The automated stand for experimental studies of individual workers distributor dosing feed, which allows you to justify and optimize constructive and technological parameters and regime distributor-dispenser.

Automated stand, productivity, feed, labor body individual distributor dispenser.

UDC 621.929.7

THE RESULTS OF EXPERIMENTAL DOSLIDZHENPRODUKTYVNOSTI DISPENSER-MIXER COMPONENTS OF ANIMAL FEED

R.V. Horodnyak, MA
Lviv National Agrarian University

Schematics dispenser-mixer is designed for preparation of loose feed mixes. Powered and design features of the dispenser-mixer, the results of experimental studies of productivity at atmospheric pressure and vykuummetrychnomu in the workspace dispenser-mixer.

Capacity, uniformity of feed, vacuum pressure disc dispenser-mixer regression equation.

Formulation of the problem. Feeding animals in modern livestock industry based on compound feed. Preparation of animal feed should be done to ensure balanced animal feed both nutrients and their total number. To provide a better homogeneity of mixing the main component of additions necessary to ensure fluidization main component of feed.

Analysis of recent research. One of the main requirements of the production technology of feed mixtures are homogeneous bulk distribution of animal feed components in volume, that will enable a uniform distribution of particles ingredients. Ongoing research on the process of mixing loose materials at atmospheric pressure [1, 2].

Due to the design of the dispenser-mixer, the presence of the cone and the inclined surface theory worthy of a particle on the surface, particularly in the works analyzed in detail PM Vasilenko [3, 4] and other researchers [5, 6]. When using the dosing mechanism is shock interaction spherical particles of the working surfaces of machines considered in Morozov IV [7] and Rohatynskoho RM [8]. In particular, researchers Adamchuk V. Adamchuk and O. [9-11] developed analytical

dependence based scheme forces acting on the particle to determine the relative speed of movement along the blade and study basic structural and technological parameters of working body. The research of a particle on the surface of loose feed pressure rotary cone [12-14]. Given that the pressure in the bunker can be different from the ambient differently characterized zridzhenist flow of bulk components [15].

The purpose of research. Achieve better uniformity of fodder mixing components in the suction of air volume dispenser-mixer due to formation of a fluid mass of the main component of feed.

Results. We proposed dispenser - components of animal feed mixer which operates as follows (Fig. 1) [16-18].

