

Milk High in Polyunsaturates Produced in ARS Experiment

Milk, and perhaps even meat, high in polyunsaturated fats might be available in the future. USDA scientists reported this week in Blacksburg, Va.

At the 67th annual meeting of the American Dairy Science Association, chemists and dairy husbandrymen of USDA's Agricultural Research Service

(ARS) told of their novel scheme for the natural production of dairy and meat products with a balance of saturated and unsaturated fats that might be more desirable nutritionally.

Dairy and beef cattle get substantial amounts of unsaturated fats in their rations, but micro-organisms in the rumen hydrogenate, or saturate, most of these fats before they enter the body tissues of the animals. Following the lead of Australian researchers, the ARS scientists have developed means of coating or encapsulating with casein oils that are high in unsaturated acids, such as safflower oil, and treating the encapsulated oil with formaldehyde to "protect" it in the rumen so it reaches the milk in a more unsaturated form.

ARS animal husbandryman H. Keith Goering used this encapsulated safflower oil to substitute part of the grain ration fed to four milking cows from the herd at the Agricultural Research Center, Beltsville, Md. The cows' weight gain and general health were normal, about the same as four control cows fed an all-grain ration, but

the concentration of linoleic, a polyunsaturated acid, in their milk fat averaged 13.6 per cent of total fat compared to 2.7 per cent for the controls.

ARS chemist Leshe P. Dryden reported that he fed steadily increasing amounts of the encapsulated safflower oil from 0 up to nearly 3,000 grams per day, and showed that the amount of the unsaturated acid in the milk fat could be controlled by the amount of the oil fed. At the highest level, the milk fat contained 33 per cent linoleic acid.

Another ARS chemist, Locke F. Edmondson, reported that unsaturated fats are more susceptible to oxidation than saturated ones. Thus, although the raw polyunsaturated milk has good initial flavor, he said definite off-flavors develop during refrigerated storage unless an antioxidant is added.

Processing the milk has little effect on its linoleic acid content, said Dr. Edmondson, adding that the fat is also stable to storage under refrigeration.

Milk high in polyunsaturated fat can be used to make butter and cheese. ARS chemist Noble P. Wong reported last week at a regional meeting of the American Dairy Science Association in Durham, N. H., that natural Cheddar cheese made from the milk has an oxidized flavor, but

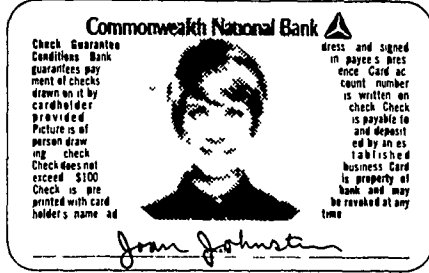
this becomes less pronounced on aging. If the cheese is made into processed cheese products, the off-flavor is even less noticeable. Another ARS chemist, Robert A. Yoncoskie, reported at today's meeting that the butter made from this milk spreads readily at refrigerator temperatures, but it poses some flavor problems.

While its flavor makes polyunsaturated milk unacceptable at present as a beverage and limits its value in making butter and cheese, it has been used successfully in experimental animal feeding. ARS research biologist T. Randall Wrenn reported at today's meeting that he fed four veal calves for 10 weeks, starting when they were four days old, with milk produced by cows fed encapsulated safflower oil. The milk fat contained 14 per cent linoleic acid. The animals kept healthy and showed weight gains comparable to four other control calves fed similarly with normal milk whose fat contained three per cent unsaturated fatty acids. In all cases, the milks were supplemented with vitamin E. In addition, the calves ate all the grain and alfalfa hay they wanted.

Biopsies showed four times as much linoleic acid in the animals' body fat when milk high in fat was fed. This indicates the possibility that through such feeding, meat can be produced whose fat will contain a higher proportion of polyunsaturated acids.

Can the same effect be achieved by feeding less expensive oils than safflower oil that are also high in polyunsaturated acids, such as soybean oil? Dr. Joel Bitman, an ARS chemist, described an experiment in which ground whole soybeans, full-fat soy flour, and full-fat soy flakes were treated with formaldehyde and fed for three to five days to two lactating Holstein cows. The results of this particular trial, said Dr. Bitman, were disappointing, since the soybean preparations did not increase the linoleic acid content of the milk more than about 8 per cent. He said, however, that work is continuing with soybeans that shows more promise of success.

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