production can be used for decision making strategic management industry. At the same time it allows to determine the structure and parameters of technological processes, technology components of milk. The dependence (12), in determining the value Fk1 the expression (7), allows to set requirements for quality performance and parameters of technological processes of competitive livestock production.

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Predstavlenы matematycheskye model zakonomernosty Dynamic competitiveness and development of functional-kachestvennoho napolnenyya techno and technological Provision animal husbandry.

Competitiveness, animal husbandry, Production, Technology, technics, funktsyonalnoe-kachestvennoe napolnenye.

Mathematical models of competitiveness and conformity to law of dynamic development of functionally-high-quality filling of technic and technology providing of stock-raising are presented.

Competitiveness, livestock, manufacturing, technology, engineering, functionality, quality content.

UDC 631,363,285

COST POWER TO DRIVE FEED HVYNTAHRANULYATORA

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The article presents the results of theoretical studies of the process of pellet feed screw with removable screw geometrics for its length. Mathematical expressions that characterize power consumption

to drive the screw pellet feed based on structurally-working process parameters and properties of pellet feed material.

Screw, granulation, food, power, pressure.

Formulation of the problem. We know that one way to improve the application of the screw job is to use screws with a variable geometry of their length, in particular section feed screw [1, 2]. Moreover, most designs propellers with variable geometric parameters are odnozahidni screws, channel dimensions which vary linearly depending on their length.

Analysis of recent research. Screws provide such performance efficiency of the process material impact on the working bodies and are used in the food and feed industry [3], particularly as working bodies screw extruder and pellet feed. One of the insufficiently studied issues in the design of such work is the impact of structurally-pelleting process parameters and properties of materials at the cost of power to drive the screw granulator.

The purpose of research is to establish patterns of exposure parameters workflow pellet feed screw in spending power to drive the screw with variable geometric parameters.

research results. To construct a mathematical model of workflow pellet feed screw distinguish on the working surface area of the screw granulator element dS (Fig. 1).

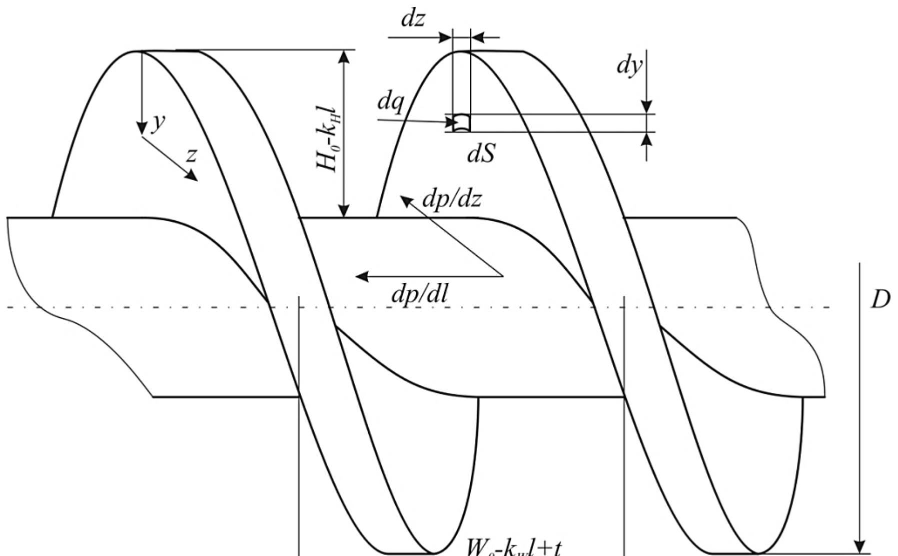

Fig. 1. The scheme to build a mathematical model of workflow pellet feed screw.

As shown in Fig. 1 (*p* - The pressure in the feed screw presses, Pa; *q* - Lateral pressure, Pa; D - outer diameter of the screw, m; *l* - The length of the screw, m; kH - rate of change of the channel depth of the screw by its length; H0 - initial value of height channel screw, m; W0 - initial value bandwidth screw m; kW - rate of change in the width of the screw channel for its length; t - width coil screw m) square loop element screw granulator dzdy is under pressure dq = μdp, where μ - coefficient of lateral pressure.