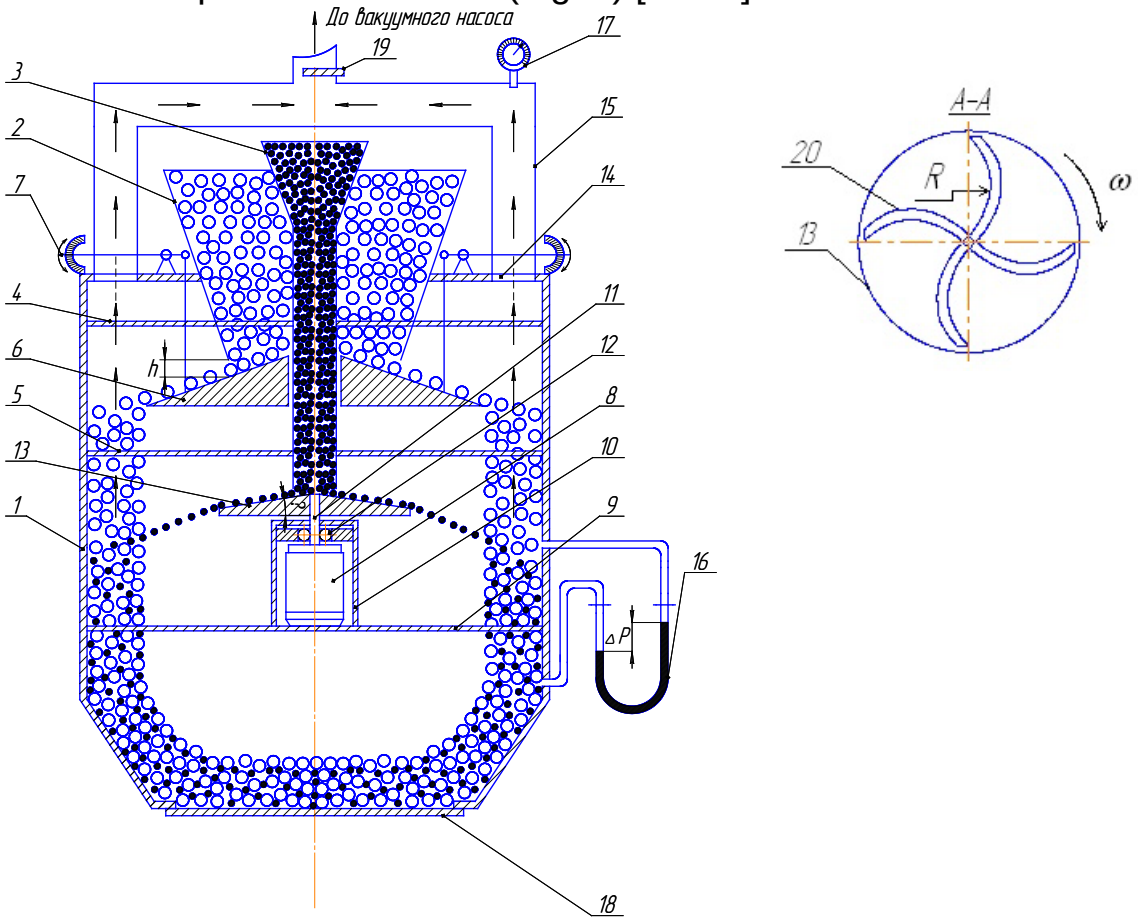

Fig. 1. Weigh mixing components of animal feed.

The process of batching and mixing is as follows. From the hopper 2 (Fig. 1), the main component is fed to the dispenser 6 through which the main component is uniformly distributed and sent to the mixing zone. By gravity main component vertically showered down. The electric motor drive shaft 8 through 11 sets in a rotating motion dispenser component 13. The component is introduced, administered, fed from the hopper 3 to 13 dispenser that provides momentum of a particle component is introduced, and sets a path joining the main component. The delivery of the main component change via the gap h, which is regulated mechanism 7, and the generatrix angle α is smaller bevel angle of the

main component. The delivery component is introduced, regulate the speed of rotation of the feeder 13. The vacuum pump sucks air from the stand volume through the sleeves 15 are connected to openings 14. When the air suction hopper from the dispenser-mixer creates a fluid mass of the main component of value dilution regulating valve 19. Vacuum Dilution measure 17, define the differential pressure drop gauge 16. Output of finished Forage mixture of mixer-feeder exercise gateway shutter opening 18.

To study the performance of the dispenser-mixer according to the procedure planned experiment conducted three factor at three levels of variation. The factors were angular speed drive*ω* in the range of 1 minute 25.12 to 75.36 min-1 corner generatrix dosing drive α - from 0 to 20 degrees. and the radius of curvature of the blades drive Rρ - from 0.03 m to 0.07 m. Experiments conducted at atmospheric pressure and vacuum 3 and 6 kPa in the hopper batching and blending components. Approximation of experimental data performed in a regression equation of second order.

The regression equation, which describes the dependence of the performance of the dispenser-mixer angular frequency ω rotation drive angle *α* generatrix dosing drive and the radius of curvature *Rρ* disk blades in natural values at atmospheric pressure is:

$$Q = -116 + 5{,}9 \cdot \omega - 2{,}2 \cdot \alpha + 6247 \cdot R_\rho + 3{,}4278 \cdot 10^{-5} \cdot \omega^2 + 0{,}0488463 \cdot \alpha^2 - \\ - 32421 \cdot R_\rho^2 - 0{,}064538217 \cdot \omega \cdot \alpha - 60 \cdot \omega \cdot R_\rho + 4{,}7 \cdot \alpha \cdot R_\rho \quad , \quad (1)$$

Graphical representation of the regression equation in a three-dimensional plane shown in Fig. 2.

