

Weed Flavors in Dairy Products

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OFF FLAVORS in milk and milk products may originate with the cow, the odors may be absorbed from the air, fermentation by microorganisms is the most common cause and any feed or weed with a strong flavor may taint the milk. Weeds are a menace to the production of dairy products on the farm, first because they reduce the productivity of all crops including the pasture and second because if some weeds are eaten by milk cows it will cause an objectionable weedy flavor in the milk and cream.

Weather has an influence on the prevalence of weed flavors in milk. When there is a normal supply of moisture the pasture grasses get a good start and there is plenty of pasture when the weeds are most abundant and palatable. Drought conditions reduce the amount of all feed available in the pasture and many weeds start early, utilizing what moisture there is available and crowd out the pasture grass.

In 1938, which was quite normal for moisture following a drought period, 55 North Dakota creameries reported on weeds. Forty-six had received Frenchweed flavored cream, 40 cream flavored with wild onions, 25 with peppergrass, and 11 reported cream tainted from rye pasture and with other weeds such as mustard, sage, and cherry shoots.

Cream with a weedy flavor is low grade cream if it is marketable at all and thus thousands of dollars are lost annually by farmers and creameries because of "weedy cream" during the years when weed flavors are prevalent.

Work done on weed flavors during recent years at this Station has indicated that the stage of maturity of the weeds is an important factor. In some cases the weeds had a stronger flavor when they were mature than when immature but the important fact was that the cows did eat readily some weeds when they were immature and lush whereas they would eat few of them when they were more mature and would leave them alone entirely

after they had gone to seed and were woody. Where the weeds were mature enough to be in bloom, the cows would pass them by where the weeds were in patches but would eat them along with the pasture grass where the weeds and the grass were together and it would require nibbling around to avoid the weeds.

Working with onions it was found that the onion flavor appeared in the milk 4 or 5 minutes after the cows began eating them. The flavor was strongest from 30 minutes and 1½ hours after the cows were fed. Onion flavor was also caused when cut onions were held by the head of the cow so that she would inhale the onion aroma, even though she was not allowed to eat the onions. It required from 5 to 6 hours after feeding onions for the flavor to disappear from the milk. It is of interest to note that a cow was fed onions regularly for a month and then when feeding was discontinued, the onion flavor left the milk in the same number of hours as when the cow was fed onions once, thus indicating that there was no hang-over.

Frenchweed is more widely distributed in North Dakota than any other milk tainting weed. It is one of the first plants to appear in the spring, bothers most during the early part of the summer and when conditions are favorable a second crop grows in the fall. Cattle will not usually eat the dried plant in the pasture or in hay if other feed is available but when they do the

weeds cause a strong characteristic flavor as apparently both oil of mustard and oil of garlic are formed when the weeds and especially the seeds are masticated and mixed with moisture. With Frenchweed the flavor and odor in the milk does not always disappear until 7 to 8 hours after the weeds are eaten.

There are two reasons why wild onions and Frenchweed cause more trouble than most off-flavored weeds. First, they are succulent and the cows will eat them readily when they are the only green plants available and they do not object to them when they are intermixed with pasture grass. Second, the flavors of these weeds are strong and readily transmitted to the milk.

Peppergrass is the cause of weed flavored milk in some localities in the South Eastern part of the State. There is a difference of opinion on how serious a menace it is to cream quality but the only safe procedure is to classify it on a par with Frenchweed.

In our trials we found that most cows would not readily eat weeds. For instance, we offered 22 cows a mixture of two-thirds dried green Frenchweed and one-third hay. Only 8 of the cows would eat the mixture. Another time we offered freshly cut Frenchweed to 30 cows in the barn and only 2 of the cows ate more than a few bites. It was always a problem to find 2 or 3 cows that would eat Frenchweed or onions for our experimental work. However, we have observed in pastures that most cows will eat green lush Frenchweed that is growing with the pasture grass and in a pasture that was short and the pasture was almost half grass and half Frenchweed the cows ate the weeds with the grass. In both cases

the cows avoided unpalatable weeds as Flixweed.

A comparison was made of the value of a "normal" ration with a "poor" ration as factors affecting the intensity of onion flavor transmitted to the milk, the poor ration consisted of just half of the feed fed to the cows on normal ration. The results indicated that the amount of feed fed in addition to the weeds did not influence the intensity of the weed flavor.

We found that the weed flavor was associated with the butterfat undoubtedly because the characteristic flavor of weeds and grass for that matter is in the oil of the plant. The scent of new mown hay, for instance, is a volatile oil. Thus the cream and butter always carried a stronger weed flavor than the milk.

Pasteurizing the milk and cream at normal and high temperature improved it slightly but did not remove the weed flavor to any appreciable extent. Heating cream under vacuum did remove most of the weed flavor.

We posted 10 yard square quadrates in a new seeding of crested wheat grass in Cass County. On counting we found that in June 1941 there were 334 crested wheat grass and 157 Frenchweed in the plots. The next June a recount showed 415 crested wheat grass and 122 Frenchweed, an increase of 24.2 percent for the crested wheat grass and a decrease of 22.3 percent for the Frenchweed.

