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ASSESSMENT OF OUTPUT OF MANURE AT THE MAINTENANCE OF PIGS DEPENDING ON THE DOSE LITTER

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The pig manure controlled use with planning its further distribution is considered. The yield aqua manure regularities in depending of a dose-dependent litter are determined.

Aqua manure, pig, manure, humidity, litter.

The manure from livestock farms is a mixture of solid and liquid animal manure, diluted mineral and gaseous substances, technological and flush water, waste feed. With greater humidity, manure contains a significant amount of mineral and organic difficult oxidizing substances. At the same time has a large enough supply of solar energy, accumulated in biomass. During processing, it is a source for the production of gaseous fuel on the basis of biomethane and composts on the basis of bedding manure and slurry after methane fermentation, which should be the main type of organic fertilizer in crop production.

Physico-chemical composition of manure depends on the conditions and duration of storage, and can vary significantly. Installed this dependence: the longer the manure is stored, the higher the degree of decomposition it reaches the higher rehabilitation content of nitrogen, phosphorus, potassium and other elements, but less ammonia nitrogen and large loss of organic matter. In this regard, there is a need to manage the process of transformation of manure in a proper organic fertilizers.

Gnove - fluid that is secreted from manure when I remove it and store. It is used for production of compost, liquid organic fertilizer and in Biocare in biogas technologies [2].

One of the most important principles of the production of compost is added to the original mixture of carbon materials, which are an important component of

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breathing and feeding organisms that carry out the process of anaerobic digestion. When laying materials for composting need to maintain a certain ratio between the nitrogen and carbon. To maintain balance, rich in nitrogen materials add carbon materials, in particular to manure add the corresponding provision of the litter. For the composting process was going in the right direction, compost mixture should have the carbon and nitrogen (C:N ratio 20-30:1 (With carbon, N - quantity of nitrogen) [2].

In quality compost as in fertile soil, the ratio of C:N must be 11:1 [1]. For plant nutrition and soil fungi best ratio of C:N 25:1. In plant debris it is 30-70:1, which indicates a large excess of carbon and nitrogen deficit [3].

With a significant excess of nitrogen he will be emitted to the atmosphere as ammonia, which indicates unproductive losses of valuable components for power plants [6].

When using manure for biogas production are two technologies: rarely phase and the solid phase. In the solid phase technologies difficulties associated with ensuring optimal conditions of course of microbiological fermentation of biomass. In particular this applies to load and homogenization of engendering biomass. Application of rare phase fermentation is more common in the practice of use of biogas plants. This ensures the continuous introduction of small portions of the input of biomass in the digester, which is the capacity of the mixer, where supported set temperature and humidity without air access [7].

The system of manure removal from the premises for animals and a daily volume of manure significantly affect the amounts of manure storage facilities and, consequently, on the capital costs required for their construction. In addition, the accumulation of raw material it is necessary to consider the fact that with time the manure loses nitrogen and total content of organic substances, it is largely determine the effectiveness of the next stage of its use for the production of compost and biogas [7].

It should be noted that methane fertilization does not provide disinfection of manure, which is fermented into biogas plants, except in the case of open storage of

waste fermentation yield methane. According to the law on renewable energy sources in the 2009 version is a focus on the closed storage for store of biomass after digestion. The size of repositories for the waste storage, as a rule, are constructing the volume of not less than 180 days reactor operation [4].

Despite a significant number of the conducted research the issues management process is the use of manure from pig farms, with the planning of its further distribution and accounting doses litter requires further research.

The purpose of research. The establishment of regularities of output of manure at the maintenance of pigs depending on the dose of the litter.

Materials and methods of research. Calculations of output of manure and humidity of bedding manure depending on the humidity of bedding manure at maximum vodotisky ability and dose litter are using the law of mass balance.

The results of the study. It is well known that the daily amount of manure on pig farms, the daily amount of litter and the total daily amount of a mixture of manure of pigs and litter depends on the number of animals and the amounts and types of litter and is determined the following way:

$$Q_Г = n_{СВ}\ q_Г\ , \qquad (1)$$

where $Q_Г$ – the daily amount of manure of pigs kg/day; $n_{СВ}$ – the number of sows goal.; $q_Г$ – the daily output of manure from pig farms using full of concentrated feed, according UNGC-APK-09.06 (table. 1) [5]listed on a sow (table. 2), kg/head. in the day.

$$Q_П = n_{СВ} q_П\ , \qquad (2)$$

where $Q_П$ – the daily need in the litter kg/day; $q_П$ - daily need in the litter are listed per sow, kg/head. in the day.

$$Q_С = n_{СВ}\left(q_Г + q_П\right), \qquad (3)$$

where $Q_С$ – the total daily amount of a mixture of manure of pigs and litter kg/day.

