

to the elevated temperature and rectal temperatures decreased slightly but respiration rates were still elevated. Semen was collected from all boars during the treatment period, but sperm motility was decreased and there was an increase in the percentage of aged acrosomes.

Dairy

The Undesirable Flavor in Milk Resulting From Grazing Cows on Wheat Pasture

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In Oklahoma and other states of the Southwest, wheat is a very important pasture crop for the grazing of livestock. It is used by dairymen to a limited extent and would be used much more extensively if it did not cause a very objectional flavor in milk. The occurrence of wheat flavor in milk is highly inconsistent. Some dairymen seem never to have difficulty with the problem while others experience the problem even when they practice all recommended control measures. The only solution of their problem is complete abandonment of wheat pasture. The inconsistency in the occurrence of the wheat problem has been responsible for serious economic losses to Oklahoma dairymen. During February, 1972, several tanker loads of milk were rejected because of wheat flavor. On one single day, eleven tanker loads were rejected in Oklahoma City. The problem is most severe in February but not to the same degree each year.

There appear to be many variables associated with the wheat problem. Some of the more important ones appear to be individuality of cows, stage and rate of growth of the wheat plants, the influence of freezing on the wheat plant, feeding and management practices on the dairy farm, etc.

The objectives of this study are: 1. To study the effect of such variables as stage and rate of growth of wheat pasture, the time grazing,

and concentrate:forage ratio on the production of wheat flavor in milk. 2. To isolate, and quantitatively measure chemical compound (s) in milk and wheat pasture samples responsible for objectionable flavor in milk. 3. To develop a simple, reliable field test to aid in the detection of wheat flavor. To date, some of these objectives have been accomplished, and the study is continuing.

Triumph 64 wheat was seeded September 15, 1972; and the grazing studies began on November 15, 1972. Twelve Holstein cows were used in this study. They were assigned at random to three groups of four cows each. All groups received the same treatment except for grazing on wheat pasture. Group I was never allowed to graze. Group II was allowed to graze for 30 minutes, and Group III was allowed to graze for 120 minutes. Both groups were removed from pasture two hours before milking. Milk samples were collected from each of the 12 cows at milking time; and, in addition, the entire quantity of milk produced by Cow No. 296 of Group III was collected. The 12 individual milk samples were divided into two portions, and these 24 portions were randomized and coded before they were examined by four experienced milk judges. The judges first examined each sample by tasting and again by smelling the samples after they had rendered slightly basic by the addition of NaOH. The quantity of milk from Cow No. 296 was analyzed for compound (s) responsible for the wheat flavor. This procedure is described briefly as follows: The milk was made basic by the addition of NaOH to release the volatiles believed to be responsible for wheat flavor. A stream of nitrogen was bubbled slowly through the milk for several hours. The nitrogen carried the volatiles from the milk into a series of traps which were charged with a weak HGI solution. The contents of the traps were concentrated and held cold until crystals appeared. The crystals were analyzed by mass spectrophotometry. Similar work is underway on wheat samples and work on other objectives will be started shortly.

The results of the organoleptic evaluations of milk produced by the three groups of cows are summarized in Figure 1. The observations made by smelling alone were more uniform than those made by tasting. The distinction between the two groups which were grazed on wheat and the control group is also more striking. The irregularities occurring in Trial 7 are, no doubt, due to a coating of ice on the wheat plants on this particular day. The intensity of wheat flavor was generally somewhat greater for Group III than it was for Group II, indicating the influence of length of grazing time. The flavor intensity for Group I increased somewhat during Trials 4 through 7, which corresponds to a period when weather conditions grew increasingly worse. During this period, it was impossible to keep lots and shelters

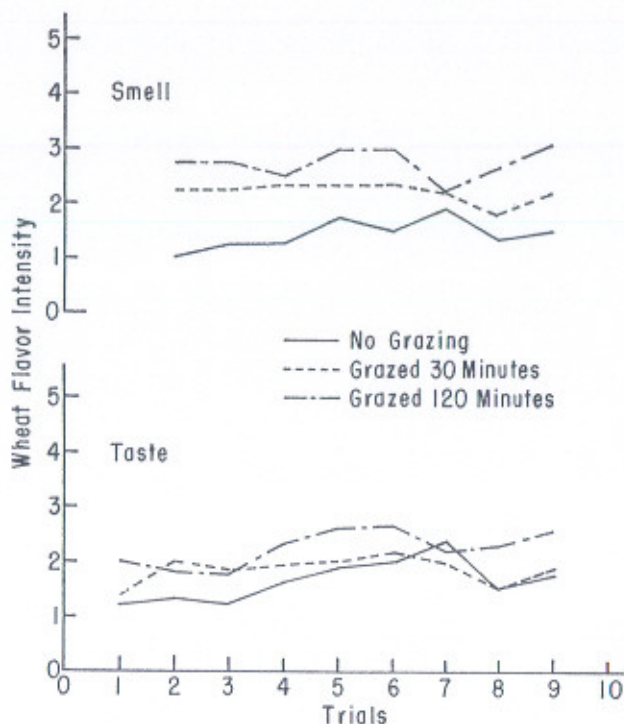


Figure 1. Average wheat flavor intensity in milk from cows grazed on wheat pasture.

in a satisfactory condition, and the cows were forced to breath air that was contaminated with undesirable odors which might have been transferred to their milk. These odors are believed to have interfered with the judges ability to identify wheat flavor. The fact that this condition was more striking in the taste evaluations than it was in the smell evaluations further supports this premise.

The difference in the tendency of individual cows to impart wheat flavor into milk was also observed in this study. Table 1 shows average flavor intensity ranges between the individual cows of each group. Since an intensity value of 1.0 indicates no detectable wheat flavor and 2.0 indicates a very slight wheat flavor, it can be concluded that no wheat flavor occurred in Group I. Table 1 also indicates that there were individuals in both Group II and III with average flavor intensities of less than 2.0, but there were certain trials when each

Table 1. Range Between Average Flavor Intensities of Individual Cows

Group	Range	
	Taste	Smell
I	1.5-1.7	1.3-1.6
II	1.6-2.3	1.9-2.5
III	1.6-2.6	2.5-3.1

individual cow of both groups produced milk with a definite wheat flavor. Cow No. 296 never produced milk that was free from wheat flavor. This was true for Trial 7 when the wheat plants were covered with ice. The average flavor evaluations on her milk by the four judges on this date were 2.6 for taste and 3.0 for smell.

The analyses by mass spectrophotometry has definitely identified a single compound, trimethylamine, as being responsible for wheat flavor in milk. This development will be extremely valuable in further research on Oklahoma's No. 1 milk flavor problem.

Dairy Foods

Emulsifiers in Foods for the Elderly

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During the last 12 years, research concerning emulsifiers in foods at O.S.U. has resulted in several new products including low calorie spreads, new cake shortenings, and candy bases. These studies with emulsifiers are continuing, and the objective of this research is to develop ideas which can be used to manufacture foods for the elderly of our population.

Present studies are aimed toward the development of high protein puddings which will be acceptable to the elderly. As a first step in this work, pudding and custard recipes were obtained from cookbooks that were from 40-80 years old. Dishes prepared from these recipes have a