



Calf Rearing Fact Sheet: Feeding

Rumen development

Key Points

1. The newborn calf can only digest milk—it needs to move to a fully functioning ruminant which can digest a complex diet like pasture.
2. Milk does not develop the rumen. Grain causes much rapid rumen development than pasture because it stimulates papillae development.

Top photo - calf fed milk and hay

Bottom photo—calf fed milk and grain



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Digestion in the new born calf

- At birth the young calf has a simple digestive system with only one of the four stomachs (abomasum) functional. The abomasum in a 40 kg calf can hold 1.5 litres but it expands rapidly to a capacity of 2.5–3 litres within a week.
- Since the calf can only handle a highly digestible milk diet when it is born it has to undergo major changes before it can handle a less digestible diet like pasture.

Digestion in the adult

- Diets such as pasture and silage contain fibre that cannot be absorbed directly - it needs to be broken down by microbial fermentation before it can be absorbed. To deal with this fibre, adult ruminants have a large fermentation vat (rumen) which operates at a neutral pH and where microorganisms can digest complex carbohydrates/fibre.
- The lining of a fully functioning rumen is covered in papillae which are finger like projections which greatly increase the surface area for absorbing the nutrient produced by microbial fermentation.

Developing the rumen

- The rumen is small at birth and milk causes no rumen development at all as it by-passes the rumen and goes straight to the abomasum. Soon after birth, the rumen begins to develop a population of microbes which enter the rumen when the calf nibbles on grass, straw or bedding. The microbes that develop will be those that best digest whatever dry feed the calf is eating.
- Water is important for the growth and multiplication of these microorganisms and if it is not provided, rumen development is restricted.
- As well as growth in size, the rumen papillae need to develop in order for the rumen to become functional. Calves fed grain (or meal) will develop a functional rumen much more quickly than calves fed on milk, grass or hay. This is because grain produces butyrate and propionate when fermented and these products develop the rumen papillae. Calves fed on milk and grass will eventually develop a functional rumen but the process will take much longer. This makes for a longer milk feeding period and a higher rearing cost.
- To optimise rumen development, and achieve early weaning, calves need to have a palatable grain based ration on offer as soon as possible (Note: palm kernel is not palatable for young calves).