1. Daily norms of output and humidity excrement

The group of animals	The output of excreta and their composition					
	Just		including			
	Weight, kg	Humidity, %	Kal		urine	
			Weight, kg	Humidity, %	Weight, kg	Humidity, %
Boars	11,04	89,43	3,80	75,0	7,24	97,0
Sows:						
idle	8,80	90,87	2,46	73,8	6,34	97,5
pregnant	10,00	91,01	2,60	73,1	7,40	97,3
lactating	15,30	90,14	4,30	73,1	11,00	96,8
Pigs at the age, days						
26–42	0,40	90,03	0,10	70,0	0,30	96,7
43–60	0,70	85,29	0,30	71,0	0,40	96,0
60–106	1,80	86,62	0,70	71,4	1,10	96,3
Pigs of weight, kg						
up to 70	5,00	86,98	2,05	73,0	2,95	96,7
more 70	6,50	87,68	2,70	74,7	3,80	96,9

2. The daily output of manure on swindol farm per one sow

The group of animals	The output of excreta and their composition			
	Kal		urine	
	Weight, kg	Humidity, %	Weight, kg	Humidity, %
The main sow	2,9	73,2	7,8	97,2
Sows repair	1,0	73,8	2,5	97,5
The grunts and repair boars	0,1	75,0	0,3	97,0
Piglets	1,7	71,3	2,7	96,3
Pigs	12,2	74,0	17,3	96,8
The total output and moisture content of manure per sow	17,9	73,6	30,7	96,9
	48,5	**кг**	**88,3**	**%**

We know, also, that the quantity of water that exceeds the maximum water retention capacity of bedding manure due to the presence of litter is:

$$Q_Г^B = Q_C \frac{W_C - W_{ПН}}{100 - W_{ПН}}, \quad (4)$$

where $Q_Г^B$ –the daily amount of water that is not contained pastilok manure and supplied to the manure, kg/day; W_C – humidity mixture of manure of pigs and litter %; $W_{ПН}$ – humidity bedding manure when the maximum number of retained water (humidity maximum vodotisky ability), %.

Humidity bedding manure at maximum vodotisky ability (HBM) is determined by the type of litter, but for plant materials it is usually in the range from 77 to 84 % [2].

Obviously, humidity mixture of manure of pigs and litter is defined as:

$$W_C = \frac{q_Г W_Г + q_П W_П}{q_Г + q_П}, \quad (5)$$

where W_C –humidity mixture of manure of pigs and litter %; $W_Г$ – humidity manure of pigs %; $W_П$ – humidity litter %.

Given that the daily amount of manure:

$$Q_{ГН} = \frac{Q_Г^B}{W_{ГН}}, \quad (6)$$

where $Q_{ГН}$ −the daily amount of manure, kg/day; $W_{ГН}$ – moisture content of manure, Rel. unit,

and substituting the values of the quantity of water that exceeds the maximum water retention capacity of bedding manure due to the presence of litter will receive:

$$Q_{ГН} = \frac{Q_C}{W_{ГН}} \cdot \frac{W_C - W_{ПН}}{100 - W_{ПН}} = \frac{n_{СВ}(q_Г + q_П)}{W_{ГН}} \cdot \frac{W_C - W_{ПН}}{100 - W_{ПН}} =$$

$$= \frac{n_{СВ}(q_Г + q_П)}{W_{ГН}} \cdot \frac{\frac{q_Г W_Г + q_П W_П}{q_Г + q_П} - W_{ПН}}{100 - W_{ПН}} =$$

$$= \frac{n_{CB}}{W_{ГН}} \cdot \frac{q_Г W_Г + q_П W_П - (q_Г + q_П) W_{ПН}}{100 - W_{ПН}}. \quad (7)$$

On the basis of the obtained equations was constructed the dependence of the yield of the manure from the humidity of bedding manure at a cost center and dose litter (Fig. 1).

