



ISSN: 2350-0328

**International Journal of Advanced Research in Science,
Engineering and Technology**

Vol. 7, Issue 5, May 2020

Scientific and Technical Solutions for the Provision of Technologies and Equipment for Grinding of Round and Grain Food in Livestock

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ABSTRACT: The article presents the results of the study of using grain food in livestock. It is known to be less resistant to temperature and more resistant to frost and drought than corn. In order to feed the animals and achieve better nutrient absorption it is necessary to achieve a finer grinding rate.

KEY WORDS: livestock, dry hay, crushers, stalks, grain grinder, to feed calves and lambs, mixed feed by livestock

I. INTRODUCTION

It is known that animal husbandry is the main branch of agriculture in Uzbekistan. That is why our state and government pay great attention to the development of animal husbandry.

Particular emphasis is placed on the modernization and accelerated development of agriculture of the Action Strategy for the five priority areas of development of the Republic of Uzbekistan for 2017-2021. It is planned to increase meat production by 105.6% and milk production by 108.1% in the near future due to food security [1,2].

Today, livestock breeding in Uzbekistan is mainly developed on personal helpers and dehkan farms, which feed 8.5 million of the country's cattle and about 15 million of sheep, which is more than 85% of the total livestock [3]. Livestock on private subsidiary and dehkan farms is characterized by low productivity of livestock, high productivity despite low expenditures. However, one of the main problems on these farms is the primitiveness of production and high level of manual labor due to the lack of technical means to meet their needs and requirements, including feed preparation equipment.

In these farms, livestock is fed mainly on dried stalks of corn, alfalfa and weeds (gumay, etc.) and straw. However, feeding livestock by crushing coarse hay and mixing it with mixed fodder leads to an increase in their productivity and good growth [4-7]. Today, due to the lack of small, compact feed preparation equipment used for crushing hay for small farms and mixing them with mixed fodder, hay is fed to livestock without crushing. As a result, about 25-30% of the feed is excreted in the waste, which leads to high losses and low efficiency. In some cases, the hay is crushed by hand-powered grinders and mixed with highly concentrated feeds is also done by hand. This leads to an extension of work and an increase in labor costs.

The existing IGK-30, ISK-3.0 and other crushers for dry hay are designed for large farms [8-10] due to their high metal and energy capacity and high cost. inefficient when used on low-income farmers and personal subsidiary farms.

This, in turn, requires serious attention and the development of mini-feed preparation devices that fully satisfy the personal assistant, farmer and farm in terms of productivity and energy consumption, and in terms of work quality indicators do not lag behind existing large-scale machines.

Research shows that farmers and personal subsidiary plots tend to increase the amount of livestock products as well as the individual use of technical means. Based on this, one of the urgent tasks is to develop a device for individual crushing and mixing of feed, intended for individual use on farms, personal assistants and dehkan farms.

For this reason, research is currently being conducted on the development of hay crushers used for crushing coarse stalks and grain crushers used for crushing forage grains [11,12]. During the research, experimental copies of them were created and their experimental work was carried out.

II. MATERIALS AND METHODS

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Corn, sorghum stalks, alfalfa hay and straw were used in the test operations of the crusher, while corn grain and cotton were used as the processing material in the test works of the grain crusher. During the experiments, it was ensured that they were in the range of 10-14 percent

During the tests, the parameters and operating modes of the crusher-crusher were as follows, ie rotor diameter (at the end of the crusher blade and hammers) - 550 mm, the number of rotor rotations - 1280 min-1; the number of blades - 4, the number of hammers - 20, the distance between the rotor and the casing - 18–20 mm.

The parameters and operating modes of the crusher were as follows: rotor diameter at the end of the crusher blade and hammers - 220 mm, diameter of the crushing chamber - 280 mm, the number of rotor rotations - 3000 min-1; the number of blades - 2, the number of hammers - 2, the distance between the hammer and the crushing chamber - 3 mm.

III. RESULT AND DISCUSSION

During the tests, specific results were obtained in both crushers.

In particular, tests of the hay crusher in the above parameters and operating modes (Table 1) showed that in all types of coarse hay processed, the crushing and cracking of the stalks was at the required level.

Table 1
Operational quality indicators of the crusher

Name of indicators	The value of indicators	
	On the test	According to IR (initial requirement)
The composition of the crushed mass: straw stalks		
- // - length 3... 8 cm,%		
- // - less than 3 cm in length,% corn stalks	86,4	Not less than 80%
- // - length 3... 8 cm,%	13,6	Not more than 20%
- // - less than 3 cm in length,% gumay stems		
- // - length 3... 8 cm,%	84,9	Not less than 80%
- // - less than 3 cm in length,% bedapichani	15,1	Not more than 20%
- // - length 3... 8 cm,%		
- // - less than 3 cm in length,%	87,2	-
	12,8	-
	78,7	-
	21,3	-
Stem cracking: - straw,% -		
corn,% -	98,8	More than 90 percent
gumay,% -	99,2	
hay of trefoil ,%	93,4	
	97,1	

In the crushed mass, 3-8 cm long stalks accounted for 86.4% of straw, 84.9% of corn stalks, 87.2% of gum stalks and 78.7% of alfalfa hay. did. The cracking or crushing of the stems was more than 90 per cent in all types of hay.

In turn, in the tests of the grain grinder in the specified parameters and operating modes, the degree of grinding in the processing of corn grain is 22.9% of the grinding modulus from 2 mm, 46.4% from 2-3 mm, 3 mm from the grinding grain for the first time. the larger ones accounted for 30.7 percent (Table 2).

Table 2
Operational quality indicators of grain crusher

	The composition of the crushed mass	Grinding rate,%	
		cornkernels	cornstarchcornstarch
In transition 1:	2 mm each	22,9	18,2
	In the range of 2-3 mm	46,4	23,6
	3 mm and large	30,7	58,2
In transition 2:	2 mm each	89,3	74,4
	In the range of 2-3 mm	7,5	19,8
	3 mm and large	3,2	5,8

The same rates were 89.3%, 7.5% and 3.2%, respectively, for the second time the crushed material passed through the crusher.

When the corn husks were also crushed in the grain grinder, their degree of grinding was slightly different.

In particular, when the sots were first passed through the crusher, the modules with a size of up to 2 mm accounted for 18.2%, the modules with a range of 2-3 mm for 23.6%, and the modules over 3 mm for 58.2%. This crushed mass was thrown into the crusher for the second time, and after processing, the content of modules up to 2 mm in the obtained feed increased significantly to 74.4%. Modules in the 2-3 mm range were partially reduced to 19.8 percent, while modules larger than 3 mm were significantly reduced to 5.8 percent. Although the degree of crushing of corn husks was significantly increased in the second processing, but in both stages their degree of crushing was rougher than the rate of crushing of the grains. Even in the grinding of grains, the degree of fine grinding was achieved only in the second processing.

IV. CONCLUSION

According to the experimental results of both types of crushers, it can be said that the performance of the crusher designed for processing coarse hay stalks meets the established requirements. However, the mixed feed obtained in the grain grinder is suitable for feeding dairy cows, cattle and sheep older than one year, and in order to feed calves and lambs and to have more assimilation of the mixed feed by livestock, it is necessary to achieve a finer grinding level. In addition, a reduction in energy and other costs can be achieved if the required level of grinding is achieved in one pass of the grain crusher. Therefore, it is necessary to continue the research on the grain grinder and bring its quality indicators to a certain level.

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