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USE OF SUGAR BEET WASTE IN LIVESTOCK

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ABSTRACT:

It is known that during the processing of sugar beets, production wastes are formed in the form of fresh and dry sugar beet chips (pulp), residues of sugar syrup-molasses and crushed parts of beets. All of them are rich in energy, contain a number of nutrients and biologically active substances. The use of these products is recommended for feeding low-producing cows and replacement calves.This article provides guidelines for the use of sugar by-products in cattle feeding.

KEYWORDS: sugar beet, bagasse, molasses, shavings, by-product, feeding, diet, production

INTRODUCTION:

Sugar production produces a variety of by-products that are used in feeding cattle. According to the production technology (see diagram 1), sugar beets are washed, crushed and diffused (washing out sugar and dissolving it in water). This solution is heated to 73-78 ° C. The raw juice containing sugar is separated from the crushed beet pulp (pulp), the main by-product of sugar production. Raw juice is purified from sediment using limestone and carbon dioxide. The purified juice contains about 12-15% of dry matter and is evaporated to obtain a thick syrup. Then sugar crystallizes from this syrup. The remains of the syrup from which the sugar was obtained is molasses, another valuable product in livestock feeding. About 35 kg of sugar, 540 kg of raw pulp and 40 kg of molasses are obtained from a ton of sugar beet.

Sugar beet chips, after the sugar has been extracted from them, leave production in a liquid state, with a water content of about 90% and at a temperature of about 70 ° C. Some of the water is removed by squeezing. So get raw pulp with a dry matter content of 20 to 30% and at a temperature of about 50 ° C. This product is fed to animals fresh or ensiled.

Fresh beet pulp should be fed in 1-3 days to prevent spoilage.

During transportation, pulp, especially in large quantities, cools slightly, so it is very important to silage it directly from the transport, without intermediate storage. This avoids loss of nutritional value, contamination, and also stimulates the process of "hot fermentation".

Despite the fact that the pulp contains relatively little dry matter, the pulp is classified as a raw material that is easily silage. For the silage process to proceed optimally, it is important to quickly and cleanly fill the silage

container, compact it tightly, and close it quickly and efficiently from the air. It is important to remember that the height of the trench should not be higher than 2 meters to ensure even cooling. The temperature inside the silo trench decreases gradually, by about 1 ° C per day. The silage trench is opened and the silage pulp is fed 6-8 weeks after the final cooling. It is very important that the speed of extraction of pulp from the trench is higher than 0.2 m per day in winter and 0.4 m per day in summer in order to avoid spoilage.

Pulp is low in protein, high in energy and has an average crude fiber content (see table 1). The basis of crude fiber is cellulose and pectin, which are very important for normal rumen function. Pulp is a very valuable feed for lactating cows as it provides energy to the rumen but does not contain starch. The diet of these feed raw materials includes from 2 to 6 kg of dry matter per head per day.

Dry pulp contains about 90% dry matter. The advantages of this product over the previous one are easy transportation. Dry pulp is included in the composition of feed for cows and young cattle.

Another by-product of sugar production from sugar beet. In a sugar factory, pulp is mixed with molasses and then dried. After drying, the mass is granulated, usually through a 12 mm diameter die (coarse granule). Molasses pulp contains even more energy than dry pulp. Depending on the amount of molasses introduced, the sugar content in the final product is between 13 and 28%. The rumen degradation of this feed is uniform, due to which it is well absorbed by animals.

Picture №. 1. Dry molded pulp

There are very different products on the market, so you need to monitor the sugar content in the molded pulp, and if the sugar beet is heavily contaminated with soil, there may also be an increased crude ash value. The sugar content must be at least 10.5%. The proportion of crude ash should be about 3.5% of dry matter, maximum 4.5%.

It is important to pay attention to the hardness of the pulp. It depends on the addition of molasses. For this reason, there are “mini-granules” on the market made of low-melted pulp, which is simply much less durable. The sugar content of such granules is correspondingly lower.

The molded pulp is well suited for feeding replacement young stock on grazing, in an amount of 1.5 to 3 kg per head per day. It is included in the diet of dairy cows in the amount of 2-4 kg. For businesses that harvest a lot of grass silage, this feed is a good energy supplement to the protein-rich staple feed.

Table 1. Nutritional value of sugar by-products from sugar beet

Indicator Raw	Raw pulp	Dry pulp	Molasses pulp	Molasses
Dry matter, g / kg	200,00	906,00	900,00	773,00
Crude ash, g / kg DM	60,00	55,19	80,00	97,02
Crude protein, g / kg DM	115,00	97,13	120,00	126,78
Crude fiber, g / kg DM	205,00	198,68	183,33	0
Sugar, g / kg DM	17,00	52,98	177,78	623,54
Crude fat g / kg DM	12,00	6,62	8,89	0
Net energy of lactation, MJ / kg	7,49	7,49	7,64	7,73
Exchange energy, MJ / kg DM	12,02	11,99	12,15	12,11
Assimilated protein (nXP), g /kg	159,30	155,34	162,42	158,41
Rumen nitrogen balance, g / kg	-7,10	-9,32	-6,79	-5,06
Calcium, g / kg DM	10,00	9,71	9,78	6,47
Phosphorus, g / kg DM	1,50	1,10	0,89	0,39
Sodium, g / kg DM	2,75	2,41	1,89	12,03
Magnesium, g / kg DM	4,50	2,52	2,53	0,26
Potassium, g / kg DM	7,00	13,25	10,00	59,51

Molasses pulp is a standard component for the production of feed for dairy cows.