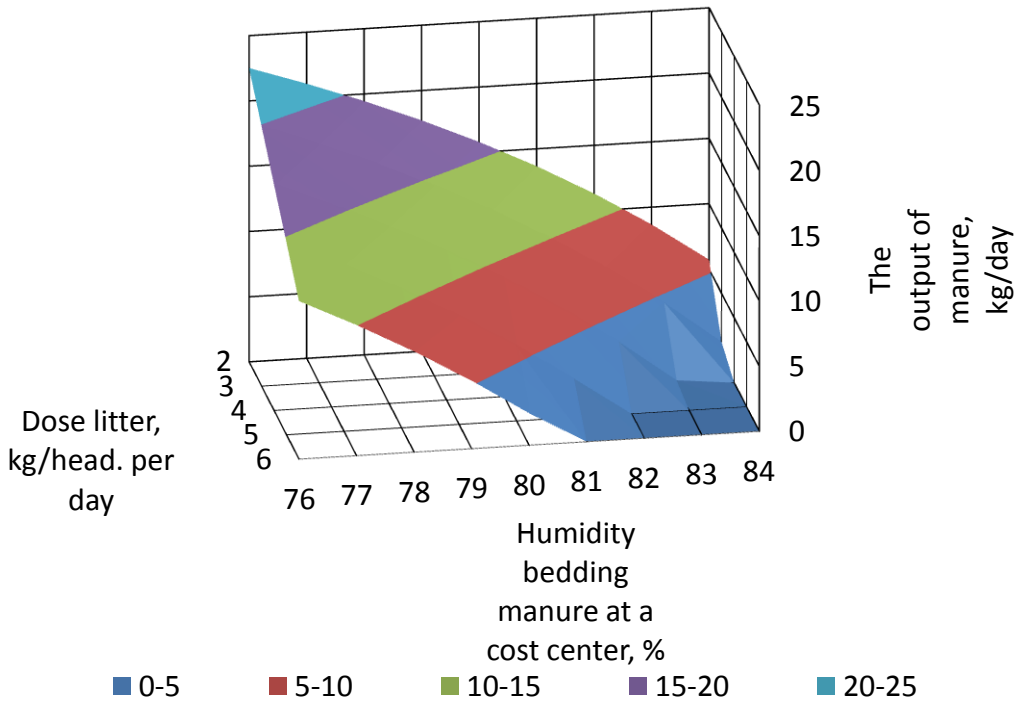

Fig. 1. The dependence of the yield of the manure from the humidity of bedding manure at a cost center and dose litter

The analysis of mutual influence of humidity of bedding manure at a cost center and dose litter showed that the maximum output of manure observed in the reduction of making litter and moisture is reduced bedding manure at a cost center. But when increasing the making of litter from 4 to 6 kg/head. a day will have no output manure within humidity changes of bedding manure at a cost center from 82 to 84%, respectively.

It is established that with the increase of litter input and humidity of bedding manure at a cost center from 77 to 82 %, humidity of bedding manure increased by the amount of 1 to 1.5 % (Fig. 2). With the increase of humidity of bedding manure at a cost center, more than 82 % litter input of more than 3 kg/goal for the day does not have a significant impact on the humidity of bedding manure. This is because the

humidity of bedding manure reaches its critical limits and further absorption of the liquid fraction is terminated.