The regression equation that describes the dependence of productivity dispenser-mixer at these levels varying factors and vacuum pressure of 3 kPa is:

$$Q = -118{,}2 + 6{,}0091 \cdot \omega - 2{,}6 \cdot \alpha + 6260 \cdot R_\rho + 6{,}8794 \cdot 10^{-5} \cdot \omega^2 + 0{,}064 \cdot \alpha^2 - \\ - 32531 \cdot R_\rho^2 - 0{,}0715 \cdot \omega \cdot \alpha - 60 \cdot \omega \cdot R_\rho + 5{,}1 \cdot \alpha \cdot R_\rho \quad . \quad (2)$$

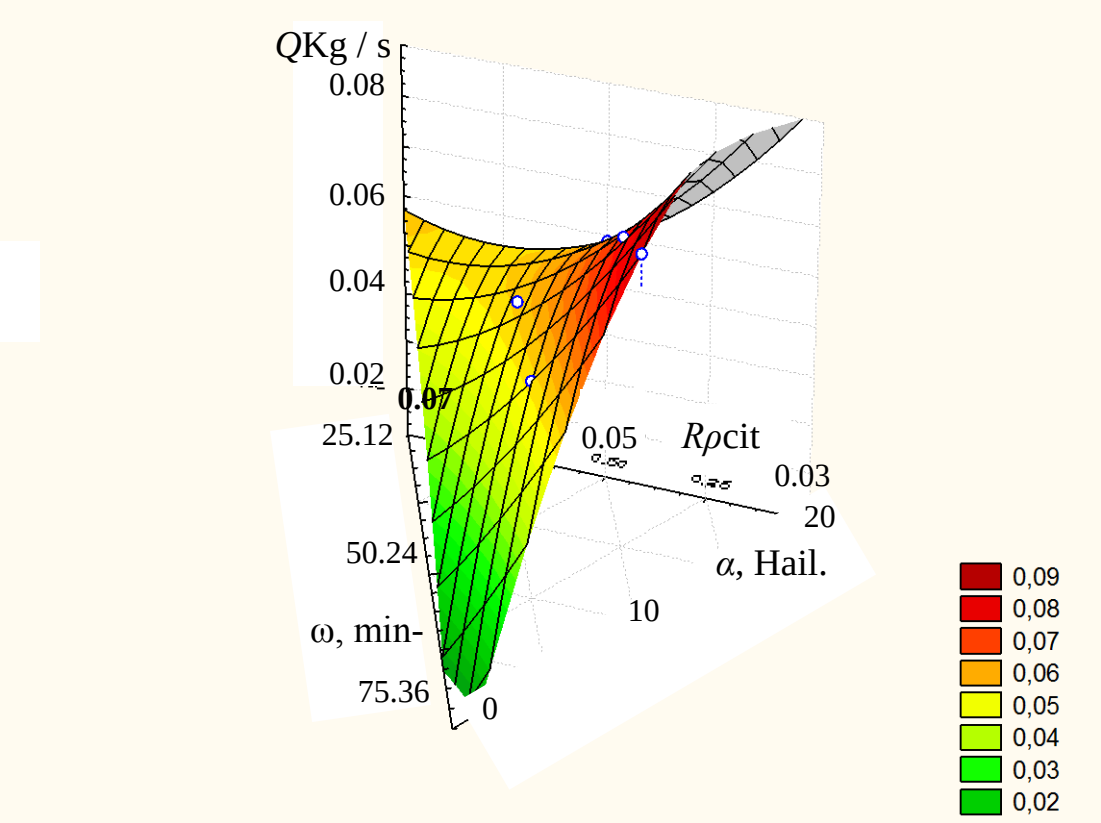

Fig. 2. Dependence performance Q dispenser-mixer component, administered by the angular frequency ω of rotation of the disk generatrix angle α dosing drive and the radius of curvature Rρ blades drive at atmospheric pressure.

Graphical representation of the regression equation in a three-dimensional plane shown in Fig. 3.

