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Milk Flavor Unaffected by Plastic Baler Twine

Consumption of significant quantities of shredded plastic (polypropylene) baler twine had no effect on animal performance or milk flavor, in this short-term trial with dairy cattle.

WITH THE EVER increasing need for efficiency in feed handling, interest has developed in the use of plastic baler twine. Such twine must resist deterioration during storage of the bale, but it must not contribute an off-flavor to the milk, interfere with feed assimilation, or reduce milk production. A short-term trial was conducted to determine whether ingestion of polypropylene baler twine would affect milk production or flavor.

Two trials were conducted, each lasting one week. Four lactating dairy cows were maintained on a diet of 8 lbs of a concentrate mix and 25 lbs of alfalfa hay daily for at least three weeks before the start of the trials. For one week before each trial, and for each of the two trial weeks, 4 ounces of chopped, shredded polypropylene baler twine were fed daily, combined with the concentrate mix. Cows 3 and 4 received this special diet during the first trial; cows 1 and 2 were fed the diet during the second trial.

Milk from the experimental and control groups was processed according to standard procedures. Milk from the evening and morning milkings was combined, "pasteurized" at 140°F for 30 minutes, cooled to 135°F, and homogenized at 2,500 to 500 psi. This procedure insured the safety of the panelists and subjected the sample to a heat treatment, so that any undesirable reaction caused by pasteurization could be detected. The heat treatment was not sufficient to produce a cooked flavor that could cover up slight flavor differences between the two samples. Following homogenization, the samples were cooled immediately over a surface cooler, to 45°F or less.

Small differences in fat and solids-not-fat contents of milk can be detected by a trained panel. Therefore, these components were adjusted either by separating a portion of the high-fat milk and using the skim milk to lower the fat content, or by adding water to reduce the solids-not-fat content. All milk samples were analyzed for fat by the Babcock method and for total solids by the Mojonnier method. Solids-not-fat were calculated by difference. The average compositions of the samples are shown in table 1. Normally, differences between control and experimental samples in both fat and total solids were considerably less than 0.5%.

Ten departmental employees with previous training in detecting differences in milk flavor served on the tasting panel. A dual-standard, paired-comparison method was used to detect differences. The two milks were presented as reference samples labeled A and B, followed by eight coded pairs, consisting of A and B presented in a counterbalanced design. The judges' task was to select the sample within each pair that was the same as A, and to indicate the sensory criteria upon which the judgment was based.

In all cases, the panel found a significant difference in flavor between the two milks. There was an average of 76% separation of samples by the panel, judging from the first week of the experiment, 74% from the second week, and 79% from the week after the baler twine was no longer fed to the cattle.

However, these judging responses were completely independent of the feeding regime of the cows. The pooled milk from cows 1 and 2 was always described as saltier, richer, creamier, more viscous, etc., than the pooled milk from cows 3 and 4. The same comments were used to describe the flavor of these milks, regardless of whether the cows were on standard ration or on the experimental feed. The panel detected differences in flavor even though the compositions of the milk were essentially the same. The same level of significance was apparent when all cows were on the standard ration. No off-flavors were detected in any of the milk samples during the trial, indicating that differences were due to natural variations in flavor of milk from different cows.

The short-term nature of the trial and the small number of animals involved make premature any general conclusions on the effect of the twine material upon animal performance. However, it can be stated that no drastic or noticeable effects upon either milk production or animal behavior were noted.

TABLE 1. EFFECT OF PLASTIC BALER TWINE ON TOTAL SOLIDS (TS), FAT, AND SOLIDS-NOT-FAT (SNF) OF MILK

Cows	Milk Composition (lbs)											
	Pre-feeding			Week 1*			Week 2†			Post-feeding‡		
	TS	Fat	SNF	TS	Fat	SNF	TS	Fat	SNF	TS	Fat	SNF
1 and 2	12.60	3.70	....	12.14	3.53	8.62	12.11	3.56	8.54	12.33	3.46	8.72
3 and 4	12.60	3.75	....	12.41	3.82	8.60	12.35	3.71	8.64	12.42	3.70	8.72

* Week 1; cows 1 and 2, controls.
† Week 2; cows 3 and 4, controls.
‡ All cows standard.

TABLE 2. EFFECT OF PLASTIC BALER TWINE ON MILK PRODUCTION

Cow	Average daily milk production (lbs)			
	Pre-feeding	Week 1*	Week 2†	Post-feeding
1	35.50	33.70	28.10	27.60
2	40.30	40.20	36.30	35.70
3	32.80	29.30	27.70	26.04
4	34.20	34.20	31.80	29.30

* Cows 1 and 2, controls.
† Cows 3 and 4, controls.

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