

ASSESSMENT OF THE UNIFORMITY OF THE COMPONENTS OF COMPOUND FEEDS FOR ANIMALS

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***Abstract.** In the production of completely loose feed, it is necessary to ensure uniform mixing of the ingredients before the formation of compound feed. Achieving the required homogeneity in the production of bulk feed is impossible without taking into account the distribution of the ingredients to be mixed.*

***Key words:** feed, mixer, homogeneity, distribution, evaluation.*

Introduction. The main technological processes in the production of compound feed are grinding, sorting, mixing and compaction. Each technological operation of the general production process should be the basis for the most optimized execution of the next cycle of continuous-flow operations of processing bulk ingredients. Research on the mixing of different materials is mainly aimed at determining the kinetic properties of this process, which characterize the change in the homogeneity of the mixture over time. Despite the fact that many studies have been conducted on this topic, the problem is currently being solved mainly at the empirical level. Pressed feed is less prone to oxidation due to a small active surface, extends the shelf life, reduces labor intensity and reduces losses during transportation [1,2].

Uniform distribution of components is achieved by mixing. Mixing is achieved by mechanical stirring until a homogeneous mass is formed. Therefore, the quality of the mixture is determined by the degree of homogeneity of the mixture. Its minimum value is determined by veterinary requirements:

- for pigs - 85%;
- for poultry - 90%;
- for cattle - 80% (with introduction of urea - 90%);
- compound feed of own production - 90 - 95%.

A large number of particles per unit volume contributes to the uniform distribution of highly dispersed components. At the same time, the process of concentration and sticking of particles will take place in different parts of the mixer. The greater the difference in the physical and mechanical properties of the components being mixed, the longer this process lasts, which makes it mandatory to evaluate the particle size composition and the efficiency of the mixing process when using a mixer. The choice of mixer design depends on the characteristics of the mixed components.

When mixing loose components, gravity is usually used, they are poured and mixed under its action [2,3,4].

Research materials and methods. Since the method of evaluating the weight distribution of the granulometric composition of compound feed includes sieve analysis, a set of eight sieves with pore size was used to evaluate the granulometric composition of the mixture of crushed ingredients of loose compound feed of recipes PC1-18/31 and K55-13/7 using a laboratory sieve machine with pore size FR -1. Weights weighing 100 g were sifted using the sieve classification method: 3.0; 2.0; 1.8; 1.8; 1.5; 1.0; 0.63; 0.50; 0.19 mm [3].

Research results. The dispersion composition was evaluated taking into account the average mass values for each class:

$$m_i = \frac{1}{n} \sum_{j=1}^n m_j \quad (1)$$

where n - is the number of experiment repetitions;

m_j - is the mass of the fraction of particles of this class in each of the n experiments

To assess the accuracy of measurements, statistical characteristics were determined for each class: dispersion, standard deviation and coefficient of variation. The granulometric composition of experimental feed mixtures was statistically evaluated:

- Arithmetic average weighted value of particle size;
- Dispersion;
- root mean square deviation S ;
- coefficient of variation.

Highly dispersed components are easier to homogenize due to the greater number of particles per unit volume. At the same time, the concentration of particles and the process of sticking will occur in different positions of the mixer. The greater the difference in the physical and mechanical properties of the mixing ingredients, the longer this process lasts. The mathematical rationale for achieving uniform mixing, if judged by a single indicator, regardless of the principle of action and construction of the mixer, modes of operation and differences in the indicators of the physical and mechanical properties of the mixed fillers, can be expressed by the equation:

$$P(\tau) = \alpha_c e^{-k_c \tau_c} \quad (2)$$

where: τ - mixing time;

k_c - is a coefficient that determines the design of the mixer, the peculiarities of the mixing process, and with the selected kinematic design parameters, its value is a constant value;

α_c - is a generalized coefficient that takes into account the physical properties of the components of the mixture, their ability to mix.

Conclusions. The stability of the quality indicators of compound feed is determined by a number of factors, the most important of which are the homogeneity of the mixed ingredients and the granulometric composition after passing through the mixer. Equations are proposed that can be used to predict the achievement of homogeneity as a function of time.

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USE OF COMPOSITE CORN FOR FEED PRODUCTIO

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Abstract. Currently, the use of corn components in the production of fodder is based on an approach that includes such areas as:

- preservation of whole and crushed cobs, this involves methods such as drying, ensiling, preservation using chemicals, introduction of air aeration with reduced air temperature;

- the accumulation of crushed grain and its kernel and the formation of a mixture, from cobs to threshin.

Key words: corn, processing, fodder, cobs, canning.

Introduction. In order to preserve corn cobs, they are collected using harvesters when the humidity is 40...45%. Whole or chopped cobs are loaded into storage, compacted and sealed. The most attractive option for storing cobs is to place them in a crushed form in pits or towers. At the same time, the size of the crushed particles should be in the range of 3-4 mm, and not less than 70% and not contain whole grains. When harvesting corn grains and initial mixtures with different amounts of grains and cobs, corn is harvested with grain harvesters. The cobs are threshed when the humidity is 35-