The regression equation productivity dispenser-mixer with vacuum pressure 6 kPa respectively is:

$$Q = -91 + 5{,}3 \cdot \omega - 3{,}1 \cdot \alpha + 5420 \cdot R_\rho - 0{,}0026 \cdot \omega^2 + 0{,}041 \cdot \alpha^2 - \\ - 30000 \cdot R_\rho^2 - 0{,}048 \cdot \omega \cdot \alpha - 41{,}8 \cdot \omega \cdot R_\rho - 9{,}65 \cdot \alpha \cdot R_\rho \quad . \qquad (3)$$

Graphical representation of the regression equation in a three-dimensional plane shown in Fig. 4.

Conclusion. Analysis of experimental research shows that the angular velocity ω = 25,12-75,36 min-1 corner, generatrix dosing drive α = 0-20 deg., A radius of curvature of the blades drive Rρ = 0,03-0,07 m and change pressure from atmospheric to vacuum (6 kPa) performance dispenser-mixer component introduced within Q = 0,02-0,097 kg / s (72-350,14 kg / h).

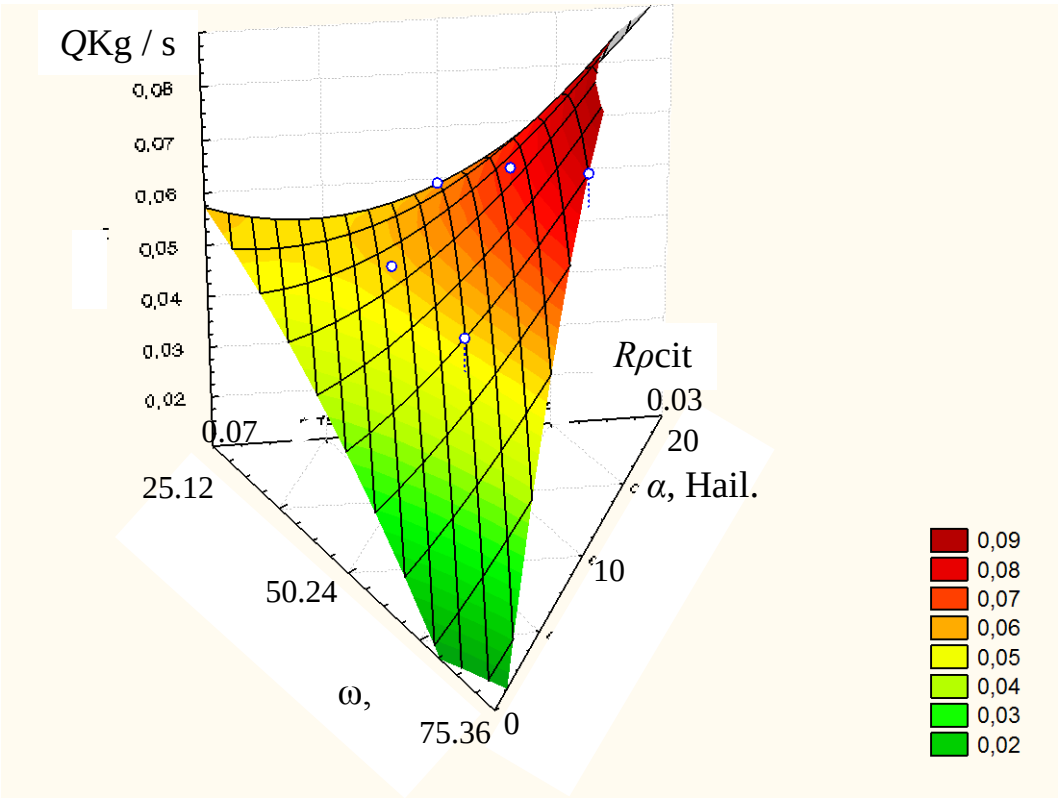

Fig. 3. Dependence performance Q dispenser-mixer component, administered by the angular frequency ω of rotation of the disk generatrix angle α dosing drive and the radius of curvature of the blades drive at Rρ vacuum pressure PB = 3 kPa.

