

## **SANITARY-HYGENIC ASSESSMENT OF KEEPING LACTATING SOWS**

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**Annotation.** An important role in providing meat for population of Ukraine plays the pig breeding, as a sector of stock-rearing it gives the foodstuffs of high value and quality. From the whole amount of meat which is obtained in the world 35% is pork. The primary purpose of pork production is a continuous supply of pigs in the amount that is required by the necessity of the country, and also of proper quality according to the men's food requirements at minimal costs.

Hygiene of animals is a part of modern prophylactic Veterinary Science and deals with the problems of health protection. On pig breeding farms the process of recreation of pigs, organization of the stage-by-stage forming of homogeneous animal groups and exceptionally high intensive conducting of the pig breeding is envisaged. In such conditions, the factors which lead to recession of the resistance of immunobiological reactivity and to the origin of diseases, are the stress by the early weaning of piglets, abrupt changes of feeding, different regrouping of animals, microclimate and others. The problem of finding reserves for increasing the production of pork, improving its quality and reducing its cost is especially important in the context of the new market relations formation in the agricultural sector of economy. In case of the violation of animals keeping, care and feeding conditions, the productivity decreases and morbidity (especially young animals) increases, decreases the survival of swine population, that affects negatively its industrial efficiency. Therefore optimization conditions of keeping sows and prevention of their diseases is an actual task at the present stage of pig breeding.

**Key words:** pig breeding, animal hygiene, sanitary-hygienic assessment, ammonia, microorganisms, dust, air smell, air indices

Physical properties of air: temperature, humidity, velocity, atmospheric pressure, solar radiation, ionization play a very important hygienic role, because they reflexively affect the physiological functions of the animal organism, causing its adaptive reactions. Unfavourable conditions lead to violation of temperature homeostasis, productivity reduce and organism's resistance, disease and even death of animals [5].

N. M. Komarov [4] noted that farm animals belong to warm-blooded ones; they are characterized by a relatively constant body temperature maintained by thermal regulation. From all the factors of microclimate, the most important role has the air temperature in the room, as well as the temperature of the floor and other surfaces. It directly affects thermoregulation, heat transfer, metabolism in the body and other life processes.

M. S. Borshch and others [1] argued that in the rooms for the animals keeping during the cold period of the year, a certain temperature should be maintained which is necessary to increase livestock productivity. The air temperature is one of the physical factors of the environment, which affect the state of the animal organism.

M. V. Demchuk and others [3] prove that it is not desirable for the normal life of an animal organism to keep it at too low or too high temperatures. Also undesirable are the sharp and frequent temperature variations. They cause over-stress in the activities of the main organs and systems of the body, reduce the animals' productivity, the effectiveness of feed use and also cause the morbidity increase.

**The aim of the research is to carry out a sanitary-hygienic assessment of lactating sows kept in the conditions of the private enterprise “Sagun Vitalij Valerijovych” in Novoodesa district of Mykolayiv region during the winter period 2017-2018.**

The parameters of air temperature in the sow house during the winter period

of 2017-2018 in the conditions of “Sagun V. V.” farm in Novoodesa district of Mykolayiv region are presented in Table 1.

*Table 1*

**Air temperature in the sow house  
during the winter period (° C)**

| Year of research, month | Number of the livestock in the group | Actual indexes of the air temperature    |            |
|-------------------------|--------------------------------------|------------------------------------------|------------|
|                         |                                      | Normative indexes of the air temperature |            |
| 2017, December          | 3                                    | 18-22                                    | 18.27±0.01 |
| 2018, January           | 3                                    | 18-22                                    | 18.01±0.02 |
| 2018, February          | 3                                    | 18-22                                    | 17.75±0.01 |

The air temperature in the sow house during the researched period varied from 18.27 ° C to 17.75 ° C. There was a slight decrease at 0.25 ° C in the air temperature in the livestock house in February 2018 compared to the normative air temperature (18 ° C) (Fig. 2).

