

How Sweet It Is: A Molasses Primer

BY MARK LLEWELLYN

What puts the “sweet” in sweet feed? Molasses, of course. Molasses has been an ingredient in livestock and poultry feeds since the nineteenth century. One of the earliest accounts reporting the use of molasses in cattle feed was published in 1890. In time, molasses became a common ingredient in swine and horse feeds. In an 86-year-old bulletin titled *Feeding Horses*, the United States Department of Agriculture listed molasses as a popular feedstuff among horsemen in regions of the country in which sugarcane was easily grown.

Processing

Sugarcane, a stout perennial grass cultivated in warm regions, is the leading source of sugar in the world. Once sugarcane is harvested from the field, the stalks are taken to the mill and fed between huge rollers to extract the sugary juice. This juice is boiled vigorously to induce evaporation of water and crystallization of sugar. A centrifuge is then used to separate the sugar crystals from the liquid fraction. The thick brown liquid left after the sugar crystals are separated by centrifuging is molasses.

To derive as much sugar as possible from each stalk, a small amount of hot water is added to the crushed sugarcane, and it is again run through the rollers. This rinsing-and-squeezing routine is repeated two more times. Molasses derived from the first two extractions and spins is the highest quality and is used in human foods. The third extraction yields blackstrap molasses, the lowest grade of molasses and that typically used in livestock feeds. For every 100 tons of sugarcane processed, three to four tons of molasses is produced. Molasses can also be procured from processing other plants rife with sugar, such as sugar beets.

One important measurement of molasses is Brix. Named after the Austrian scientist Adolf Brix, the Brix scale is used solely for pure sucrose solutions and graduated so that its readings at a specific temperature represent the percentage of sucrose, by weight, in a solution. In addition to sucrose, molasses contains other sugars such as glucose and fructose, so the Brix scale is not completely reliable for measurement of total sugars in molasses. In the molasses community, therefore, Brix is representative of specific gravity. In the United States, for instance, the standard Brix of molasses following dilution is 79.5°F. Prior to dilution, the Brix of molasses is typically 90°F. This product, called high-Brix molasses, is much too thick to use in livestock feeds.

Viscosity is also important to molasses producers and feed manufacturers. Simply put, viscosity is the measure of resistance to flow, its thickness or thinness. Numerous factors may affect the viscosity of molasses. Characteristics of the sugarcane, such as its variety or maturity, may affect viscosity, as may peculiarities in processing and environmental temperature. In general, viscosity is reduced by heat and increased by cold.



Horse Feed Ingredient

Manufacturers of horse feeds use molasses to improve palatability, reduce dustiness, eliminate or decrease sorting of certain components in a textured feed, aid in the pelleting process, improve mixing integrity of a concentrate, and add nutrients or other ingredients to a ration.

Feed manufacturers rarely use undiluted blackstrap molasses in their mills. Most cut the molasses with one or more of the following ingredients: corn steepwater, condensed molasses solubles, soy solubles, distillers solubles, brewers solubles, lignin sulfonate, or condensed whey. The dilution of molasses with any of these ingredients lowers the viscosity of the liquid, making it easier to handle and less destructive to mill equipment. These additives have secondary benefits: corn steepwater may add a bit of pro-

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tein; brewers, distillers, and condensed molasses solubles are rich in some B-vitamins, including hoof-building biotin, and amino acid precursors; and lignin sulfonate and condensed whey may aid in pellet binding. Mold inhibitors, flavorings, vitamins, trace minerals, and fat are sometimes added to molasses as well.

Prices

Wholesale prices for feed-grade molasses differ based on geographic location. In early 2002, for instance, blackstrap molasses in New Orleans and southern Florida was priced at \$65 and \$77.50 per ton, respectively. Higher prices occurred as molasses was shipped further from production centers, with the Baltimore and Philadelphia markets paying \$90 per ton. These prices are based on 171 gallons per ton; each gallon would weigh approximately 11.7 pounds. The cost per gallon varies depending on price per ton. For a \$65 ton, for example, price per gallon would be 38¢.

Nutritional Contributions

What nutritional contributions does molasses make to a feed? Undoubtedly, molasses increases the energy load of a feed due to its sugar content. In fact, its energy content is comparable to oats, although energy in oats is afforded by starch, not sugar. Additionally, molasses contains significant dry matter, up to 85%. Molasses tends to be high in calcium because lime (calcium hydroxide) is typically used during sugarcane processing. Other than this, it offers little in the way of nutriment. Low to nil

quantities of protein, fiber, fat, minerals, and vitamins are present in molasses.

The Practical Side

The amount of molasses used in sweet feeds tends to depend on the region in which the feeds will be used. In the northeastern United States, a sweet feed may contain 7-10% molasses. In the West, however, a similar textured feed may contain 4-7% molasses. Molasses content should not exceed 12-15%, as the feed becomes too sticky and difficult to handle. As a binder in pelleted feeds, no more than 3.5 to 5% molasses should be used. More than this may make the pellets too mushy, and less may cause the pellets to be crumbly.

Some horse owners reject the use of sweet feeds, citing the tendencies of molasses to harden in the winter, thus creating an impenetrable brick that is impossible to scoop, and to draw pesky flies in warmer months. Feed manufacturers usually temper these complaints by using less molasses in batches of feeds during extreme weather. In hot, humid weather, the amount of liquid molasses should be reduced to about 5% of a loose grain mix. If more is used, mold may proliferate. Mold inhibitors are often added to molasses in the summer prior to being mixed into a textured feed.

Molasses may have a place in the treatment of horses unwilling to eat. Small amounts of feeds coated with molasses may be too irresistible for an anorexic or ill horse to refuse. Molasses can provide much-needed energy to an ailing horse.

Molasses is a time-honored ingredient used in most commercial feeds. While the majority of horses will never encounter a physiological problem connected with eating molasses, the occasional horse in two subsets – the young and the old – may. Recent research has indicated that young horses given sweet feeds (grain mix plus molasses) may be at higher risk of developing orthopedic disease than peers fed pelleted or extruded concentrates of the same basic formulation. A correlation between osteochondritis dissecans (a type of developmental orthopedic disease) and glucose intolerance (abnormally elevated blood glucose and insulin following a sweet feed meal) in foals genetically predisposed to skeletal problems is being investigated.

On the opposite end of the age range, feeds containing more than 3% molasses should be used with caution in aged horses with documented pituitary dysfunction. Horses with pituitary problems often have hyperglycemia (excessive sugar in the blood). Feeding high levels of molasses will likely exacerbate this condition.

Molasses has been used in horse feeds for over 100 years, and it will likely retain its prominence among feed manufacturers and horse owners for years to come. One thing is certain: the horses will not complain! ☺☺