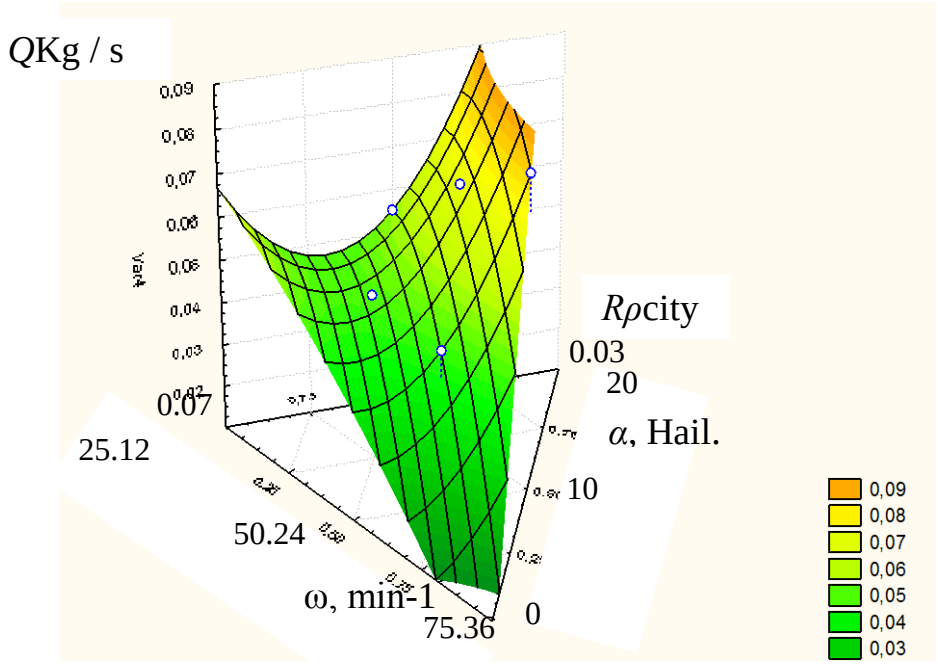

Fig. 4. Dependence performance Q dispenser-mixer component, administered by the angular frequency ω of rotation of the disk generatrix angle α dosing drive and the radius of curvature of the blades drive Rρ under vacuum pressure PB = 6 kPa.

