

Can molasses unlock the potential of grass silage?

Faced with some challenging first cuts and rising purchased feed prices, now could be the time to take a closer look at molasses in rations, suggests one UK liquid feed supplier.

Early indications suggest dairy diets will need careful balancing this winter with particular emphasis on rumen health, says Georgina Chapman, technical support manager with ED&F Man.

"This year's first-cut grass silages have higher NDF and lignin contents making the forage more difficult to digest, according to the latest grass silage results," comments Ms Chapman (see table from Trouw Nutrition GB).

"At the same time they are lower in the rapidly fermentable carbohydrates needed to feed the fibre digesting bacteria, which will reduce the contribution from forages and could also have a negative impact on dry matter intakes.

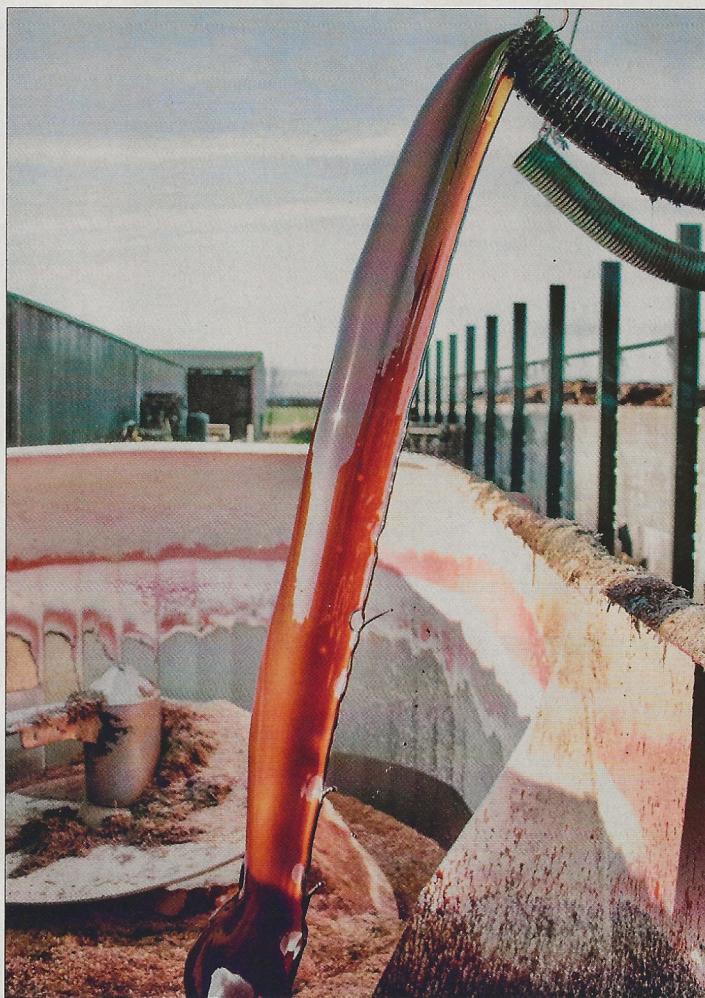
"This points to the need for increased fermentable metabolisable energy in supplements. But with cereals at high prices and silages having a high Acid Load and a low Fibre Index, the choice of energy sources will be important. In addition, we are seeing low Rumen Fermentable Proteins which means that nitrogen efficiency and protein sources will be important.

"Against this background, farmers should look closely at the opportunity to make increased use of molasses and molasses blends containing regulated release proteins as a cost-effective and efficient supplement to improve rumen health and forage utilisation," maintains Ms Chapman.

Molasses is a complex product which contains sugars and numerous organic acids, she explains. The sugar fraction is a blend of different sugars including sucrose and glucose which are the important six-carbon sugars.

"Six-carbon sugars are proven to be more beneficial to dairy cows than the five-carbon sugars found in fermentation coproducts, wheat syrup, processed feeds and silages.

"They are more highly rumen fermentable and more effective at improving fibre digestion, increasing microbial protein production



Molasses contains a blend of important sugars.

and stimulating rumen fungi. Stimulating fibre digestion will be important this year with the high NDF and lignin levels," she says.

Rumen fermentation

Cane molasses also has a significant impact on the rate of rumen fermentation. Sugars are rapidly fermented and most will have been fermented within two to three hours of feeding. But trials show that the rumen fermentation remains more active long after the sugars have gone.

"By promoting faster and more active fermentation, this will increase rumen throughput and so stimulate dry matter intakes. By raising the sugar levels in the diet

to 6% to 8% while holding overall starch and sugar at around 28% to 32%, we can create a more efficient fermentation without increasing the acidosis risk."