It is written in general terms the expression spending power to drive the screw:

$$dN = \mu p V_{yz} dzdy \,, \tag{1}$$

where: Vyz - circular speed of rotation of the screw element area of round pellet as a function of the coordinate z and y, m / s:

$$V_{yz} = 2\pi n y \,, \tag{2}$$

where: n - speed screw presses, s-1.

In turn, the screw length l z coordinate associated with dependence:

$$z = \pi l \sqrt{\frac{(D - H_0 - k_H l)^2}{(W_0 - k_W l + t)^2} + \frac{1}{\pi^2}} \,. \tag{3}$$

Prodyferentsiyuvavshy left and right of expression (3) is written:

$$dz = \frac{\pi (D - H_0 - k_H l)[k_W (D - H_0) - k_H (W_0 + t)]}{(W_0 - k_W l + t)^3 \sqrt{\frac{(D - H_0 - k_H l)^2}{(W_0 - k_W l + t)^2} + \frac{1}{\pi^2}}} dl \,. \tag{4}$$

The function of pressure, as a part of dependence (1), the authors [4, 5] that suggest the nature of change of pressure in the extrusion mass screw presses can be approximated by the dependence of the form:

$$p = p_0 e^{A_p l} \,, \tag{5}$$

where: p0 - pressure at the beginning of the screw channel, Pa; l - the distance along the axis of the screw, m; Ap - a constant factor that describes the nature of the change in pressure in the feed screw granulator and its length.

For our conditions (at l = 0 p = 0 when l = lmax p = pm) expression (5) can be written as:

$$p = p_m e^{-A_p \left(\frac{l_{\max}}{l} - 1 \right)} \,. \tag{6}$$

Combined analysis of dependence (6) and pressure expression obtained earlier in [6] allows you to add expression to determine the ratio Ap:

$$A_p = \frac{k_p \mu a_0'}{\left(1-\frac{l_{\max}}{l}\right)k_H k_W}\left(e^{\frac{kH_0}{k_H}}\left(f_b + f_s\right)k_W\left[Ei\left(kl_{\max} - \frac{kH_0}{k_H}\right) - Ei\left(kl - \frac{kH_0}{k_H}\right)\right] + \right.$$
$$\left. + 2e^{\frac{kW_0}{k_W}} f_s k_H \left[Ei\left(kl_{\max} - \frac{kW_0}{k_W}\right) - Ei\left(kl - \frac{kW_0}{k_W}\right)\right]\right), \quad (7)$$

where: η - the viscosity of the feed raw Pa · s; fb, fs - friction Forage mixture, respectively, the material of the working chamber and screw granulator; lmax - the maximum length of the screw, m; a_0' - The estimated coefficient $a_0' = \pi\sqrt{\left(\left(D-H_0\right)/\left(W_0+t\right)\right)^2 + 1/\pi^2}$; Ei - integral exponential function.

Moreover, given the nature of the assumptions adopted in determining the dependence yew in [6], the ratio Ap advisable to determine the conditions l *→lmax*. Graph of (7) for conditions l *→lmax* shown in Fig. 2.

