

## YEAST AS A SUPPLEMENTARY FEED FOR LACTATING COWS<sup>1</sup>

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In a previous report results were given of the addition of yeast to the rations of growing calves. A second part of the investigation concerned the effect of using yeast as a supplementary feed for cows in milk and the influence upon the vitamin B content of the milk produced.

The requirements of the bovine for vitamins have not been determined as yet. Until sufficient experimental evidence is available to justify a different conclusion it would appear advisable to assume that this species has a vitamin requirement in general similar to that of laboratory animals, which have supplied the data upon which the present knowledge of vitamins is based.

The rations commonly fed cows in well managed dairy herds apparently would supply a liberal amount of vitamin B. At least half the nutrients are usually supplied in roughages which undoubtedly contain a fair amount of vitamin B. The remainder of the ration usually consists of ground grains and by-products. Seeds are looked upon as supplying a liberal amount of vitamin B, and when ground corn, oats, barley, or other grains are used it is certain the ration will contain vitamin B in considerable amounts. It would appear that the only possibility of a ration low in vitamin B would occur when by-products low in this accessory were used in excess. Gluten meal and beet pulp are examples of by-products low in this vitamin.

The logical procedure in studying the relation of a vitamin to the feeding of dairy cattle would appear to be as follows.

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a. Determine if the bovine requires the vitamin in question as do the laboratory animals.

b. An estimation of the quantitative requirements in terms of some feeding stuff serving as an especially potent source of the vitamin.

c. Determine if any danger exists of ordinary rations being deficient in the vitamins in question.

d. Find if any advantage results from supplying the vitamin in amount considerably in excess of the minimum demands of the animals and of the amount usually received through the ration.

The study which is reported in this paper for reasons which were explained in the first report did not follow the procedure suggested but began with the last rather than the first of the four parts outlined. Large quantities of spent yeast are available from breweries and the use of this product as a feed for animals has long been common in Europe. In Europe yeast is looked upon as a source of efficient protein rather than a supplementary feed having special effects such as might be expected if it were fed for the sake of a vitamin it might furnish.

According to Sherman and Smith "While often referred to as growth promoting it should be emphasized that vitamin B is essential to normal nutrition at all ages."

"The mechanism of the action of vitamin B has been variously thought to be that of a physiological stimulant to glandular secretion of an indirect metabolic stimulant, particularly for carbohydrates." "While the relation of vitamin B to cellular metabolism seems still a matter of speculation, it is clear that it often exerts a very direct influence upon appetite."

#### EXPERIMENTAL

With these facts in mind it appeared worth while to test the value of yeast as a supplement to a common ration as fed under practical conditions. The results were to be measured from the practical feeds standpoint as indicated specifically by effect upon milk production and in general upon condition and appetite of the animal as noted by observation. If the yeast

possesses properties of a galactogog its addition to the ration should result in a stimulation of the mammary glands or by increasing the efficiency of the digestive and assimilative functions. The former might cause an increased appetite to compensate for the increased secretion while the latter might make an increased secretion possible by furnishing the mammary glands with more nourishment.

The plan of the experiment was to feed commercial dry yeast at the rate of 25 grams daily for each pound of milk produced. This particular amount was chosen arbitrarily but as at least furnishing even more than the maximum amount that could be fed under commercial conditions. Eight cows were used, arranged in two groups and fed according to the reversal plan as follows:

	GROUP 1	GROUP 2
Period 1 (40 days).....	Yeast supplement	Basal ration
Period 2 (40 days).....	Basal ration	Yeast supplement
Period 3 (40 days).....	Yeast supplement	Basal ration

The first ten days of each period were considered preliminary. The comparison of data in each case is for the thirty-day periods following the preliminary. The ration used consisted of alfalfa hay, corn silage, dried beet pulp and a grain mixture of ground corn 2 parts, ground oats 2 parts, wheat bran 2 parts, and linseed oilmeal 1 part. The plan of feeding in general was to give each animal as much roughage as she would consume readily and in addition a supply of grain somewhat more than necessary to supply the protein and energy needed, according to Armsby's standards. The purpose in supplying some surplus of nutrients was to allow any stimulation from the yeast to exert its full effect without the limitation from a deficiency of nutrients. The energy fed ranged from 120 to 135 per cent of that called for by the feeding standard. A summary of milk and fat produced by the individuals used is given in table 1. The reversal plan of arranging experimental periods of feeding recognizes the fact that after the first month under normal conditions the decline

in milk production follows a rather uniform curve until the end of the lactation period approaches. The average of the first and the third period should, therefore, be practically the same as the figure for the second period. The object in arranging one group with the experimental ration the first and the third, while for the other group the experimental ration in the second

TABLE I  
*Summary of milk and fat production*

ANIMAL NUMBER	MILK PER DAY			BUTTERFAT PER DAY		
	First 30-day period	Second 30-day period	Third 30-day period	First 30-day period	Second 30-day period	Third 30-day period
	<i>pounds</i>	<i>pounds</i>	<i>pounds</i>	<i>pounds</i>	<i>pounds</i>	<i>pounds</i>
<i>Group 1</i>						
120	24.46*	22.47	19.95*	1.181*	1.115	1.035*
301	39.84*	37.80	37.85*	1.135*	1.026	1.097*
317	23.06*	20.64	11.75*	0.872*	0.752	0.503*
320	27.41*	27.13	26.78*	0.922*	0.877	0.918*
Average.....	28.69*	26.51	24.08*	1.027*	0.942	0.888*
Average for first and third periods.....		26.38			0.957	
<i>Group 2</i>						
102	10.99	8.46*	8.73	0.509	0.428*	0.456
306	33.89	32.17*	31.91	1.190	1.024*	0.988
333	34.20	31.32*	26.05	1.077	1.024*	0.875
500	32.57	29.13*	26.57	1.232	1.115*	1.078
Average.....	27.91	25.27*	23.31	1.002	0.897*	0.849
Average for first and third periods.....		25.61			0.925	

\* Receiving 25 grams dried yeast per pound of milk.

period is to check environmental factors such as weather conditions, that might otherwise not be detected. The results in table 1 do not indicate any effect from the addition of yeast to the ration. In the first group the average milk yield for the yeast periods was 26.4 pounds per day and for the second without yeast 26.5. In the second group the average of the two

basal periods was 25.6 pounds compared to 25.5 for the yeast period.

#### CONCLUSIONS

Adding a dried yeast preparation at the rate of 25 grams per pound of milk produced to a ration commonly fed in good dairy herds did not increase the milk or butterfat yield.

No effect could be observed in the way of condition of the animal or stimulation of appetite.