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THE FEASIBILITY OF GRANULATING AND BRIQUETTING ANIMAL FEED AND POULTRY FEED

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Modern conditions for the formation of economic relations in the agro-industrial complex provide for the development and introduction into production of small-sized energy-saving mechanization equipment with high operational reliability [1]. Existing means of mechanization, which increase the productivity of the process of creating complete feed and reduce its energy intensity, have a large mass and provide specific energy intensity. The use of such units in small farms leads to unreasonable energy consumption, which increases the cost of feed materials [2].

Bulk feed has disadvantages that reduce the efficiency of its use: low density, hygroscopicity and self-sorting of feed during transportation. The above disadvantages are largely eliminated by granulation and briquetting of mixed feed.

The size of the granules depends on the type and age of animals and birds. For example, the diameter of pellets for young poultry should be no more than 3 mm, for adult poultry in the range of 4-5 mm, for weaned piglets - 5-8 mm, for adult pigs - 8-10 mm. The ratio of pellet length to diameter should not exceed 1.5 for poultry and 2 for animals [3].

Two options for pressing granules are used - “wet” and “dry”, while the feed is affected by heat, humidity and pressure.

With the wet method, the feed is moistened with hot water at 70-80°C before pressing to a relative humidity of 30-35%. Granules from such feed mixtures are pressed on continuously operating screw presses, also used in the food industry in the production of pasta. After the press, the wet granules enter the dryers, where they are dried with hot air to a humidity of 12%. Then the granules are cooled and put into a sifting machine to separate out fine crumbs and stuck together particles [3-4].

Granules obtained by the wet method are durable and can not swell in water for a long time, but the need to dry the granules complicates and increases the cost of their production.

With the dry granulation method, the feed supplied for processing should have a moisture content of no more than 12-14%. Before pressing, the feed mixture is steamed, which increases its temperature and humidity. The temperature of the granules when leaving the pressing chambers is 50-80 ° C, humidity is 13-17%. In this case, moisture acts as a lubricant, ensuring relative movement of particles during their compaction. Cooling of granules and separation of small crumbs from them is carried out in cooling and sorting plants. After cooling, the humidity of the granules is about 14%, and the temperature is 5-6 °C higher than the air temperature [4].

The advantages of the “dry” method of producing pellets are its simplicity, high productivity and preservation of the vitamins included in the feed mixture. Disadvantages include: the complexity of manufacturing matrices and the high energy intensity of the process. Today, granulated feed is produced using granulator presses mainly using the “dry” method [5].

The process of granulation by pressing consists of three independently and sequentially occurring stages: 1) preparation of the material; 2) pressing of the material (formation of granules); 3) cooling of granules and separation of crumbs. Compound feed in granulators is rolled and squeezed out due to frictional forces that arise when pre-compacted feed passes through the openings of the pressing chamber. [5-6]

During briquetting, feed particles become so close to each other that the forces of intermolecular attraction become noticeable and lead to the strengthening of the product. An indicator of briquette density is the compaction coefficient, which depends on pressure, physical and mechanical properties of the pressed product and the presence of binders (molasses, etc.) in it.

Press installations used in powerful feed mills are not advisable for use on small farms. The

solution to the problem is possible by developing a design and technological scheme for small matrix presses, which will provide animals and poultry with complete granulated feed.

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