The following table gives the results obtained by this Station while establishing pastures. Percentage composition of pastures during the years when they were being established. Based on stalk count.

Percentage Composition of Pastures -- 1938-41
(based on stalk counts)

	Pasture A-1				Pasture A-2		Pasture A-3	
	1938	1939	1940	1941	1940	1941	1940	1941
Bromegrass.....	8.0	39.6	67.1	71.8	53.1	70.0	71.4	75.8
Crested wheatgrass.....	2.6	19.0	29.5	24.7	33.4	28.2	25.1	23.8
Sweet clover.....	10.4	35.3	0.8	1.8	2.5	0.5	1.5	0.2
Weeds.....	79.0	6.1	2.6	1.7	11.0	1.3	2.0	0.2
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		Pasture B-1			Pasture B-2		Pasture B-3	
Bromegrass.....	3.7	8.3	21.3	42.8	17.9	41.1	19.0	42.8
Crested wheatgrass.....	10.5	13.7	25.5	26.9	20.1	21.0	29.2	26.9
Slender wheatgrass.....	13.2	47.1	45.3	20.6	56.8	29.9	47.9	28.8
Western wheatgrass.....	0.1	1.1	3.9	1.8	0.5	1.5	0.3	0.5
Timothy.....	0.1	.....	.....	.....	.....	.....	.....	.....
Red canary.....	0.1	.....	.....	.....	.....	.....	.....	.....
Sweet clover.....	4.3	15.6	0.1	0.8	.....	0.5	.....	0.2
Alfalfa.....	1.0	2.4	3.5	6.8	3.0	4.6	2.7	1.9
Weeds.....	67.0	11.8	0.4	0.3	1.7	1.4	0.9	0.1
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

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1. Careful pasture management. This consists of:
 - (a) Conserving moisture
 - (b) Avoiding over grazing
 - (c) Dividing the pasture into two or three fields and rotating them
 - (d) Cutting or pulling weeds so that they will not go to seed.
 - (e) Seeding a new field and when possible plowing the weedy field for a rotation of cultivated crops. In brief manage the pasture so that the grass will crowd out the weeds and not let the weeds crowd out the grass.
2. Painstaking herd management.
 - (a) Keep the cows off weedy pasture for from 3 to 8 hours before milking. That may in some cases mean that the cows will have to be taken off the weedy pasture at noon and at twilight after they have their fill.
 - (b) Provide the cows with enough good feed so that they will not be forced to eat weeds. If the pasture is short it should be supplemented with hay, grain silage, or green feed.
 - (c) A combination of these two methods is excellent; that is turn the cows on the weedy pasture after milking and then transfer them to a clean pasture or a dry lot 5 to 8 hours before milking.

Conclusions:

It is apparent that there are three ways to avoid or correct off-flavors in milk and milk products.

1. Careful herd management which requires feeding cows an adequate ration so that they will not be forced to eat weeds and

keeping the cows off weedy pastures from 3 to 8 hours before milking.

2. Practicing good pasture management so as to control the weeds.

3. The creamery can overcome the difficulty by using one of the several types of vacuum pasteurizers. As this equipment is expensive it can be used economically only by creameries that handle a large volume.

The New Mida Wheat Variety

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THE new bearded common wheat variety, Mida, previously known by its number 2829 is being distributed under contract for the crop season of 1944. As the variety was of sufficient promise one year ago to warrant its increase in 1943 under contract with a limited number of farmers, a larger amount of seed is now available for distribution than if its increase in 1943 had been limited to the experiment stations. Mida wheat approaches Rival more nearly in its characters than to any of the other standard varieties, but it is distinct from Rival in breeding, in its behavior in the field, and in milling and baking. Mida is superior to Rival as to stem and leaf rust resistance, resistance to shattering and strength of straw. The cross which produced this variety was made in 1933 and it entered into several experiments in 1939. Since then the wheat has been closely studied and has been found to be a desirable variety.

Statements appeared in the papers of the State early in March that the variety would be distributed under contract to a limited number of farmers to be selected on the basis of suitability of land, location, cleaning and storage facilities and as to the experience of the farmer in growing pure seed. The purpose of the contract, which covers all sales of seed and which gives the experiment station an option as to the disposition of 75 percent of the 1944 crop, is to aid in the more rapid and equable distribution of seed for the 1945 crop and to prevent its going into market channels. Also in following the distribution of the seed the behavior of the new variety can be studied in comparison with established varieties. Circular 68, now in press, will deal in more detail with this new variety.

Seeds of Frenchweed germinate freely in the fall and the plants live over winter. Some of the larger plants begin to bloom in the fall, and while they rarely produce seed then, flower buds can over-winter and bloom early in the spring. Seeds from these flowers will mature by the middle of June. It is essential that fields with these over-wintered plants be worked sufficiently in the spring to destroy the plants. (O. A. Stevens)