**(Рисунок 2)**

**Fig. 2. Dynamics of the air temperature in the sow house**

During the winter period 2017-2018 a change in such indicators of microclimate in the pig-breeding house was observed: the content of ammonia, microorganisms, dust and air smell (Table 2).

*Table 2*

**Dynamics of microclimate parameters in the sow house  
during the winter period**

| Year of research, month | Number of the livestock in the group | Microclimate indexes       |                                              |                         |               |
|-------------------------|--------------------------------------|----------------------------|----------------------------------------------|-------------------------|---------------|
|                         |                                      | ammonia, mg/m <sup>3</sup> | microorganisms, thous.micr.b./m <sup>3</sup> | dust, mg/m <sup>3</sup> | smell, points |
| 2017, December          | 3                                    | 25.0±0.087                 | 350.0±15,9                                   | 3.1±0.12                | 3             |
| 2018, January           | 3                                    | 24.9±0.791                 | 349.7±16,7                                   | 3.0±0.14                | <4            |

|                   |   |            |            |          |    |
|-------------------|---|------------|------------|----------|----|
| 2018,<br>February | 3 | 26.7±1.162 | 351.9±14,1 | 3.3±0.10 | <4 |
|-------------------|---|------------|------------|----------|----|

The results of our studies about the presence of ammonia in the air of the sow house (Table 2) showed an excess of their established departmental standards of technological design (pig farms, complexes, farms, small farms) [3] on average 2.5 times. There is an excess of normative data concerning the presence of microorganisms in a cattle-breeding house where sows are kept during the winter period. This indicator increased 2.3 times. The amount of dust impurities in the air of this house exceeded the normative indicators and was  $3.0 \pm 0.14$  in January and  $3.3 \pm 0.10$  mg / m<sup>3</sup> - in February, 2018. In the air of the room there was a smell of urine in December, and at the end of the winter period, they felt it more and it was valued at 4 points.

At the subsequent stage of scientific work, the pollution of the pig farm with pollutant gas, microorganisms, dust and the presence of foreign smells was assessed (Table 3, 4). The results of studies about the presence of ammonia in the places of removal animals from the livestock houses into the outdoor pens showed an excess of their established departmental standards of technological design (pigsties, complexes, farms, small farms) [2] on average 2.5 times.

*Table 3*

**Microclimate parameters in the places of removal into the outdoor pens**

| Year of research, month | Number of the livestock in the group | Microclimate indexes       |                                              |                         |               |
|-------------------------|--------------------------------------|----------------------------|----------------------------------------------|-------------------------|---------------|
|                         |                                      | ammonia, mg/m <sup>3</sup> | microorganisms, thous.micr.b./m <sup>3</sup> | dust, mg/m <sup>3</sup> | smell, points |
| 2017, December          | 3                                    | 24.9±0,10                  | 350.0±14.79                                  | 3.1±0.13                | 3             |
| 2018, January           | 3                                    | 24.3±0,82                  | 349.1±15.10                                  | 3.0±0.27                | <4            |
| 2018, January           | 3                                    | 26.1±1,10                  | 350.0±14.22                                  | 3.2±0.10                | <4            |

An excess of normative data about the presence of microorganisms in the places of removal from the livestock houses into the outdoor pens, where lactating sows are kept during the winter period, was observed. This indicator increased 2.3 times. The amount of dust impurities in the air in the places of removal from the

livestock houses into the outdoor pens exceeded normative indexes and was  $3.0 \pm 0.27$  in January and  $3.2 \pm 0.10$  in February, 2018. In the the air in the places of removal from the livestock houses into the outdoor pens there was a smell of urine in December, at the end of the winter period they felt it more and it was valued at 4 points.