Ms Chapman says that this is due to the effect of sugars on volatile fatty acid (VFA) production. VFAs are the fuel for the animal, so higher VFA levels will mean that the cow has access to more energy.

"As well as improving rumen fermentation, sugars also help maintain optimal rumen pH by increasing the rate at which VFAs leave the rumen by stimulating absorption across the rumen wall. Sugars favour butyric acid production too which is a less powerful acid, thereby reducing the total acid load in the rumen and helping

maintain a more stable rumen pH.

Ms Chapman highlights new trials at the University of Reading—supported by ED&F Man—that show the benefits of feeding molasses, both on fibre digestion and also on nitrogen utilisation.

Molasses feeding trials

In the first trial, cows were fed on four diets that contained the same energy and protein content but with differing amounts of carbohydrates. "A control with no molasses was compared with three diets containing Regumix—a 27% protein, 53% sugar liquid feed—at a rate of 0.7kg, 1.4kg and 2.1kg, respectively.

"As the proportion of molasses was increased, NDF digestibility increased significantly, meaning that cows were making better use of forages. Additionally, good rumen health was maintained, confirming that adding molasses does not increase acidosis risk, which is particularly important with high acid load forages.

"We also saw an increase in the efficiency of protein utilisation with more fed nitrogen retained and less excreted, opening the door to lower crude protein diets. Milk urea levels also fell, showing that the regulated release protein in Regumix was effectively utilised by the cows."

Nitrogen efficiency

The second trial has looked more closely at nitrogen efficiency, replacing a proportion of the rape and soya in the diet of mid-lactation cows with Regumaize 44 (a 44% protein, 55% sugar, high protein molasses blend). In the trial diet, 1.6kg of rape and soya was replaced with 2kg of Regumaize 44, reducing the rape: soya ratio by 40% but leaving the total dry matter fed the same. The diets had the same energy and protein contents.

Average early, later and overall first-cut silage results for 2021

Nutrients	Early 1st cut 2021	Later 1st cut 2021	Overall average 1st cut 2021
Number of samples	457	1,605	2,062
Dry Matter (%)	33.7	33.4	33.5
Crude Protein (% DM)	14.6	12.8	13.2
D Value (%)	73.2	71.0	71.5
ME (MJ/kg DM)	11.7	11.4	11.4
NDF (% DM)	41.8	43.9	43.4
ADF (% DM)	25.3	27.6	27.1
Lignin (g/kg DM)	36.0	36.7	36.6
Rapidly Fermentable Carbohydrate (g/kg DM)	215.9	215.2	215.5
Total Fermentable Carbohydrate (g/kg DM)	436.6	453.8	449.9
Rapidly Fermentable Protein (g/kg DM)	94.6	82.1	85.0
Total Fermentable Protein (g/kg DM)	108.5	94.1	97.4
Acid Load	52.5	50.4	50.9
Fibre Index	167.1	176.0	173.9

The change in the diets had no impact on milk yield and butterfat but milk protein was increased, from 3.62% to 3.71% due to the extra readily fermentable energy in the high protein molasses.

“At today’s prices, the diet including Regumaize 44 would be

16p/cow/day cheaper, or nearly £1,000/month for a 200-cow herd,” Ms Chapman comments. “For farmers on a constituent based contract, the additional milk protein would help support milk prices too.

“We would never advocate

a total switch from conventional protein to a high protein molasses blend as this would compromise the total protein balance between rumen degradable protein (RDP) and bypass protein in the diet,” Ms Chapman stresses. “But a partial replacement could go quite a way

to reducing the impact of rising prices.”

To optimise rumen fermentation, she says Professor Mike van Amburgh from Cornell University, speaking on a recent webinar, recommended formulating diets to include 6% to 8% sugar in the dry matter with a high proportion of six-carbon sugars. He commented that sugars in this range improve microbial yield and fibre digestion and advised that sugars can be increased if starch levels are lower.

Dietary starch levels

Ms Chapman recommends starch content should be 22% to 30% in cows 20 to 200 days in milk, falling to 18% to 27% in cows more than 200 days in milk.

“To get the most from higher NDF silages, the starting point has to be optimising rumen function to maximise fibre digestion. Molasses can play a significant part in this and, in addition, could be a cost-effective option, particularly where farms can be set up to handle bulk deliveries,” she concludes.



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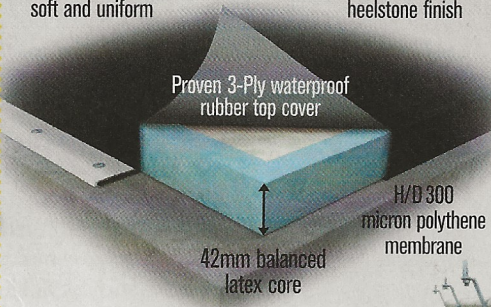
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