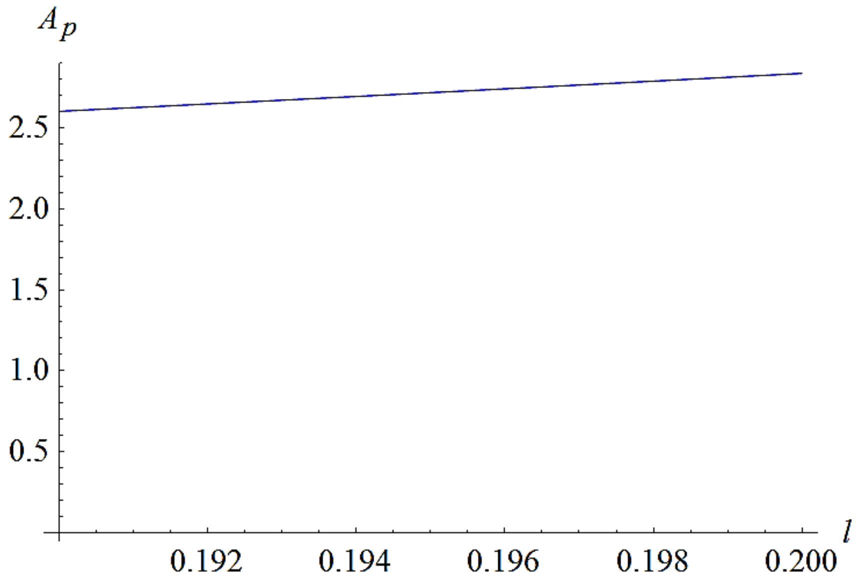

Fig. 2. Effect of process parameters on granulation ratio Ap character changes in pressure in the channel screw granulator following conditions:
kH =0,038; kW = 0,049; H0 = 0,016 m; W0 = 0,022 m; t = 0,005 m; *D* = 0.08 m; fs = fb = 0,3; k = 2,77; μ = 0,3; kp = 0,03.

The limits of integration in solving addiction (1) will be:

$$l \in \left[0;\ l_{\max}\right],$$
$$y \in \left[0;\ H_0 - k_H l\right]. \quad (8)$$

So, with (8), we write the desired expression spending power to drive the screw:

$$N = 2\pi n \mu p_m \times$$

$$\times \int_0^{l_{\max}} \int_0^{H_0 - k_H l} e^{-A_p\left(\frac{l_{\max}}{l} - 1\right)} y \frac{\pi (D - H_0 - k_H l)[k_W (D - H_0) - k_H (W_0 + t)]}{(W_0 - k_W l + t)^3 \sqrt{\frac{(D - H_0 - k_H l)^2}{(W_0 - k_W l + t)^2} + \frac{1}{\pi^2}}} dydl. \quad (9)$$

The dependence (9) makes it possible to establish the cost of power required to drive the screw pelleting of feed given geometric parameters.

Conclusion. As a result of theoretical research were obtained relationship, which allows you to set power consumption for pellet feed screw drive with removable screw geometric parameters based on structurally-working process parameters and properties of pellet feed material.

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In Article Theoretically yzlozhenы results of research work process vyntovoho fodder granulator with yzmenyayuschymysya heometrycheskymy parameters screw on dlyne ego. Poluchenы matematycheskye dependence, harakteryzuyuschye zatratы-power to drive screw granulator in fodder dependence from konstruktsyonno and technological workers bodies parameters and properties pellet feed raw materials.

Screw, granulirovanija, pressure of, food, facilities.

The paper presents the results of theoretical studies of pellet feed screw working with varying geometric parameters of the screw along its length. The mathematical dependence that characterize the expenses of power to drive the screw pellet feed, depending on the constructional

and technological parameters of the working bodies of the granulator and properties of feed raw materials, were received.

Feed, pelleting, power, pressure, screw.

UDC 631,363

ANALYSIS OF THE DISTRIBUTION OF PRESSURE AND LEAKAGE KORMUZ LAWS BUNKER

VV Radchuk Engineer

The analysis of the pressure distribution of the material in the hopper and the equations for determining the law outflow of feed from the hopper.

Dispenser, vertical axis vichkovyy drum leakage, pressure distribution.

Formulation of the problem. Entering the maximum animal performance is not always depend on a sufficient number of harvested forage and its high quality. In addition, it is necessary that the animal diet was balanced enough for a number of indicators. Adherence to the principle of balanced diet by feeding the main elements enables a 10-20% increase technological impact of feed [1]. Rationing and accurate dosing concentrates on the basis of individual milk production of cows positive effect on their milk production, helps reduce the total cost of feed per unit of production, and save feed.

Analysis of recent research. Review designs dosing and dispensing means indicates widespread use in livestock bulk and weight distribution means for the dosed combined feed. Analysis of existing metering shows that doses extensive operation simple and reliable in operation, and energy-intensive metal. Dispensers engaged by weight dosing principle structurally difficult to maintain. Regardless of the method and type of dosing dispenser ultimately controlled feed by weight or by weight deviation from the specified dosage of food standards within the established livestock admission requirements. Under the influence of the working feed dispenser with unloading rising layer of variable section with varying bulk density, because of what feed is probabilistic in nature [2, 3, 4].