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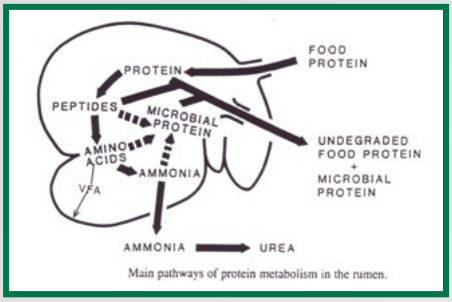
Molasses: Powering the Rumen

Why feed molasses?

The addition of sugars to a rumen diet has a significant effect on both fibre digestion and microbial protein production which are the two key drivers for maximising animal performance.

Whether you are talking about milk yield or daily live weight gain, maximising rumen function and efficiency is key to cost effective performance. Ruminants have evolved to utilise fibre.



Main pathways of protein metabolism in the rumen.

The more that can be obtained from natural forage, the less reliance on the more expensive, bought in alternatives. Maximising rumen function will:

- Generate energy in the form of VFA
- Stimulate the growth of rumen microbes (see table 1)

Approximately 70% of the protein consumed by ruminants is broken down into ammonia which is used by the rumen microbes to produce microbial protein, a major source of nutrients to the animal. With a higher yield of microbial protein less extra protein, in the form of soya or other rumen by pass protein, needs to be fed. Therefore maximising rumen performance helps reduce feed costs.

	Silage Alone	Added Sucrose 6-carbon (from molasses)	Added Starch	Added Xylose	Added Lactose	Added Fructose
Microbial Protein production g/d	64	93	74	82	89	86

Chamberlain 1995 (table 1)

Fibre Digestion

Work from the USA has shown benefits in fibre digestion through the addition of sucrose (6-carbon sugar).

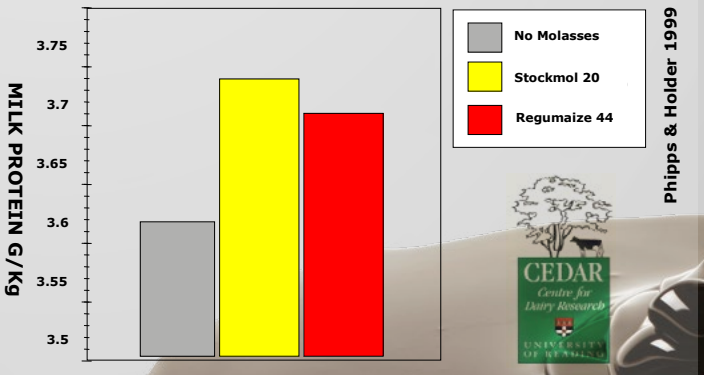
- It is believed that rumen fungi, which play an important role in opening up fibre and allowing it to be broken down more effectively, are stimulated by the addition of the 6-carbon sugars present in molasses.
- The readily fermentable nature of molasses stimulates the rumen microbial population, resulting in increased fibre digestion.

Furthermore, sugars, and in particular sucrose, stimulate the production of propionate (a key VFA in the rumen) by the rumen bugs. Higher rumen Propionate levels are indicative of improved rumen health and energetic efficiency. A healthier rumen leads to better fibre digestion and ultimately improved animal performance. Also, propionic acid is less acidic than acetic acid produced from starch breakdown in the rumen, therefore reducing the likelihood of Acidosis. Propionate is also a key driver for milk protein. Molasses is the most cost effective source of 6-carbon sugar available on farm and is therefore the ideal ingredient to use when looking to increase milk protein.

Sugars & Milk Production

Research work has shown that feeding extra sugar (in the form of cane molasses) in the diet has a positive effect on milk protein yield. (see fig 1)
In the USA, feeding recommendations suggest adding an additional 3-5% more sugar to give an overall ration content of 5-8%. Higher yielding cows typically require higher sugar levels which if not reached lead to a “Sugar Gap”. Achieving this level of sugar in a ration can be accomplished using 1-2kg/hd of a cane molasses product, which is the most cost effective source of sucrose available.

