ED&F MAN
EST. 1783

Liquid Products

Molasses: Powering the Rumen

RESEARCH PROVEN

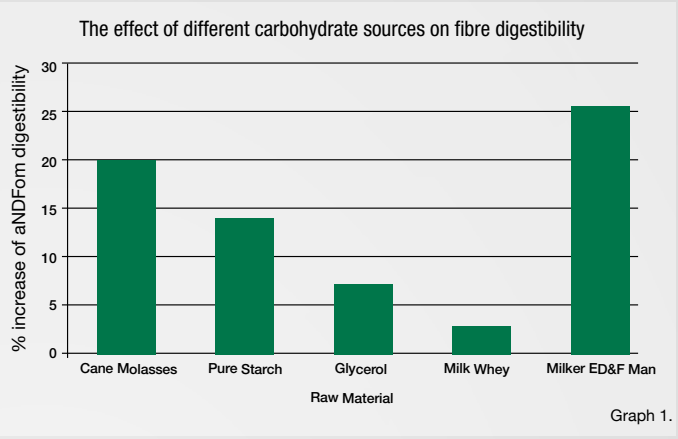
Why feed molasses?

The addition of sugars to a ruminant diet has a significant effect on both fibre digestion (Graph 1) and microbial protein production (Table 1) which are the two key drivers for maximising animal performance.

Feeding a molasses based liquid feed has been shown to stimulate rumen fermentation and microbial activity, leading to an increase in fibre digestion.

Maximising rumen function and efficiency is essential for cost effective production on farm, both in terms of milk yield and live weight gain. By enhancing rumen function, this will:

- Generate energy in the form of volatile fatty acids (VFA's)
- Stimulate the production of microbial protein



Graph 1.

	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

Table 1.

Fibre Digestion

Silage whether it be grass, maize or wholecrop is the lowest cost nutrient supply available to livestock farmers. Therefore, maximising the fibre digestion of home-grown forage is vital for cost effective milk production or live weight gain. Farm trials carried out by ED&F Man have shown significant improvement in fibre digestion (Figure.1) with a 17% improvement in fibre utilisation after using a molasses based liquid feed.

Adding sugar to replace a proportion of the starch has also been shown to increase fibre (NDF) digestibility. Ideally the starch to sugar ratio should be around 3:1 for optimal rumen function. This can only be achieved by incorporating additional sugars. Depending on the base level of sugar in the ration feeding a product such as Stockmol 20 or Molale can ensure the optimum sugar level, and starch to sugar ratio is achieved.

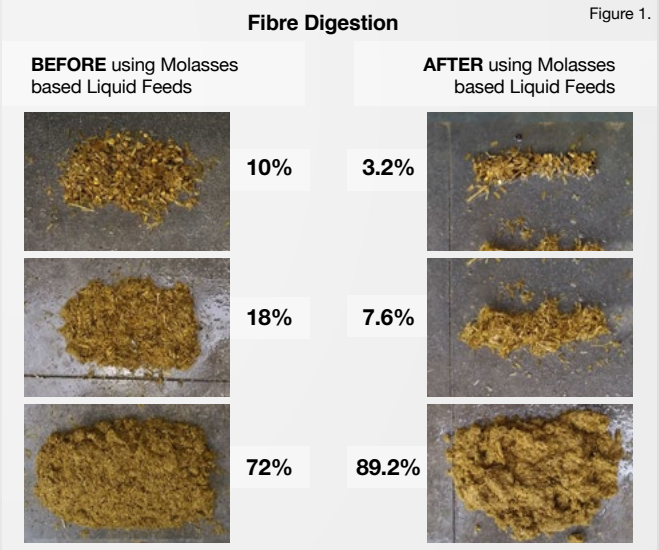


Figure 1.

Sugars & Milk Quality

For many farmers it is critical to improve milk quality in order to maximise returns per litre and improve enterprise margins. An improvement of 0.2% fat and 0.1% protein can result in a significant increase in milk price. Using a molasses based liquid feed can help improve milk constituents by maximising forage intake, improving fibre digestion and optimising rumen function.

