

Studies on Wheat Pasture Flavor in Milk

L. J. Bush, P. E. Johnson¹, R. L. Von Gunten
G. V. Odell and G. D. Adams

Story in Brief

Use of wheat pasture for grazing by lactating dairy cows is limited by the fact that an undesirable flavor is frequently produced in the milk following consumption of this forage. Feeding of alfalfa hay during a 2-hour interval between grazing wheat pasture and milking tended to accentuate, rather than eliminate, the problem. Since the compound responsible for the undesirable flavor, trimethylamine, was detected in milk at concentrations of 0.5 to 3 p.p.m. by 50 percent of an untrained panel, a reliable method to detect the compound in bulk milk at very low concentrations is needed.

Introduction

Many years ago, Trout and Hartwood (1944) reported that milk from cows pastured on common rye pasture had a very offensive flavor, whereas milk from cows grazing Balbo rye was not affected. In 1958, a study was conducted at the Oklahoma station to compare Balbo-rye, barley, common rye, oats and wheat forage as to their effect on flavor of milk. The most undesirable flavors resulted from grazing cows on common rye and wheat, with the undesirable milk flavor being characterized as "fishy". An undesirable milk flavor resulting from grazing cows on brome grass pasture was also described in this manner by Loney et al. (1963).

In work reported last year, Johnson et al. (1973) found that the intensity of wheat flavor in milk was related to the amount of time cows grazed wheat pasture. Since a standard 2-hour withdrawal period was al-

¹ Assistant Professor Emeritis, Department of Animal Sciences & Industry.

lowed for all the cows before milking, the greater flavor intensity was evidently a reflection of the amount of forage consumed. The compound in milk responsible for the "wheat pasture" flavor was identified as trimethylamine.

The purpose of this work was to determine the effect of feeding cows alfalfa hay after grazing wheat pasture on the occurrence of "wheat" flavor in milk. In addition, laboratory work was directed toward establishing the concentration threshold for detecting trimethylamine in milk.

Materials and Methods

Twelve lactating Holstein cows were divided into two groups of six each. Both groups were allowed to graze wheat pasture for two hours each day and were removed from the pasture two hours prior to the evening milking. One group was fed alfalfa hay during the interval between grazing and milking, whereas the other group was fed hay after milking. Milk samples for flavor evaluation were taken periodically (generally twice each week) at the evening milking and refrigerated until the following day. Examination of the milk for wheat flavor was carried out in the manner previously described (Johnson et al., 1973). After five sampling periods, treatments for the two groups of cows were switched.

The odor threshold for trimethylamine in milk was established by determining the percentage of individuals with no training in milk flavor detection, who could detect the compound in milk at different concentrations. This was done with milk at different acidity levels (pH) to identify concentration sensitivity limits needed for detection by gas liquid chromatography, and ultimately by means of a field test system.

Results and Discussion

Average intensity of wheat flavor in milk was moderate to high during most of the period (Feb. 7 - Mar. 25) covered in this trial. Feeding of alfalfa hay immediately after grazing definitely did not reduce the milk flavor problem. In fact, slightly higher flavor intensity scores were recorded for milk from cows fed hay just after grazing (Figure 1). Moreover, this continued to be the situation when the groups of cows were switched, indicating that it was not an effect due to certain cows in a particular treatment group.

On the basis of the above results, feeding cows alfalfa hay after grazing wheat pasture would not be advised where the interval between grazing and milking is only a few hours. Presumably, any feed ingredient having a relatively high digestible protein (N x 6.25) content would tend

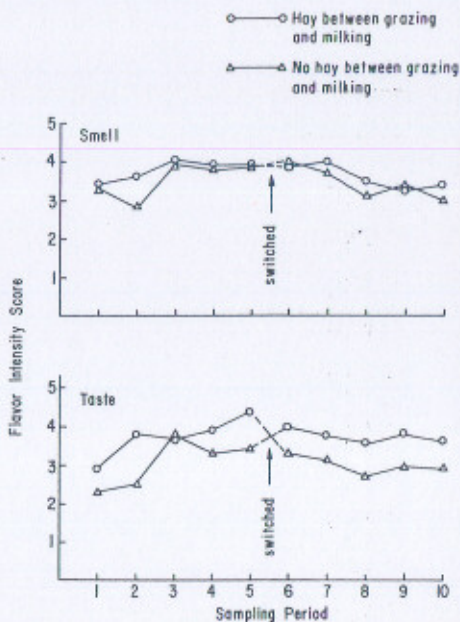


Figure 1. Average wheat flavor intensity in milk from cows grazed on wheat pasture.

to supply sufficient non-protein nitrogen compounds to increase the concentration of trimethylamine in the milk. There is a possibility that feeding grain high in readily available carbohydrate prior to grazing wheat pasture would favor more rapid utilization of NPN compounds from wheat forage in the rumen and thereby reduce the amount of trimethylamine in milk. Further work to elucidate this point is underway.

The odor threshold for trimethylamine in milk was found to be around 10 p.p.m. At this concentration, at least 90 percent of a panel of untrained individuals detected the odor in milk, whereas only 50 percent of the panel detected the compound in the concentration range of 0.5 to 3 p.p.m. Essentially the same result was obtained when the milk was adjusted to pH 9. A detection method of value for field use would need to be sufficiently sensitive to give a positive test for trimethylamine at rather low concentrations, since it would be used by individuals without special ability as milk judges.

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Micronized Sorghum Grain in Rations For Lactating Dairy Cows

L. J. Bush and G. D. Adams

Story in Brief

Since sorghum grain is often the most economical energy source in dairy rations, research work to evaluate different methods of processing is justified. The purpose of the trial reported here was to compare sorghum grain micronized to different degrees with finely ground grain in terms of feeding value for lactating dairy cows.

Grain for the experiment was ground using a 1/16 inch screen, or micronized to give test weights of either 30 or 18 lb. per bushel. These treatments did not affect average milk yield of the cows to a significant extent, with persistency of production being very similar for the groups throughout the trial. Data on milk composition were not conclusive. Digestibility of ration components was not related to method by which the grain was processed. Ruminal VFA values in cows fed micronized grain were marginal in terms of expected effect on milk fat percentage.

Introduction

Micronizing of sorghum grain has been shown to result in greater breakdown (gelatinization) of starch in the grain than is obtained by grinding or by rolling. Moreover, the degree of gelatinization increases as the extent of micronizing, measured in terms of density of product pro-