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FEEDING APPLES TO DAIRY COWS

by

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Many letters of inquiry are received by the Dairy Husbandry Department of the College, especially during the fall of every year, relative to the feeding value of cull or windfall apples for dairy cows. In most of these letters the statement is made that the writer has been told by neighbors that apples will dry up or cause a decline in milk production in dairy cows. Very little experimental work has been done in which apples have been compared directly with other succulent feedstuffs for the dairy cow. We do know that a chemical analysis shows that apples contain approximately 82 per cent water. Approximately  $15\frac{1}{2}$  per cent of the 18 per cent dry matter in apples consists of sugars. There is only .5 of 1 per cent of crude protein, .4 per cent ash, 1.3 per cent crude fiber and .4 per cent fat.

It has been our belief that the idea that apples will cause cows to decline in production has come about due to the fact that it is the common method to utilize cull or windfall apples by allowing the cows to pick them up under the trees in an orchard. Apples are very palatable to the cow, and as a result, the average cow will probably consume them in such a large quantity that she would not care to eat very much hay, grass, or grain; and as a result she would not receive sufficient nutrients to maintain her milk production.

Inasmuch as so many inquiries have been received and there was so little information available, it was decided in the fall of 1935 to conduct a feeding trial with dairy cows to determine something of the actual feeding value of apples. We were fortunate in having given to us for this feeding trial about 10 tons of cull, yellow Newtown apples. A group of sixteen cows in milk in the dairy herd were selected in the middle of October at the close of the pasture season. For two weeks previous to the including of apples in the ration, the cows received oats and vetch hay, a grain mixture consisting of equal parts of ground barley, ground oats, wheat bran and linseed oil meal, and corn silage. The corn silage was fed at the rate of 30 pounds per cow daily. After two weeks on this ration, the 16 cows were fed 15 pounds of corn silage and 20 pounds of apples daily. Chemical analysis had shown that there was approximately  $\frac{3}{4}$  as much dry matter in the apples as in the corn silage, and therefore 20 pounds of apples were fed to replace the 15 pounds of corn silage. Thus, the cows received the same amount of dry matter in the form of succulent feedstuffs whether corn silage or apples were fed.

Two of the sixteen cows refused to eat the apples. The other fourteen ate the amount given and seemed to relish them very much. The amount of grain fed, an average of 6 pounds per cow daily, was kept the same throughout the feeding trial. The cows were allowed all the hay which they would consume. The cows increased in production about one pound daily during the week when the combination

of apples and silage was fed over the previous two weeks when corn silage was fed.

After the week on the combination of silage and apples, the ration was changed so that all of the silage was replaced by apples, the change taking place over a 3-day period, and each cow being fed 40 pounds of apples daily in two feedings. This amount of apples was fed daily for one week. During this period the average daily production decreased by about 2 1/2 pounds of milk per cow per day.

The cows were then changed back over a 2-day period so that they were again receiving only corn silage, 30 pounds of corn silage being fed daily in place of the 40 pounds of apples. The average production during this week decreased slightly from what it had been when the cows were receiving apples as the only succulent feed.

Following this week's feeding on corn silage, the cows were again fed 40 pounds of apples daily for a week after a 2-day transition period. There was a small average increase in milk production when the cows were changed from corn silage to apples at the rate of 4 pounds of apples for each 3 pounds of corn silage.

Following this second feeding period on apples alone, the cows were reversed again after a 2-day preliminary period and received 30 pounds of corn silage. The average daily milk production during this final week on experiment was about 1 pound per cow per day less than for the period previous when apples were fed.

A study of the individual and total milk production data over the 58-day feeding period covered in this experiment would seem to indicate that apples can be successfully fed to dairy cattle in place of a standard succulent feed such as corn silage without any deleterious effect upon the milk flow. It should be noted that the cows were fed at the rate of 40 pounds of apples or 30 pounds of corn silage per animal daily. Inasmuch as the cows used would average approximately one thousand pounds of body weight, this would mean that the cows were fed succulents in the form of corn silage at about the rate of 3 per cent of their body weight daily, and in the form of apples as about 4 per cent of body weight daily.

Other experimental work at the Oregon State College with succulent feed-stuffs including kale and various kinds of ensilage would seem to indicate that the best results are obtained if succulents are fed at the rate of about 3 to 4 per cent of the body weight of the animal daily. If as much as 6 per cent of the body weight of the animal is fed daily, the cows tended to decline in production, probably due to the fact that they were consuming too much of a feedstuff that was palatable but that was low in dry matter, energy, and protein value. Especially would this be true in the case of apples, because if too high an allowance were fed the cow would be limited not only in the energy intake but also in her protein intake. As indicated previously, apples have only about .5 per cent of crude protein, of which .4 per cent is digestible. This means that a thousand pound cow would have to consume almost 100 pounds of apples daily in order to obtain sufficient protein to maintain her body. If she were to produce 25 pounds of 4 per cent milk, she would have to consume about 200 pounds more of apples in order to have sufficient protein to produce the 25 pounds of milk daily. It would be out of the question to expect a thousand pound cow to consume 300 to 350 pounds of apples daily, and it is therefore very obvious that apples can not be used as the sole feed of the dairy cow. As an

appetizer and succulent feedstuff, apples may very well form a part of the dairy cow's ration.

It would seem that the apples stimulated production when fed along with corn silage and also that they maintained production somewhat better than did the corn silage when fed at the rate of 40 pounds daily in comparison to corn silage fed at the rate of 30 pounds daily.

There was no apparent ill effect on the cows insofar as digestive disturbances were concerned. It seemed necessary in our case, however, to chop the apples in the manger with a shovel in order to facilitate the cow's eating them and eliminate the possibility of the cow's choking.

Samples of milk from cows receiving apples were judged from time to time and apparently the apples were without influence in affecting the flavor and odor of the milk produced.

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