

The Development of Rumen Function in the Lamb

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Most of the work that has been done in the field of rumen biology has been directed towards the adult ruminant. *Lately, a certain amount of work has been done on the development of rumen function in young animals. Most of this work has been done on dairy calves.

Lengemann and Allen (1955) showed that there was an increase in the total volatile fatty acid production in calves up to 6 months of age. McCarthy and Kesler (1956) followed the total volatile fatty acid production, cellulose digestion and blood glucose levels in dairy calves from 1-15 weeks of age. They found there was a gradual increase in the cellulose digestion up to 15 weeks. The volatile fatty acid levels increased up to 8 weeks and then levelled out. The blood glucose levels gradually fell up to 6 weeks and then levelled out. McArthur (1957) found that 8-10 week old calves, when fed grass, had a dry matter digestibility of 74.6 per cent.; cows had a digestibility of 75.2 per cent. Preston, Archibald and Tinkler (1957) showed that 3 week old calves when fed grass digested 72 per cent. of the dry matter; this efficiency was attained immediately the grass was fed and did not vary throughout the experiment.

As dairy calves are normally hand fed, it is an economic advantage if their feed can consist mainly of roughages and grass. **These** materials can only be fed to the best advantage, if a well developed functional rumen is present. The development of early rumen function in lambs may also be an advantage. Firstly, it would mean that the strain on the lactating ewe would be relieved. Secondly, there may be some connection between weaner unthrift and the poor development of rumen function at that age. Two series of observations have accordingly been undertaken to obtain information on the development of rumen function in lambs.

Six lambs average age 2 weeks, were taken and reared on ewe's milk replacer until they reached an average live weight of 29 lb. The lambs were then divided into 3 nutritional groups and the following rations were fed for 29 days:—

Group A milk *ad lib*.

Group B milk, 66 per cent. of A; lucerne chaff 50 per cent.
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Group C milk, 33 per cent of A; lucerne chaff *adlib*.

At the end of the 59 days all lambs were put onto an 18-day digestibility trial, in which they were fed 300 g of lucerne chaff per day, in 2 feeds. For analytical purposes, the digestibility trial was divided into 6 successive, 3 day periods. At the end of the first 3 day period the average digestibility of the dry matter of all the groups was 62.0 per cent.; the group A lambs had a digestibility of 56.6 per cent. and the group C lambs had a digestibility of 64.7 per cent.; the group B lambs were mid-way between the other 2 groups. By the end of the fourth 3-day period all differences between the groups had disappeared. It can be concluded from this experiment that the diets fed previous to the digestibility trial did have some effect on the dry matter digesti-

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bility figures, but this effect was of a very short term nature. A similar picture was obtained for total protein digestibility.

In another experiment, 8 two-day old lambs were taken and fed for 64 days on a ewe's milk replacer, and then fed lucerne chaff *ad lib*. During the later part of the milk feeding stage and throughout the chaff feeding stage, rumen pH and total volatile fatty acid production was measured. Rumen liquor samples were taken by stomach tube 2 hours after feeding, and the pH and volatile fatty acid analysis were done immediately. Throughout the whole experiment the pH of the rumen contents remained approximately constant at about 7.0. The volatile fatty acid levels on the milk fed lambs were constant at about 5.2 m.mol./l; immediately the lucerne chaff was fed the volatile fatty acid content rose sharply and, within 5 days had reached a peak of 38.8 m.mol./l.

These two experiments indicate that the development of rumen function in the lamb as in the calf may not be such a slow process as is generally thought.

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