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MODERN TECHNOLOGIES FOR PROCESSING SOY AND THE USE OF PROCESSING BY-PRODUCTS

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ABSTRACT:

The practice of including soybeans and their processed products in diets for dairy cows has become quite common. They are a valuable source of essential amino acids and are suitable for any diet that contains roughage. Depending on the processing technology, soybeans can provide the diet with high quality protein, digestible, non-digestible and soluble protein, energy, fat and fiber.

KEYWORDS: soybeans, volume, oil, meal, animal husbandry, compound feed, feed mixture, cake.

INTRODUCTION:

Soy is now one of the most profitable crops on the world market. The growing demand for this crop has caused a real "soy boom" around the world. Soybeans began to grow even in those regions that were considered absolutely unsuitable for soybean cultivation.

Soybean oil and meal production volumes have increased by 65% over the past 5 years. Almost all soybean oil is exported, while meal is in demand both in foreign markets and domestically.

In response to the growing needs of the world's population for protein food, agrarians annually increase the area for soybeans. Soy is a source of complete protein that can compensate for the lack of meat, fish, milk or eggs in the diet. Soybean meal is used as a high-protein feed in livestock and poultry farms. And also as a raw material for biofuel production. Considering the above, the demand for soybeans and its processed products in the coming decades is beyond doubt.

The price of soybeans and products of its processing is constantly growing. All over the world, many farmers are beginning to invest in soybean processing, since it is very profitable for a real owner to receive additional income not only from growing soybeans, but also from its processing.

This is the most profitable way to process soybeans for a livestock farmer. Since the fat content in soybean meal should be minimal for feeding farm animals, a way suggests itself - to squeeze oil from soybeans and sell it, and use the meal for internal needs.

To extract vegetable oil from soybean seeds, various technological equipment is used that differ in price, performance, etc. - from small simple presses to complex high-performance plants with minimal human

intervention in the production process. The quality of the resulting oil strongly depends on the quality of the input raw materials and production technology. For nutritional purposes, it is important to obtain an oil with high nutritional quality and a pleasant taste.

Typically, basic production options are used, differing in the percentage of oil yield and its quality:

1) Single hot pressing.
2) The oil yield when using the best presses is up to 85%. The result is an intensely colored oil with a pleasant odor (due to the substances formed during heating).
3) Hot pressing + re-pressing. Oil yield - up to 92%.
4) For re-pressing, special Second pressing expellers are used, for example Sterling Rosedowns.
5) Hot pressing + chemical extraction. Oil yield - up to 98.99%. After chemical extraction of oil, the meal should contain no more than 1% solvent.

In the future, so that the soybean oil is better preserved and does not go rancid, it is refined and brought to consumer conditions (refining, etc.). Most large crushers and biodiesel plants use hot pressing in conjunction with chemical extraction to maximize oil yield. For most feed mills and farmers, investing in soybean oil chemical extraction equipment will be unprofitable because it is very expensive, explosive and bulky. Better to use quality single hot press / wringer machines.

Soy is one of the most important components of any compound feed. It is especially beneficial to establish soybean processing (and this will bring great profit) in two cases: first, if the agricultural firm (or holding company has large sowing areas for soybeans and, accordingly, high volumes of soybean production; second, if there is any livestock farming on the farm (dairy direction or meat direction, sheep, goats, and especially poultry). In the presence of farm animals, the production of feed based on soybeans will be very profitable. Especially when using intensive technologies and keeping.

Extruded soybeans are exposed to high temperature exposure, during which the product outlet temperature can fluctuate between 132-149 ° C. Extrusion takes place under the influence of heat and pressure on the product for some time. During this process, the soybeans are ground and heated in the extruder screw, from where the product is obtained in the form of a rope. The product is heated by converting mechanical energy into heat under the influence of physical impact - grinding of grains. During extrusion, the fatty bonds of soybeans are destroyed, this can accelerate the passage of fat in the rumen when feeding such a product to dairy cows. Feeding with extruded soy can reduce the fat content of milk.

Table 6 shows the results of studies comparing roasted and extruded soybeans with soybean meal and raw soybeans. At the same time, milk production increased on average by 1.24 kg of milk per day.

Table 1.Animal reactions after eating roasted soybeans

Processed soybean	Milk quantity	Изменение в количестве жира	Change in fat	Dry matter intake
Fried	3,5 (16)[2]	+0,06 (16)	-0,07 (16)	— 0,02 (16)
Extruded	2,9 (20)	-0,17 (19)	-0,06 (17)	+0,2 (18)

Soybean meal is a complete balanced protein source. It contains all the essential amino acids and is a concentrated source of protein and energy. In addition, this feed contains less fiber than other oilseeds.

There are two main types of soybean meal. One of them is made using the technology of direct washing out of the oil with an organic

solvent, resulting in a meal with a crude protein content of 44%.

By adding regular soybean meal to the diet, we provide it with breakdown protein. However, only a small amount of it is "saved" from the scar. Heating or processing soybean meal promotes chemical reactions between sugars and amino acids, which increase the protein value of the product. Depending on the method of processing, the amount of rumen insoluble protein can vary between 50-70%.

There are currently no studies on the use of calcined soybean meal in the diets of dairy cows versus roasted soybeans. A minimum of information is available that only concerns the heating conditions for the meal.

We also investigated the effect of processing technology on protein breakdown in the rumen. Two early lactating Holsteins were cannulated to determine how the size of the grind affects the digestibility of soybeans in the rumen. The protein source was raw and roasted soybeans, which were ground or milled.

Table 3 contains indicators of the effectiveness of cicatricial digestibility of soybeans of various processing technologies. Milling the soybean grain increased the total surface area of the particles and promoted the degradation of the substrate by scar microorganisms. The results showed that the digestibility of crude protein of ground roasted soybeans did not differ from ground raw grain and ground soybean meal (Table 2).

Table 2 Efficiency of digestibility in the rumen (%) of soybeans of various processing

	Raw ground soybeans	Raw ground soybeans	Roasted chopped soy	Roasted soybeans
Dry matter	53,2	67,6	53,3	62,5
Gray protein	47,7	63,4	38,8	51,9

Based on these studies, it was concluded that whole / halved and halved / quartered grain grinding is the optimal particle size for rumen. Soy grains, whole or cut in half, with little or no separation in feed mixtures. However, for cereal mixes or other additives, half / quarter grain is best. If the purpose of feeding calcined soybeans is to provide the diet with non-degradable proteins in the rumen, then it is not recommended to use pounded or granulated soybeans in the diet.

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