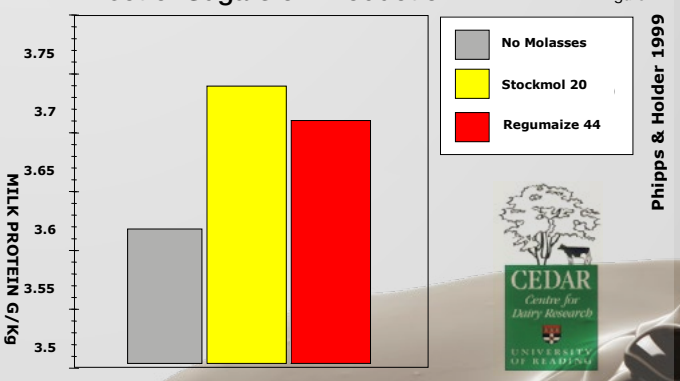


Figure 2.

Published data has shown that milk protein can be increased by up to 0.1% (Figure 2) by adding a molasses blend (Stockmol 20 and Regumaize 44) to the ration. This is due to the molasses promoting microbial protein synthesis within the rumen. Microbial protein is the primary source of essential amino acids for the cow, these amino acids are then utilised by the mammary gland for milk protein synthesis. Over 90% of the proteins in milk are made in the udder from amino acids, glucose and acetate.

Additionally, around 50% of milk fat is made up of short chain fatty acids, which are made in the udder from volatile fatty acids primarily acetate and butyrate. The addition of a molasses blend to the diet has shown to increase production of acetate and butyrate in the rumen and therefore improve milk fat (Figure 3).

Figure 3.

Sugars (% DM)	6.4 (0 % molasses added)	8.9 (5 % molasses added)
Starch (% DM)	36.3	32.9
pH average	5.73	5.87
Butyric (mol/100 mol)	16.7	17.7
Acetic (mol/100 mol)	46.3	46.9
Propionic (mol/100 mol)	28.7	27.4

Martel et al., 2011.

Molasses a Protein Source

Regulated Release is a unique patented process developed by ED&F Man Liquid Products. It is designed to give rumen bacteria exactly what they need to thrive – a balanced and synchronised supply of energy and protein, leading to increased microbial protein production and better animal performance (Figure 4). With a higher yield of microbial protein, less extra protein in the form of soya or bypass protein needs to be fed. Therefore, maximising rumen performance and allowing cost effective production. This was confirmed in published data BSAS 1999 (See Figure 2), a trial was conducted replacing a 1.6kg of rape soya blend with 2kg of Regumaize 44 within a TMR. The results found a significant increase in milk protein (+0.09g/kg), an increase in milk fat (+1.5g/kg), whilst feed intake was maintained. Regulated Release is the only independently trialled high protein molasses blend on the market.

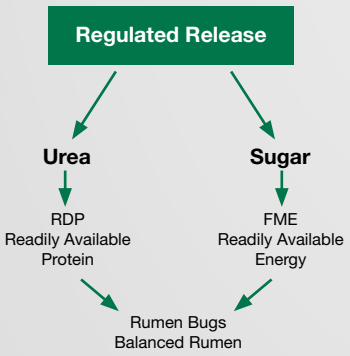


Figure 4.

Approximately 70% of the protein consumed by ruminants is broken down into ammonia in the rumen. It is then utilised by the rumen microbes as building blocks to produce microbial protein, this process requires fermentable energy with the most ideal source being molasses (See Figure 5). Microbial protein is a major source of nutrients to the animal and represents around 45-55% of the metabolisable protein that is available to the animal. Metabolisable protein is used by the ruminant for synthesis of:

- Milk protein
- Tissue protein (i.e muscle structure)
- Enzymes, hormones

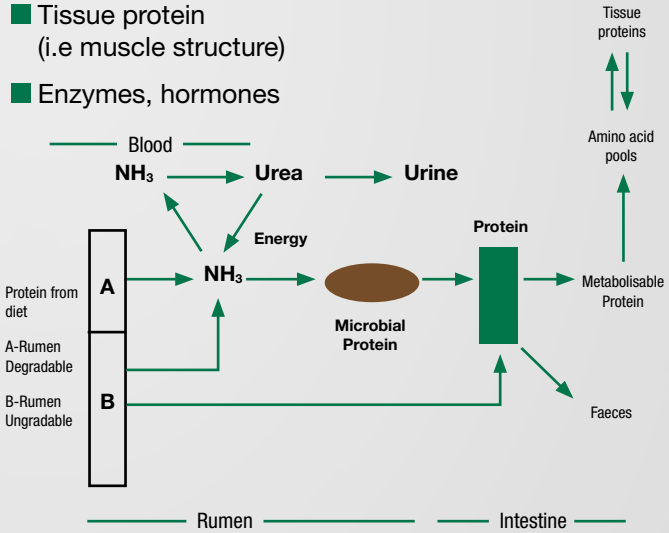


Figure 5.

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