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Results of experimental studies Screw conveyor mixer

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Determined experimentally depending impact of operational parameters of the conveyor-mixer for mixing process. Constructed response surface experimental results of performance and quality mixing parameters Forage mixture of conveyor-mixer.

Conveyor, mixer, performance parameter.

Problem. Mixing of the components is a major agricultural production, which is used in all sectors, including the preparation of seed, seed dressing in, feeding and introduction of trace elements in feed mixtures in animal and more. The widest practical application of acquired auger mixers. These advantages include the possibility of continuous mixing, the short duration of the mixing process, small dimensions, etc. [6]. However, there are some drawbacks, including screw conveyors, mixers do not provide high quality mix.

Therefore, it became necessary to develop a screw conveyor-mixer with vibrating device to combine the mixing auger effect of exposure to vibration to the material in order to intensify the process of mixing and transportation, providing high quality mixing components, cycle time reduction and elimination of "dead zones."

Analysis of recent research. Theoretical dependence and general provisions of the mixing and interaction with bulk materials working bodies are in the works Vasilenko PM [2] Revenko II [4], Plachkova VA [7] Huryka OJ [6], GM Kukty [3], Etc..

The analysis work proved that most often use blade or screw mixer makes the required quality mixing Forage mixture. However, due to vibration can achieve the required uniformity Forage mixture [5].

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Ago **purpose** Data **Research** is to determine the influence of experimental dependencies operational parameters of the conveyor-mixer for mixing process the mixture.

Results. To establish efficient operational parameters of the mixing of bulk materials multivariate experiment conducted by determining the

effect of rotational speed of the screw shaft, fill factor and the oscillation amplitude trough the quality and performance of the mixer mix. Investigation of mixing was carried out according to plan Box-Benkena. This is a type of statistical plans, which are used in the planning of scientific experiments. This plan allows you to receive the maximum amount of objective information about the impact of the factors studied, the production process using the smallest number of experiments. Region Planning - hypercube, each factor takes values at three levels: -1, 0 and +1 [8].

Box-Benkena plans are the plans of the second order, ie they allow to get the regression model as a quadratic polynomial complete:

$$Y = b_0 + \sum_{i=1}^{k} b_i \cdot x_i + \sum_{i=1}^{k-1} \sum_{j=i+1}^{k} b_{ij} \cdot x_i \cdot x_j + \sum_{i=1}^{k} b_{ii} \cdot x_i^2, \quad (1)$$

where Y - the objective function; b_i, b_{ij}, b_{ii} - The estimated coefficients of the model;
k - number of factors (Table 1).

1. Factors and levels of varying the model parameters.

Levels and intervals variation	Encoded value	Factors and their designation		
		Screw shaft rotational speed n, rad / s (x1)	Fill factor ψ, (x2)	A trough amplitude mm (x3)
The upper level	+1	7.3	0.4	2
Basic level	0	6.6	0.35	1
Lower level	-1	5.9	0.3	0
The interval of variation		0.7	0.05	1

The target function Y is selected homogeneity in the first case and the second performance. Matrix planning realized to slow horizontal conveyor screw type mixers with vibrating device. According to the program of experimental research conducted 15 experiments in a fivefold repetition. For independent variables taken: 1. The duration of activation - 60 sec. Step 2. screw - 275 mm. 3. The speed of the shaft mixer - 6.6 rad / s2. 4. The outer diameter of the screw - 250 mm. 5. The oscillation frequency of the vibrator - 50 Hz.

Treatment of experimental data was performed using regression analysis, which is based on the constructed regression equation and determine the contribution of each independent variable on the dependent variation of the studied variable that determines the impact factors on output indicators [9]. As a result tryfaktornoho experiment that characterizes the influence x1, x2, x3 on the quality and performance mix conveyor-mixer considering significant coefficients obtained the following regression equation:

- To determine uniformity:

$$Y = -44,4637 \cdot x_1 - 3709,5732 \cdot x_2 + 70,8286 \cdot x_3 + 3896,004 \cdot x_1 \cdot x_2 + \quad (2)$$
$$+245,033 \cdot x_1 \cdot x_3 + 4291,0832 \cdot x_2 \cdot x_3$$

- To determine the performance:

$$Y = 0,4631 \cdot x_1 - 1473,2453 \cdot x_2 - 4,1233 \cdot x_3 + 1588,2635 \cdot x_1 \cdot x_2 + \quad (3)$$
$$+18,9499 \cdot x_1 \cdot x_3 + 1390,3273 \cdot x_2 \cdot x_3$$

The surfaces Review coded variable factors influence the homogeneity of the mixture (Fig. 1) and the performance of the conveyor-mixer (Fig. 2).

