Dairy Foods

Pilot Plant Studies on the Reduction of Chemical Oxygen Demand of Cottage Cheese Whey by *Kluyveromyces fragilis*

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Cottage cheese whey (450 gal.) and the first rinse water (400 gal.) were pumped directly from the cheese vat in the University Creamery into a 1,000 gallon milk tank in the pilot plant. The temperature of the whey was adjusted to 35°C (95°F), and antifoam was added to control excessive foaming. Thirty gallons of *Kluyveromyces fragilis* starter (saved from previous batch) was added, and the mixture was allowed to incubate 24 hours with continuous aeration. The system was aerated by sparging air through a perforated stainless steel pipe in the bottom of the tank. At the end of 16 hours, sufficient starter for the next batch of whey was withdrawn. At the end of the 24 hours the aeration was stopped, and live steam was injected into the cultured whey until the temperature reached 88°C (190°F). After steaming, the precipitated solids were allowed to settle overnight.

After the yeast and whey proteins were settled, the effluent was siphoned from the tank. The solids remaining in the bottom were recovered by draining the material from the tank onto racks covered with duck cloth, and allowing the spent whey to drain. After about 4 hours on the racks, the solids were placed into large plastic containers (thirty gal. plastic refuse cans with perforated bottoms and lined with duck cloth). Each can was filled to approximately one third capacity. A plastic container (nonperforated) was placed on top of the yeast-whey protein precipitate and filled with water to serve as a press. Each was left undisturbed overnight to further expel effluent from the yeast-whey protein material. The pressed yeast-whey cakes were forced through coarse wire sieves (¼ inch) and spread on clean duck cloths to dry at ambient temperature.

Samples for analysis were taken from the vat after inoculation ("O" time), at the end of the incubation period (24 hours) before steaming, after steaming when the solids had settled (effluent), after draining (yeast-whey

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Table 1. Analyses of samples from cottage cheese whey cultured with *K. fragilis*

	Lactose %	Protein %	BOD's mg/l	COD mg/l	pH
"O" time	2.15	0.46	24,172	50,120	4.7
24 hours	0	0.36			5.0
Effluent		0.14	12,943	25,457	5.1
Yeast-whey paste		10.13			
Dried yeast-whey		73.75			

paste), and after drying (dried yeast-whey). The results of these analyses are presented in Table 1.

K. fragilis completely utilized the lactose in the cottage cheese whey and reduced the BOD's and COD of the whey 46 percent and 49 percent, respectively. The yeast-whey protein material obtained can be used in formulating human or animal foods. The dried material contained 73.75 percent protein.

The Continuing Study of Wheat Pasture Flavor in Milk

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The lush green wheat pastures available to the dairyman each fall and spring are a lure to trouble. The cows consume it readily and as a result the milk produced has a highly undesirable taste and odor. This odor is "fishy" in nature and has been analyzed to be trimethylamine. Earlier work from this station confirmed that the amount of wheat consumed was directly related to the amount of fishy flavor in the milk.

Current work is being undertaken to determine if there is a high grain yielding variety of wheat that can be grazed with less off flavor being generated in the milk. Tam-101, Osage, and Triumph-64 varieties have been investigated with only slight variation observed in the off flavor produced after grazing. There was not enough variance to influence the grain selection by the dairy farmer.

It would appear that herd management to control the extent and time of grazing is the best tool currently available to limit the production of trimethylamine.