

# Volatile Fatty Acids

Volatile fatty acids (VFAs) are end-products of microbial fermentation in the rumen and reticulum and, upon absorption into the portal bloodstream, become the main source of metabolizable energy (ME) for the ruminant animal. The main VFAs, in descending order of their normal concentrations in the rumen are: acetic, propionic, butyric, isobutyric, valeric and isovaleric. The iso- acids are often referred to as *branched-chain VFAs*. Typical concentrations in early lactation cows are

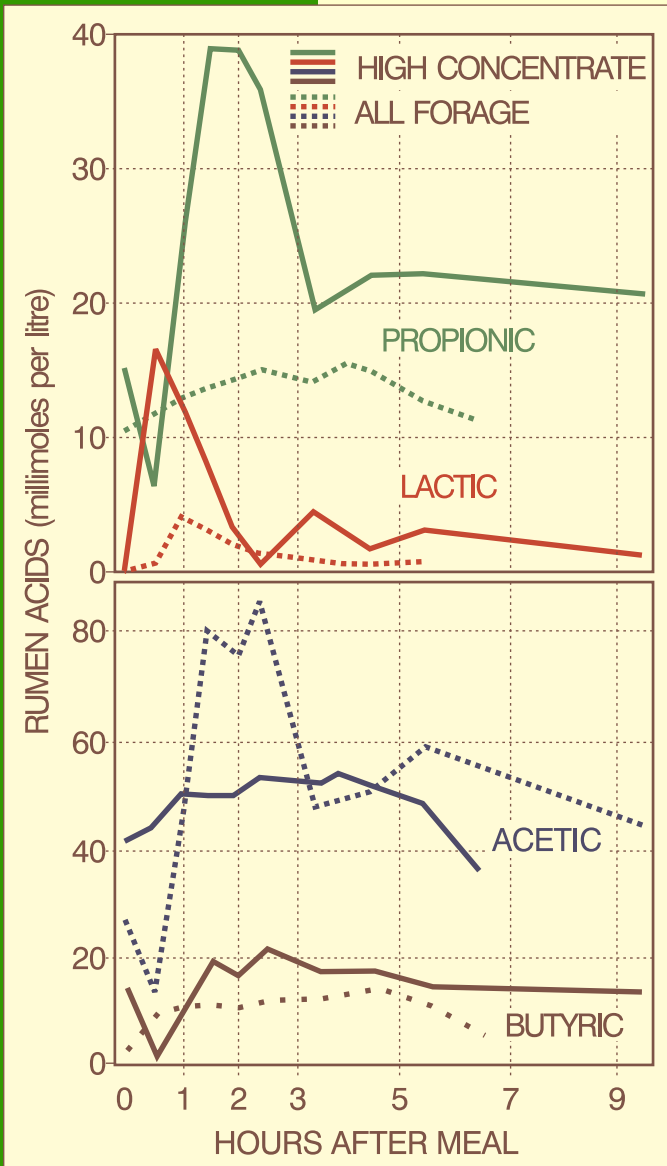
as follows:

	CONCENTRATE:FORAGE	
	50:50	75:25
Total VFA, mM <sup>1</sup>	102.9	104.0
Acetic, mM	59.5	46.9
Propionic, mM	21.2	37.6
Acetic:Propionic ratio	2.89	1.31
Branched Chain VFA, mM	2.50	1.68

<sup>1</sup> millimoles per litre, a measure of concentration

As shown above, VFA levels can be markedly influenced by diet and its effect on the population of fibre-digesting bacteria. High concentrate diets suppress this population, favouring the proliferation of starch-digesting bacteria and reducing acetic in favour of propionic acid production. Reduced acetic acid concentration is associated with a decrease in milk fat test.

Significant concentrations of lactic acid may also appear immediately after ingestion of high concentrate diets as shown in the figure to the left. The subsequent decline in lactic acid concentration is due to its conversion to acetic, propionic and butyric acids. Lactic is a relatively strong acid which markedly depresses rumen pH. Regular ingestion of high starch meals may lead to rumen acidosis as lactic acid causes pH to repeatedly fall below pH 6.



for more information:

[Rumen Acidosis](#), Alberta Dairy Management

[Influence of Concentrate:Forage Ratio and Sodium Bicarbonate on Rumen Fermentation in Early-lactation Cows](#), University of Alberta Dairy Research Highlights