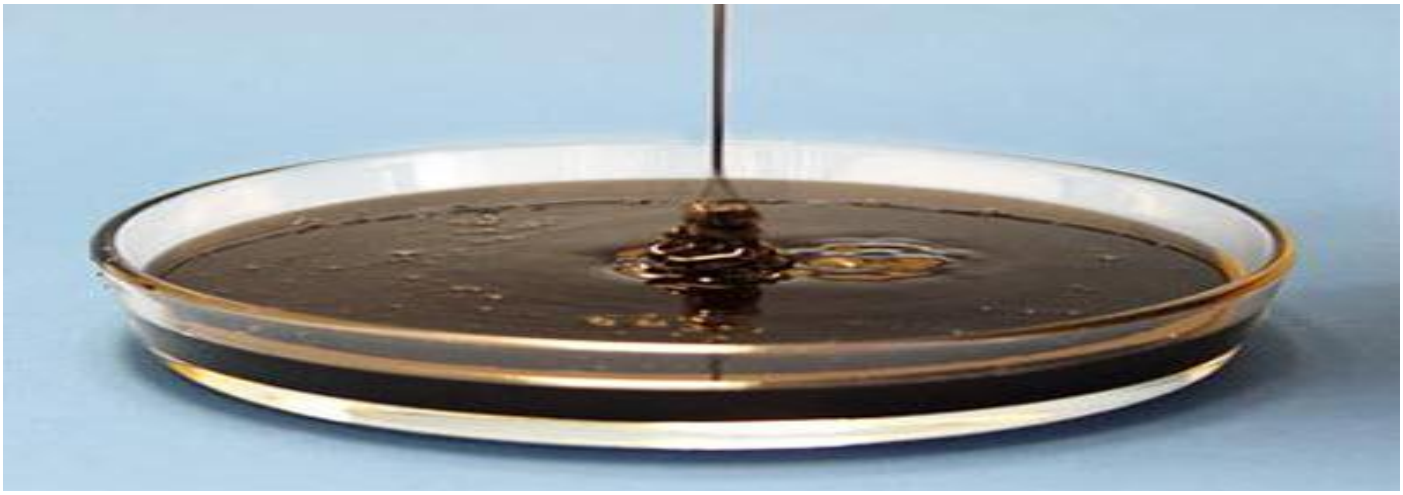
Also, this feed is a very good sorbent: 1 kg of dry pulp binds 2-3 liters of liquid. Therefore, it can be used to prevent sap loss, for example, when ensiling wet grass (4. or 5 mows). The grass is ensiled in layers, with a thin layer of molded pulp. For the same purpose, pulp can be used for silage of beer grains.

Molasses is a by-product of sugar production. It is dark brown or black syrup.

The dry matter content of molasses is 70-75%, the sugar content is about 50%. Sugar is responsible for the high energy content of this raw material. To improve the fluidity of molasses, water is added to it, then the dry

matter content is reduced. In practice, molasses with a dry matter content of less than 50% is often found, which, of course, reduces the amount of energy in this raw material. Therefore, it makes sense to check the molasses for dry matter content.

Molasses contains no crude fiber and has about 10-12% crude protein. Molasses is widely used in feeding; it significantly improves the taste of the diet. It is often fed in combination with straw. Dairy cows receive no more than 1-2 kg per day due to the high sugar content. Almost all industrial feed for cattle includes molasses in the amount of 5 to 10%.



Picture №. 2. By-product of sugar production molasses

Also, molasses can be used as a means for silage for raw materials with a low sugar content (below 6% sugar in dry matter) in the amount of 30-40 kg per ton of silage. But its efficiency in comparison with modern means for silage is extremely low.

By-products of sugar beet processing are high-energy raw materials with a low crude protein content and a pronounced negative nitrogen balance in the rumen (-4 to -9 g N / kg DM). This raw material is rich in calcium and potassium, which means that it is not applicable in feeding dry cows (with the exception of molasses in special cases).

Shredded beet pieces are a new product that sugar factories have recently begun to offer to agricultural producers. It is a mixture of chopped tails and sugar beet heads. The dry matter content of this product ranges from 12 to 18%. The digestibility of silage from chopped parts of beets is similar to silage from sugar beet tops, it contains about 6.3 MJ CHEL or 10.3 MJ OE per kg DM. The nutritional value of each individual batch is highly dependent on its raw ash content.

Sugar by-products are an interesting feedstock for livestock. Pulp in various forms supplies cheap and highly valuable energy in the form of cellulose, hemicellulose and pectin. These foods are slowly digested in the rumen and are gentle on rumen microorganisms. The use of these products is recommended primarily in diets with protein-rich staple foods. Also, in feeding low-productive cows (for example, in the 3rd lactation period), cereals can be completely replaced with pulp. Beetroot products vary greatly from manufacturer to manufacturer. Therefore, in each specific case, it is important to research these products for the content of dry matter, sugar and other nutrients.

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