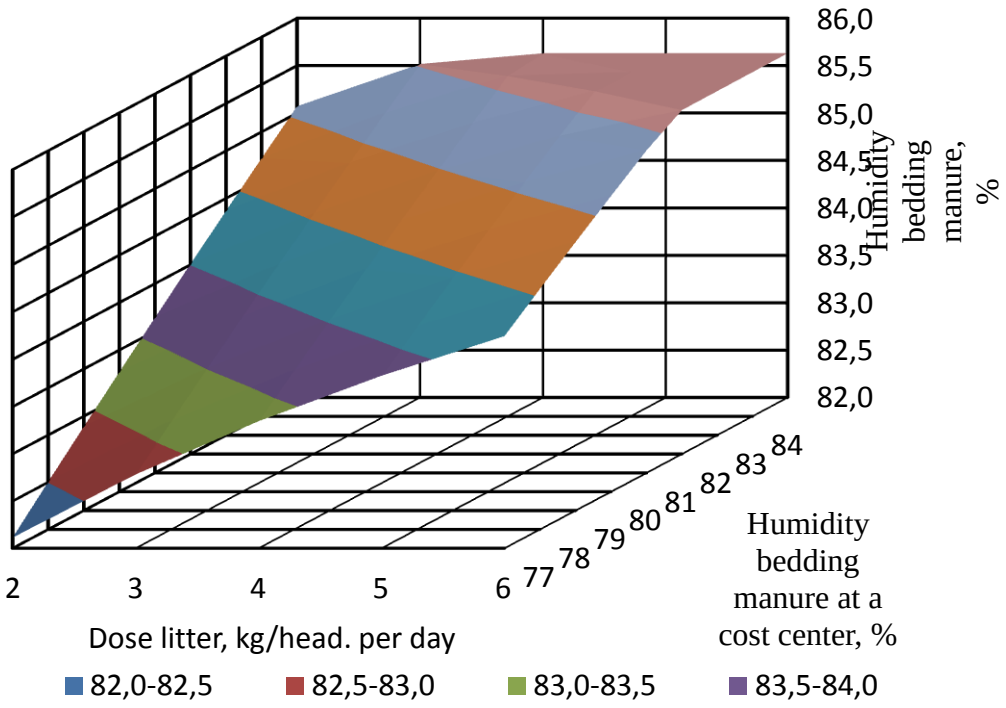

Fig. 2. The dependence of humidity of bedding manure from moisture bedding manure at a cost center and dose litter

With increasing doses litter input a decrease in output of manure at a constant value humidity level of 80 %, which corresponds to a cost center bedding manure (Fig. 3).

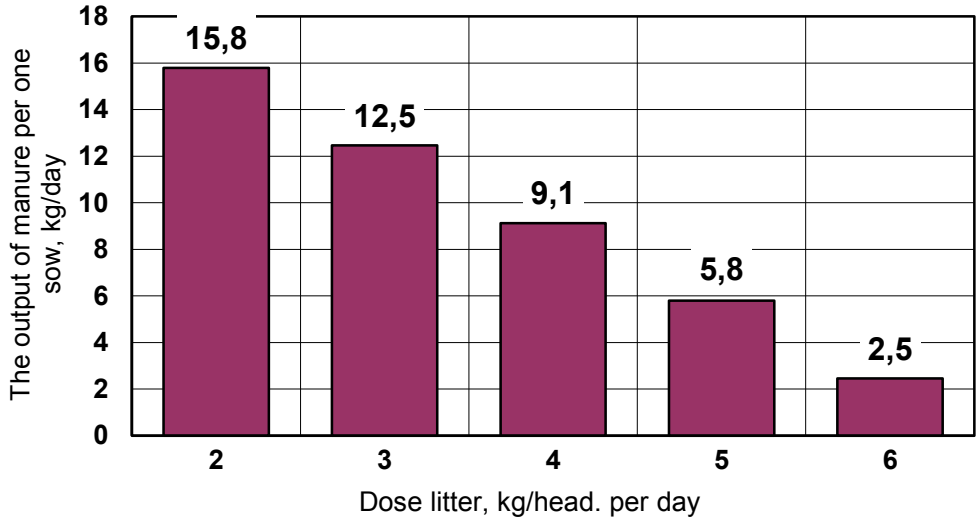

Fig. 3. The dependence of the yield of the manure from the dose litter moisture bedding manure at the level of 80 %, which corresponds to a cost center

This graph shows that with the constant value of humidity of bedding manure, which corresponds to a cost center, and daily use litter in the amount of 2 kg/head., the output of manure will be 15.8 kg/head. in the day, in the increase of the dose to 6 kg/head. - 2,5 kg

Conclusions

The regularities of the output of manure, depending on the dose litter allow controlled use of manure from pig farms with the planning of its further distribution for aerobic fermentation of bedding manure and aerobic digestion of manure in biogas plants with subsequent return to composting of manure.

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Рассмотрено контролируемое использование навоза свиноферм с планированием его дальнейшего распределения. Установлены закономерности для определения выхода навоза в зависимости от дозы подстилки.

Навозная жижа, свиньи, навоз, влажность, подстилка.

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