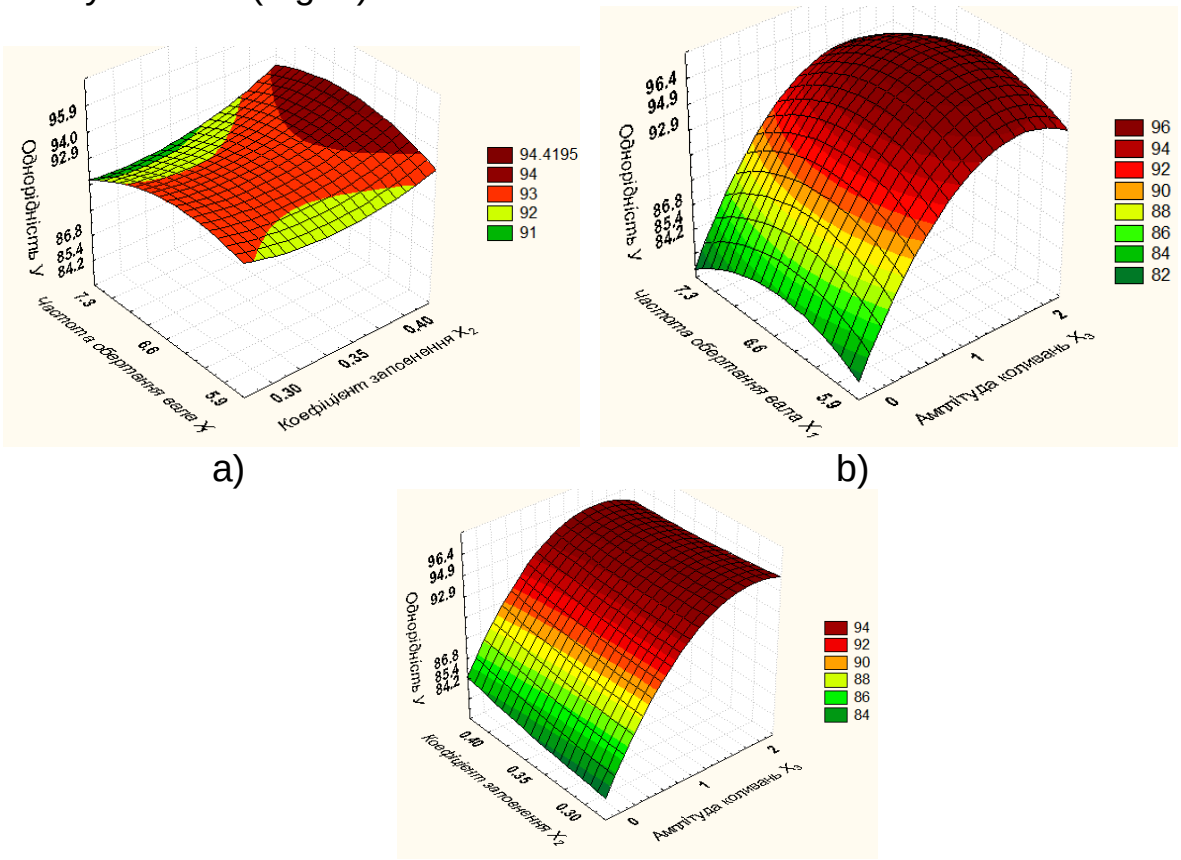

Fig. 1. Dependence of uniformity: a) speed screw shaft groove and fill factor; b) screw shaft rotation frequency and amplitude of oscillation trough;
c) trench fill factor and amplitude fluctuations groove.

