTION OF WASTES

There are two kinds of waste. The first may be called mechanical, and results in actual loss; the second consists of failure to use resources to the best advantage. Either type is deplorable. In our treatment of food products we have been guilty of permitting wastes in both ways. It is high time to call a halt, and the leaders in this must be those engaged in educational work with producers and handlers of food. The members of our association, then, may very profitably center their thought on the better utilization of dairy by-products. What would we think of the meat packer who threw away the tongues, livers, trimmings, etc? We would condemn him as wasteful; and yet we permit the waste of vast quantities of valuable food in the dairy industry. Dairy-men themselves are not wholly to blame. They have not been taught proper methods of utilization. Furthermore, consumers are largely ignorant regarding the food value of skim milk and its products; hence the market demands have been limited.

Any campaign to reduce wastes of skim milk must have both objects in view; that of educating the consumer as to food values and uses in the dietary; and that of teaching dairymen how to manufacture the various by-products.

#### WASTE OF SKIM MILK

In the past much skim milk has been wasted both by throwing it away and by feeding it to farm stock when it could have been used to better advantage for human food. This does not mean that no skim milk should be fed to calves, hogs and chickens. Such a conclusion would be ridiculous, because our markets are not ready to absorb all the skim milk produced. But human needs should be cared for first, and only the surplus skim milk fed to live stock. Such a procedure is logical and is based on economic grounds. One hundred pounds of skim milk will produce from 15 to 19 pounds of cottage cheese. The same amount, when fed with corn to hogs, will produce only about 6 pounds of live weight or 4.8 pounds of dressed pork. Thus skim milk made into cottage cheese furnishes nearly seven times as much protein and about as much energy as the pork it would produce. Furthermore, in making cottage cheese from 100 pounds of skim milk, about 80 to 85 pounds of whey is recovered which has half the value of skim milk for hog feeding. This illustrates the fact that the greatest economy is to use food stuffs direct, rather than through domestic animals.

#### UTILIZATION OF BY-PRODUCTS

Dairy by-products may be utilized for human food in a number of ways. They may be consumed immediately to replace other articles in the diet; or they may be transformed into products that can be stored from periods of flush to be used in periods of shortage.

Skim milk and buttermilk without processing of any kind may be used for direct consumption as beverages or in cookery. We have not yet begun to realize the possibilities of the skim milk drinks such as buttermilk lemonade, prepared buttermilks,

koumiss and the like. They are pleasant and nutritious, in which respect they differ from many commonly used beverages.

The most available opportunity for the use of skim milk is through cottage cheese. I say "most available," because the manufacture of cottage cheese does not require elaborate equipment nor long training of operators. It can be quickly taught on any farm or in any factory where skim milk can be had, and this means almost anywhere. Furthermore, it can be consumed in fairly large quantities on the farm and in the immediate vicinity.

Protein is one of our expensive food constituents; yet skim milk contains a slightly higher percentage of it than does whole milk. It is estimated that the milk produced in the United States in 1917 contained about 11,000,000,000 pounds of solids. Of this amount about 3,400,000,000 pounds, or nearly one-third, was left in skim milk, buttermilk and whey during the manufacture of butter and cheese. What a tremendous amount of human food contained in the so-called by-products! If all the skim milk left from buttermaking in one year could be made into cottage cheese it would furnish over 900,000,000 pounds of protein; or nearly as much as is contained in all the beef consumed annually. This shows the possibility of partially replacing meat in the American home not only to benefit our pocketbooks but to release supplies for export.

Comparatively few people realize that a pound of cottage cheese, selling for 10 to 18 cents, contains as much protein as 1 to  $1\frac{1}{2}$  pounds of meat. It also furnishes as much energy as  $\frac{1}{3}$  to  $\frac{2}{4}$  of a pound of meat. Cottage cheese may be used in cookery in a number of ways as a meat substitute. It may be prepared with vegetables as a "roast," served as a salad, etc. Where there are refrigeration facilities, cottage cheese may be frozen and stored for several months.

Let us consider for a moment some of the ways in which skim milk may be stored in flush periods to relieve shortage at other seasons. Condensed skim can be manufactured. It can be used in a number of ways by bakers, confectioners and ice cream makers.

Probably one of the greatest fields for the future lies in the manufacture of skim milk powder. We have as yet hardly begun to develop this industry which will provide a product capable of extensive storage, transportation at minimum cost, and utilization in a multitude of ways. It may be held over to meet seasonal shortages of production; or it may be shipped to localities where there is normally insufficient production. In combination with butter it may be used to reconstitute milk and cream for various purposes.

#### OTHER WASTES THAT SHOULD BE CHECKED

Many other wastes occur in the industry, all of which should be stopped. Whey from the average cheese factory probably contains about 0.2 per cent fat which can be recovered and used for the manufacture of whey butter. Milk sugar, albumen cheese and primost may also be made from whey.

It is true that the manufacture of some of these by-products requires large amounts of raw material and rather expensive apparatus. But the larger dairy establishments can well afford to make the investment; and there is opportunity for community development along this line.

#### PASTEURIZATION OF BY-PRODUCTS

Apparently little attention has been paid by the various states to the pasteurization of skim milk and whey. Certainly if these articles are to be used for human food, pasteurization is imperative; and if we are going to successfully combat the spread of animal diseases, all dairy by-products should be pasteurized. About a year ago I wrote to dairy officials in all the states to ascertain what laws were in effect regarding the pasteurization of skim milk and whey. Forty-five states replied and of these only six had such laws on the statute books. They were Colorado, Iowa, Maryland, Michigan, Minnesota and Pennsylvania. There is certainly work in the field for those interested in dairying in the other states.