Effect of Sugars on Production (fig 1)



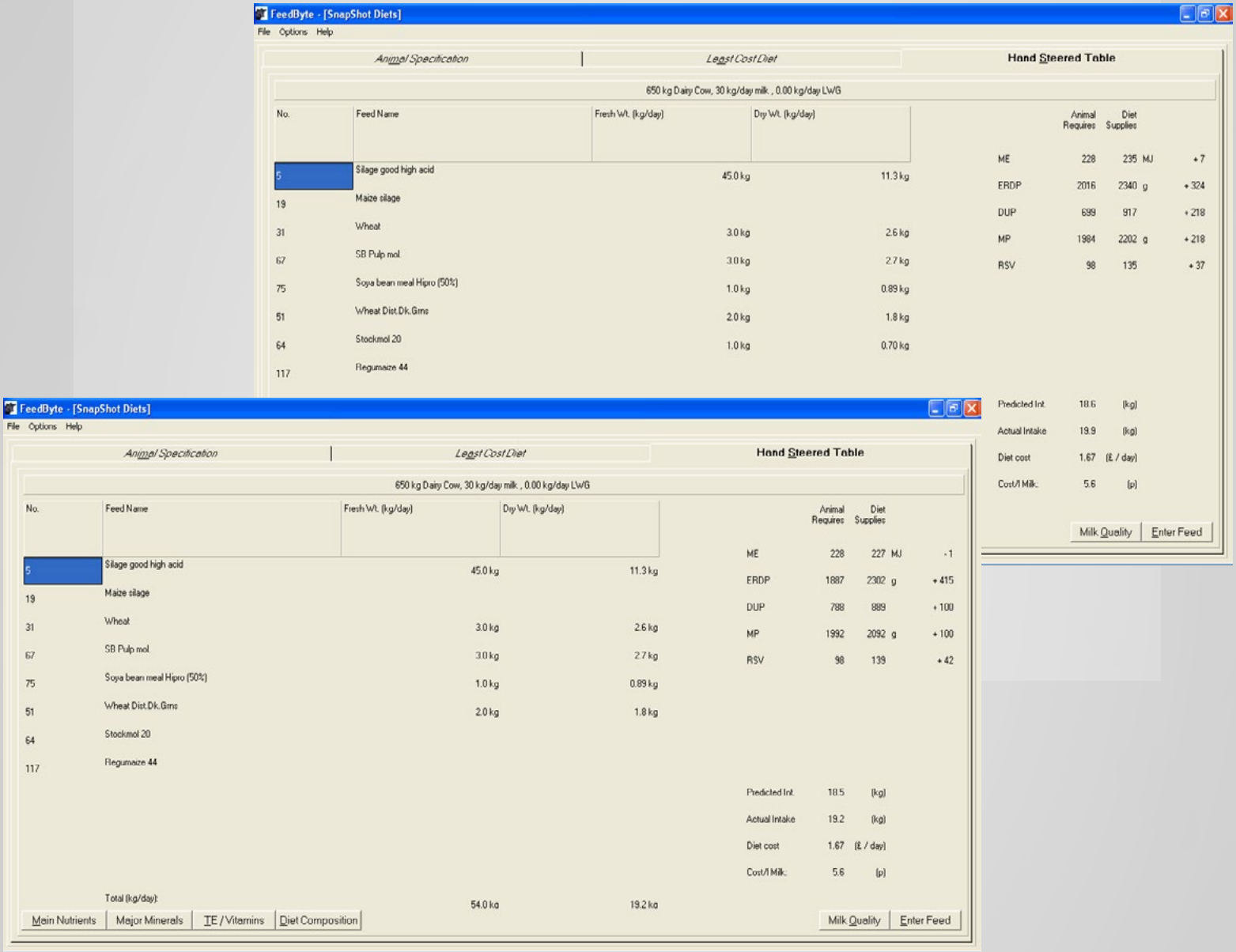
CEDAR Centre for Dairy Research

Molasses a Protein Source?

Trial work has shown that the actual source and type of sugar has an effect on microbial protein synthesis. As can be seen from the table below, adding Sucrose (from molasses) is the most effective way of increasing microbial protein synthesis while the addition of starch is the less effective.

This is effectively illustrated by using the SAC Feedbyte ration package. By adding 1kg of Stockmol 20 (which in itself is not a high protein feed), rumen microbial protein production increases from 2092g to 2202g, an increase of 108g of protein.

This comparison underlines the benefits of not relying solely on cereals to supply energy to the rumen, but additionally providing a good level of sugar, ideally as sucrose. Further work has highlighted that 5-carbon sugars such as xylose, arabinose and ribose have a lower ruminal and intestinal digestibility than 6-carbon sugars such as sucrose and glucose. (see table 1)



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