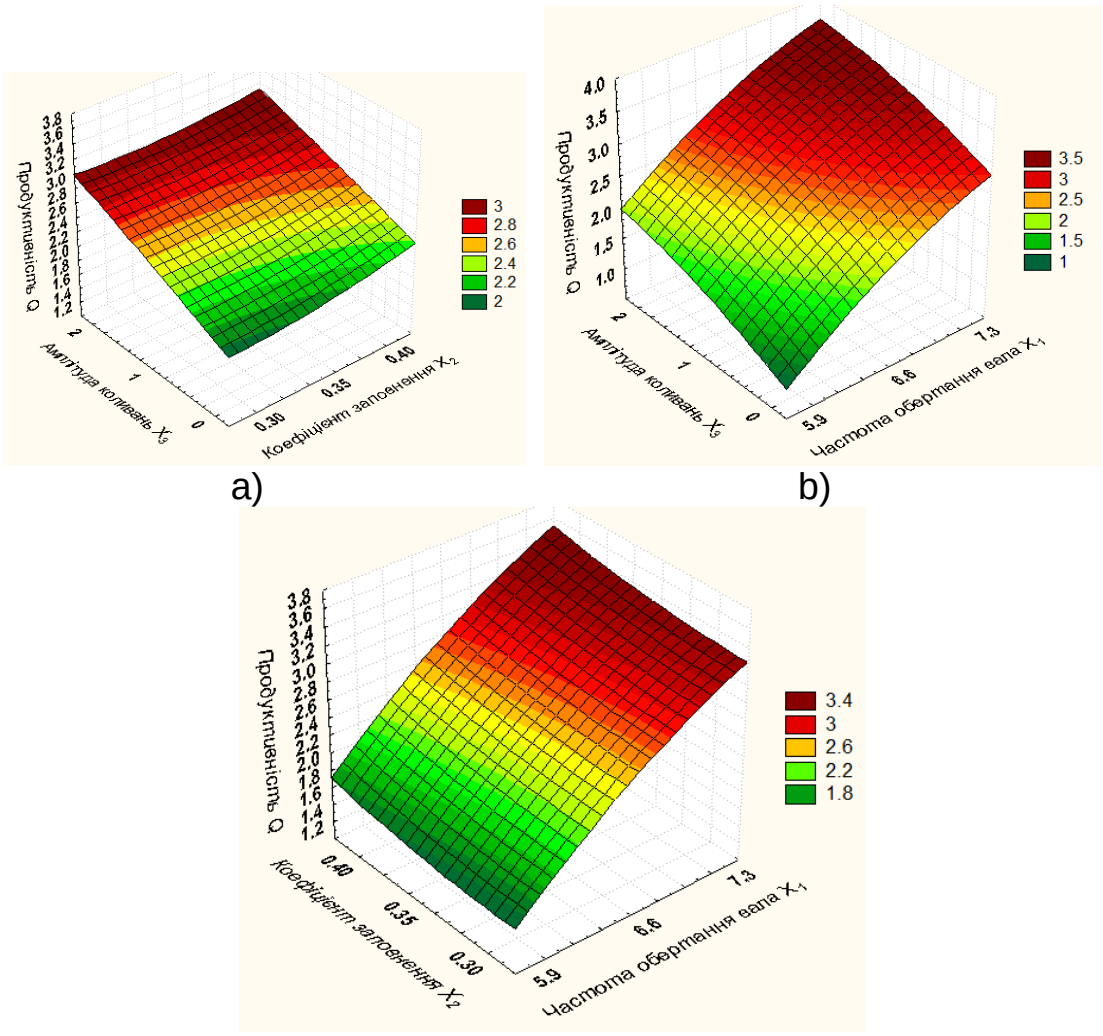

Fig. 2. Dependence of performance: a) amplitude fluctuations gutters and gutter fill factor; b) the amplitude and frequency of oscillation trough screw shaft rotation; c) trench fill factor and amplitude fluctuations groove.

Analyzing the equation surfaces graphically presented in Fig. 1, it can be argued that the quality of the mixture affect all the above mentioned factors. The increase in the oscillation amplitude trough (ie vibration) has a significant impact on the homogeneity of the mixture whose value reaches 96%.

Also it should be noted that uniform mixing without vibration does not meet zootechnical conditions [1], Because the quality indicators constitute 82-84%.

As a result, we can say that the homogeneity of the mixture increases with simultaneous increase in rotational speed screw, fill factor and the oscillation amplitude trough.

The results of experimental studies and graphic dependence (Fig. 2) show that increasing the frequency of rotation of the screw, the

oscillation amplitude and fill factor increases productivity trough conveyor-mixer.

From Fig. 2 also shows that a significant impact on the performance of the mixer is the oscillation amplitude trough. It was found that with increasing oscillation intensified the process of moving bulk materials, providing increased performance. The final stage of the mathematical treatment of experimental data is to determine the optimal parameters of the experimental setup.

Thus, the rational mode of screw mixer meet the following parameters: speed rotor ω = 6,6 rad / s, the groove filling factor ψ = 0,35 and the oscillation amplitude A = 2mm. This performance mixer was 3.0 ... 3.5 t / h with a coefficient of uniformity of mixture 94 ... 96%.

Conclusion. As a result of experimental studies optimum parameters of the conveyor-type screw mixer, providing the best possible performance mixing (up to 3.5 t / h) with sufficient homogeneity of the mixture (96%). The effect of vibration effect on the process of moving Forage mixture and homogeneity of its preparation.

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Opredelenы Experimental dependence of influence rezhymnыh conveyor-mixer parameters to process smeshyvanyya. Be built surface otklyka эksperymentalnыh results of research and proyzvodytelnosty

qualities smeshyvanyya kormosmesey parameters from the conveyor-smeshivatel.

Conveyor, mixer, proyzvodytelnost, option.

Experimental dependences of influence of regime parameters of conveyor mixer on mixing process are defined. Response surfaces of outcomes of experimental researches of productivity and quality of blending feedmixing from conveyor mixer parametres are defined.

Conveyor, mixer, productivity, parameter.

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LEGAL BASIS USING legal methods MONITORING EQUIPMENT AIC UKRAINE

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The article examines the influence of regulation methods for monitoring the efficiency of agricultural machinery innovation policy AIC Ukraine.

Monitoring method and technique.

Problem. As you know, one of the interpretations monitoring - information from public sources.

Business development in agricultural engineering at the present stage of development, has become increasingly dependent on the speed of acquisition, processing and transmission of accurate, reliable and predictive information - without this income does not get, the more value added generated mainly through knowledge rather than cheap labor.

Analysis of recent research. Soviet Union could not withstand the economic competition with the capitalist countries, as responsible persons in making sure their ideological superiority really stopped to think in terms of the introduction of new knowledge and ideas [1, p 30]. As is common knowledge, innovation policy is key to its economic power andDesire to be successful makes people compete, compete, compete [2, C. 53-120].

The main branch of the economy, which determines others are agribusiness [3, S. 8].

In a statement the 42nd President United States Bill Clinton "On national security strategy and its implementation and strengthening of"