



The vital role of rumen microbes

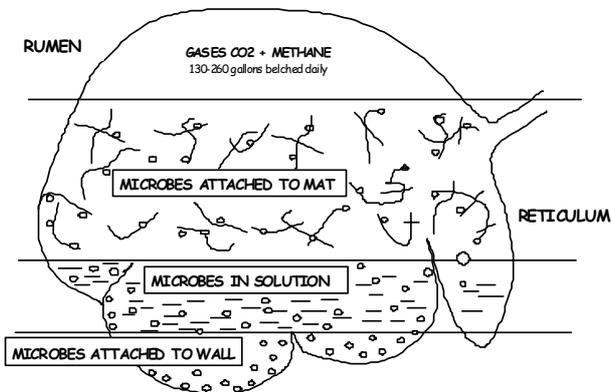
Technical Note N01

The importance of rumen microbes

Increasing the production of microbes in the rumen is the key to lifting milk production and composition.

The microbes break down feed to produce volatile fatty acids, which are used by the cow as energy for maintenance and milk production.

The rumen microbes are also digested and absorbed in the small intestine of the dairy cow as the main protein source for milk production—providing up to 70–90% of a cow's protein requirements.



Roles of different microbes

Fungi, bacteria and protozoa are the three different types of microbes produced in the rumen.

Different microbes have different digestive roles.

There are two main groups of rumen microbes: the slow-working fibre-digesters located on the fibre mat in the rumen, and the fast-working microbes that float around in the rumen fluid, looking for easily-digested nutrients like sugars and starches.

Feed influences microbe type, digestion and intake

Because each group of microbes has very specific functions—like digesting fibre, starch, sugar or protein—the numbers of each are directly related to diet.

A minimum amount of longer fibre particles to form the rumen mat is required for optimal microbe production.

The type of feed—especially its fibre content—influences the type of microbe in the rumen, the speed of digestion, and the total intake of dry matter and nutrients (Refer to Technical Note #3: Feed intake and Technical Note #4: Factors affecting feed intake).

Concentrates and lush forage—containing lower amounts of fibre—build up the quick-working 'floating' microbe population, and feed is moved quickly through the rumen and digestive system. The cow wants more food, and intake is potentially increased.

Mature forages contain higher fibre and lower soluble nutrients, which build up the slow-working, fibre-digesting microbes and cause feed to move more slowly through the system. The cow feels less hungry, and intake is reduced.



Importance of a consistent diet

Microbe populations take time to recover and build up after sudden feed changes.

Forage fibre-digesting microbes may take 4–6 weeks; starch (grain)-digesting microbes take 4–5 days; lactic acid-producing bacteria (from slug feeding) take 2–4 hours to build up.

If the diet keeps changing every few days, the required microbes will not be present in sufficient numbers for optimum digestion. The diet should therefore be as consistent as possible.

Essential nutrients for the microbes

Refer to Technical Note N05: Important nutrients

Water

Cows require up to 100 L of drinking water/cow/day.

Water maintains the rumen liquid environment, supports microbe metabolism, and dilutes acids in the rumen. (Refer to Technical Note N02: Managing for healthy rumen function)



Energy

Most energy for microbes to grow and multiply is sourced from:

- starches (e.g. cereal grains)
- sugars (e.g. lush forages, molasses and citrus pulp)
- digestible fibre (e.g. forages, cottonseed hulls, palm kernel extract and brewer's grain).

Protein

Microbes use both true protein (e.g. protein meal and pastures) and non-protein nitrogen (e.g. urea) for growth and reproduction. Rumen microbes in turn become the largest source (>70%) of dietary protein for the cow.

Minerals

Calcium, phosphorus, sulphur and magnesium are essential for microbes to grow and multiply.

Further information

Contact the DAFF Customer Service Centre by Phone 13 25 23 or Email callweb@daff.qld.gov.au

More technical notes can be found at: www.dairyinfo.biz

Protein Plu\$ Checkbook (Published 2006 by DPI&F Qld)

Feed Plu\$ CD v4.0 (Published 2008 by DPI&F Qld)

Condition magician booklet (Published 2003 by DPI Vic)

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