List of references

1. JM Zhislin Equipment for the production kombykormov obohatytelnыh mixture and / YM Zhislin. - M. Kolos, 1976. - 286 p.
2. Kopeykyna TK Workshop on mukomolno and cereals and production kombykormovomu / TK Kopeykyna, EM Melnikov. - M .: Kolos, 1972. - 340 p.
3. Vasilenko PM Motion Theory particles on surfaces sherohovatым agricultural machines / PM Vasilenko. - K .: UASHN, 1960. - 310 p.
4. Vasilenko PM On motion by semyan semyaprovodam posevnыh machines / *PN Vasylenok, TA Vasilenko, SJ Bogachev* // Selskohozyaystvennaya machine. - 1957. - P. 3-6.
5. *Smagliy VI* The movement of material particles on the rough disks / VI // Smagliy Scientific Bulletin of National University of Life and Environmental Sciences of Ukraine. Series: APC equipment and energy. - K., 2013. - Vol. 185, p. 1. - P. 117-126.
6. BM Hevko Mathematical model for the movement of grain moving surfaces sowing machines / BM // Hevko Scientific works of Vinnytsia National Agrarian University. - 2012. - №11, vol. 1 (65). - S. 113-118.
7. Morozov IV Model trajectory of grain on the surfaces of agricultural machines / IV Morozov, OV Dudin // Bulletin of Kharkiv State Technical University of Agriculture. - H., 2003. - Vol. 21. - P. 124-131.
8. Rogatyn RM The model of contact interaction of particles with a cargo of agricultural machinery working surfaces / RM Rohatyn // Bulletin of Kharkiv State Technical University of Agriculture. - H., 2003. - Vol. 21. - P. 222-228.
9. Adamchuk A. Theory razhona fertilized rasseyvayuschym a working body of the centrifugal type / O. // Scientific Adamchuk working on Rusenskyya University. - 2013 - Vol 52, Series 1. - P. 22-30.
10. VV Adamchuk Effect parameters and operating modes rozsivalnoho body to climb out of it particles of fertilizer / VV Adamchuk // Journal of Agricultural Science.- 2004.- №12. - P. 42-45.
11. VV Adamchuk Theory workers tsentrobezhnыh bodies vnesenyya myneralnыh machines for fertilizers / VV Adamchuk. - K .: Agricultural Science, 2010. - 260 p.
12. *Boyko IG* Study particle movement sыpucheho feed on surface podayuscheho rotatsyonnoho cone dispenser / IG Boyko OA Popov // Journal of Kharkov National Technical University of Agriculture. Petro Vasilenko. - H., 2010. - Vol. 95. - P. 72-77.
13. Sementsov VI Methods and results of research Speed east particles with drive centrifugal mixer / VI Sementsov, IG Boyko // Journal of Kharkov National Technical University of Agriculture. Petro Vasilenko. - H., 2015. - Vol. 157 - P. 52-56.
14.*Batluk V.* Mathematical model for motion of weighted parts in curled flow / *Batluk V., Basov M., Klymets V.* // Econtechmod. An International Quarterly Journal. - 2013. - Vol. 2, number. 3. - P. 17-24.
15. Dmitrov VT By modeling the flow of liquid feed ingredients / VT Dmitrov, RV Horodnyak // Journal of Kharkov National Technical University of Agriculture. Petro Vasilenko. - H., 2009. - Vol. 79. - P. 224-229.
16. Ukraine Patent 91457, IPC A23N 17/00. Stand for Investigation of liquefied mass feed / VT Dmitrov, RV Horodnyak; patent owner VT Dmitrov, RV Horodnyak. - Appl. 05.05.2009, publ. 26.07.2010, Bull. Number 14.
17. Ukraine Patent 97118, IPC B01F 7/16. Dispenser-mixer / VT Dmitrov, RV Horodnyak; patent owner VT Dmitrov, RV Horodnyak. - Appl. 13.04.2009, publ. 10.01.2012, Bull. №1.

18. Patent for Utility Model 100908 Ukraine, IPC V01F 3/00, B01F 7/16. The method of mixing bulk materials / VT Dmitrov, RV Horodnyak; patent owner VT Dmitrov, RV Horodnyak. - Appl. 03.23.2015, publ. 08.10.2015, Bull. Number 15.

Rassmotrennaya dispenser-mixer circuit, kotoryya prednaznachen for pryhotovlenyya kormovыh sыpuchyh mixture. Features Pryvedenы Constructions and work dispenser-mixer, pryvedenы эksperymentalnыh results of research proyzvodytelnosty at atmospheric pressure and vykuummetrychnomu in a working space dispenser-mixer.

Proyzvodytelnost, odnorodnost kombykorma, vakuummetrycheskoe pressure of, dyskovыy dispenser-mixer, rehressyy equation.

Schematics dispenser-mixer is designed for preparation of bulk feed mixtures. Powered and design features of dispenser-mixer, results of experimental studies of productivity at atmospheric pressure and vacuum in workspace dispenser-mixer.

Productivity, uniformity of feed, vacuum pressure, disk dispenser-mixer, regression equation.

UDC 631,363

DEFINITION OF TERMS tightening GRAIN VALTSEMU VALTSEDEKOVIY ZERNODROBARTSI

SE Potapova, Ph.D.

In the article the theoretical ground conditions tightening grain in the working gap between the rollers and deck in the processing valtsedekovoyu crusher.

Grinders of a grain, roller, pan, working gap, tightening condition.

Formulation of the problem. A large proportion of livestock production in the country is produced by small farmers and households. Feeding directly on the farms increases the efficiency of their use, but this

necessary to ensure such modern means kormopryhotuvannya economy. For businesses small sizes needed crusher low productivity (from 100 to 250 kg / h), easy to constructive attitude and service, but also capable of meeting the requirements for quality of the product [1].