*Table 4*

**Microclimate parameters between the different places of keeping lactating sows during the winter period**

| Year of research, month | Number of the livestock in the group | Microclimate indexes       |                                              |                         |               |
|-------------------------|--------------------------------------|----------------------------|----------------------------------------------|-------------------------|---------------|
|                         |                                      | ammonia, mg/m <sup>3</sup> | microorganisms, thous.micr.b./m <sup>3</sup> | dust, mg/m <sup>3</sup> | smell, points |
| 2017,December           | 3                                    | 23.7±0,02                  | 233.3±7.01                                   | 1.0±0.01                | 2             |
| 2018, January           | 3                                    | 24.0±0,10                  | 232.7±6.80                                   | 2.1±0.21                | 3             |
| 2018, February          | 3                                    | 25.1±1,10                  | 230.8±14.21                                  | 2.2±0.10                | 3             |

Table 4 shows that the concentration of ammonia between swine buildings where sows are kept is not significantly different from the indicators in the places of removal from the lactating sows house into the outdoor pens. Significantly smaller amounts of microorganisms are observed in the external environment as compared to their number in samples taken at windows and gates. This number is reduced by 1.25 times. Comparing the following indicators (Tables 3, 4), such as the amount of dust in the air, the presence of foreign smells, we can state that their meaning decreases. The average dust content of sow houses decreased by 1 mg / m<sup>3</sup>. There was a decrease in the smell by 1 point, it was slight constant and manifest unstable. Indicators of ammonia content in the air of a sow house and its concentration at a distance of 2.5 m between two rooms of the swine farm are presented in Figure 3.

(Рисунок 3)

**Fig. 3. The content of ammonia in the air in the sow house  
and on the territory of the whole swine farm**

The number of microorganisms in the air of the sow house and between the two rooms where the sows are kept at a distance of 2.5 m is shown in Figure 4.

(Рисунок 4)

**Fig. 4. Number of microorganisms in the pig-breeder  
and on the territory of the pig farm**

Ammonia, the microorganisms which are removed from the sow house, are concentrated on the territory of the farm. This is explained by the fact that the amount of ventilation exhaust ducts in the sow house is 1 pc. 0.25 x 0.25 m in size, ventilation tidal ducts in the room are absent. The height of the exhaust ducts should be more than 1.5 m above the top of the roof. On this swine farm, air is removed from the sow houses to the open feeding pigpens and to the territory of the whole farm. The height of the room and the exhaust channels affect the turbulence of the wind direction. This action was observed at a distance equal to the double height of the room. Between the houses a circulating zone is created, that is, an aerodynamic shadow in which air circulation is observed. The distance between livestock buildings does not correspond to animal breeding standards (18 m).

**Conclusions**

1. The air temperature in the sow house during the researched period varied from 18.27 ° C to 17.75 ° C. There was a slight decrease in the air temperature in the swine building in February 2018 compared to the standard air temperature (18 ° C) at 0.25 ° C.

2. There is an excess of normative data about the presence of microorganisms, ammonia, dust, and smell of urine in the swine house where lactating sows are kept during the winter period.

**Literature**

1. Borshch M. S. Dovidnyk z hihiieny silskohospodarskykh tvaryn / M. S. Borshch, V. P. Mazurenko, V. V. Krasii. – K. : Urozhai, 1991. – 232 p.  
(A reference book in hygiene of agricultural animals)
2. Vidomchi normy tekhnolohichnoho proektuvannia. Svyinarski pidpriumstva (kompleksy, fermy, mali fermy). VNTP-APK-02.05. – K. : Ministry of Agrarian Policy of Ukraine, 2005. – 98 p.  
(Department norms of the technological planning. Pig breeding enterprises (complexes, farms, small farms))
3. Zahalna veterynarna profilaktyka / M. V. Demchuk, O. V. Kozenko, O. H. Bohachyk [and others]. – Lviv : SPOLOM, 2012. – 360 p. (General veterinary prophylaxis)
4. Komarov N. M. Mikroklimat v zhivotnovodcheskikh pomescheniyah: rekomendatsii / N. M. Komarov. – M. : Kolos, 1970. – 8 p. (Microclimate in stock-raising apartments: recommendations)
5. Kosheleva H. Otrymannia zdorovoho molodniaka / H. Kosheleva // Svyinarstvo. – 2004. – № 3. – P. 15-18. (Receipt of healthy sapling)

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