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THE CHOICE OF A DESIGN OF THE DEVICE FOR PRODUCTION OF COMPOUND FEED

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In the work the analysis of the equipment and technology of its production for production of the granulated forages is carried out, it is shown that the most responsible element is the matrix. Ways of increase in its resource are planned.

One of the main objectives which face agriculture [1] is the possibility of consumption by the population by 2020 of meat products per capita more than 75 kg. The solution of this important economic task can be promoted by intensive development of a food supply. At the same time, the important part is assigned to production of formula-feed products – complex uniform mixes of different fodder means for full feeding of animals. Its growth in comparison with 2009 has to be 41,9%. It is possible to carry to the main advantages of use of compound feed: creation of a type of a forage with certain physicochemical properties; high nutritional value as in them different feeder components and additives are evenly distributed and concentrated (molasses, vitamins); mechanization and automation of distribution of forages is facilitated; expenses of forages as a result of decrease in losses of a mealy part of compound feed during the transporting and distribution are cut down. It will give the chance to provide balance of forages and to reduce their cost value. The conducted researches showed [4] that use of the balanced compound feeds increases productivity of animals on 10 ... 12%. Therefore, the researches directed to improvement of the equipment for production of formula-feed products have relevance.

The purpose of the work is the analysis of design features and results of researches of the equipment for production of the granulated forages taking into account requirements imposed to sterns and technologies of their production.

It is possible to carry on the main requirements which are imposed to the operation of cars for production of compound feeds: fineness of grind, size of a mass fraction of not ground seeds, a mass fraction of moisture, lack of the remains of packed compound feeds in the press for their production.

The carried-out analysis showed that the greatest contribution to development of production of compound feeds was made by prominent scientists A.P. Dmitrochenko, N.I. Denisov, S.S. Elenevsky, A.S. Yemelyanov, A.A. Zubrilin, P.D. Pshe-nichny, A.S. Solun, M.F. Tomme.

For the production of formula-feed products [2–7] two constructive versions of cars found distribution: extruders (with horizontal giving of components of compound feed) and grinders (with vertical giving of components of compound feed). The main part of an extruder – the screw, a special design rotating in the body which moves and compresses raw materials from the entrance feeder to a lattice matrix, and then to a die hole through which goes further on a technology chain. It should be noted that due to friction of the moved material about an extruder part temperature can reach 200⁰ C that corresponds to the lower bound of range of temperatures of the lower issue staly that also complicates operating conditions of parts of an extruder.

The most technology difficult in production and loaded is the matrix which represents the tempered disk (temperature of tempering 800 C with the subsequent cooling in water) made of steel 40X (σ_T of =395 MPas, HB 187-229, $K_{UV} = 1,2$ and $K_{UB} = 0,95$), equipped with a set of the through openings (diameter from 3 to 6 mm depending on matrix thickness) reamed on depth up to 5 mm executed on concentric circles with a certain step. Production of a matrix with ensuring exact coordinates of openings can be carried out, for example, by means of a dividing head on the vertical milling machine. At the same time it is reasonable to carry out drilling of openings with application of the conductor in the presence of cutting fluid. Such approach will allow to provide exact coordinates and high quality of the drilled openings.

When using grinders with vertical giving of components of compound feed for formation of granules the matrix on which the rollers crushing the arriving initial components are rolled is also used. At the same time the matrix will also be the most loaded element.

For the analysis of the intense deformed condition of a matrix it is reasonable to use a finite element method as which it is possible to use tetrahedral pyramids. It will allow to estimate most fully distribution of tension in volume of a matrix.

Thus, the carried-out analysis showed that for production of compound feeds it is possible to carry a research of the intense deformed condition of elements of cars with optimization of the choice of material of

parts of a press to the main directions of further researches of cars, improvement of manufacturing techniques of parts for a possibility of production of such device in small farms, the development of recommendations about decrease in the cost of production and to decrease in labor costs on their production.

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