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Technological solutions for improving the welfare of gestating sows in group housing

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Abstract. Modern pig breeding is focused on improving the welfare of sows by optimising housing conditions and introducing natural feed additives with hepatoprotective effects. The aim of the study was to determine the effect of the complex feed additive "Gepasorbex" on the behavioural reactions

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of gestating sows. The experiment was carried out under conditions of group housing of animals in industrial conditions of the private-rental enterprise "Victoria" (Mykolaiv region). The experiment was carried out on 62 heads of two-breed sows (Large White × Landrace), inseminated by boars of the terminal line "*Maxter*". The sows were divided into three groups: control (basic diet), experimental II (basic diet + 0.15% "Gepasorbex") and experimental III (basic diet + 0.15% commercial analogue). Behavioural responses were assessed using video monitoring (*Mobotix 6MP* network camera) for two weeks. It was found that the addition of the feed additive "Gepasorbex" to the diet contributed to a decrease in motor activity (186.5 min in experimental group II vs. 289.2 min in the control group, $p \leqslant 0.001$), an increase in rest time (by 4, 18-6.41 % more compared to the control, $p \leqslant 0.01$) and a decrease in stereotypical behaviour, in particular fictitious chewing (decrease by 120.2-131.1 min, $p \leqslant 0.001$) and hunger indication (by 109.0-111.8 min, $p \leqslant 0.01$). The use of "Gepasorbex" as a functional feed additive for gestating sows has demonstrated its effectiveness in improving their behavioural profile, which confirms the feasibility of using natural hepatoprotectors in programmes to improve animal welfare. The results of the study indicate that the inclusion of mycotoxin adsorbents in the diet helps to reduce stress reactions, increase the comfort of keeping and the overall welfare of sows. The data obtained can be used to optimise technological solutions in industrial pig production systems

Keywords: mycotoxin adsorbents; pig welfare; video monitoring; group housing; feed components; feed additive

Introduction

Modern pig farming is actively developing towards improving animal welfare and optimising feeding practices. One of the key aspects of effective sow management is creating comfortable conditions that align with welfare principles, as well as employing sensible feeding strategies. Natural feed additives, particularly those based on milk thistle and other botanical components known for their hepatoprotective and antioxidant properties, are attracting significant attention.

Keeping gestating sows in groups is a common and mandatory housing method that aligns with the concept of welfare and has a positive impact on the animals' social behaviour. During the production cycle, sows are regrouped after insemination through re-mixing, which can obviously lead to aggressive forms of internal interaction and restlessness within the groups (Lopez *et al.*, 2021).

As M. Priester *et al.* (2020) noted, a restricted feeding regime is used to prevent obesity in sows throughout the reproductive cycle – they are typically fed twice a day (at 8^{00} and 16^{00}), which activates high feed motivation and reduces resting time. Researchers from Mexico, P. Islas-Fabila *et al.* (2024), stated that to meet energy requirements, the feeding allowance for pregnant sows varies around 2.4-2.6 kg, which constitutes approximately 50-60% of *ad libitum* intake.

According to M.C. Meunier-Salaun *et al.* (2001), the controlled feeding of pregnant sows contrasts with the natural form of feeding and can lead to the manifestation of atypical behaviours (stereotypies): bar biting; sham or vacuum chewing (chewing movements not associated with feed intake); sniffing or licking the floor or feeder in the absence of feed; time spent standing compared to lying down is used as an indicator of hunger, as sows do not appear satiated. It is worth noting that the feeling of satiety, which is insufficient with restrictive feeding of sows, and the reduction of hunger are the corrective factors by which positive changes can be introduced into sow feeding strategies.

In the convincing opinion of Korean researchers S. Do *et al.* (2023), diets for gestating sows enriched with fibre reduce active oral stereotypies,

increase chewing and resting time, and decrease the rate of feed consumption. Furthermore, diets with the addition of milk thistle contain a number of biologically active substances that mitigate the negative consequences of hunger by reducing exploratory behaviour, and postprandial satiety is increased due to fibre consumption, raising the level of short-chain fatty acids in the blood and lowering the level of the digestive hormone ghrelin (Jensen *et al.*, 2015).

Thus, the available literature search suggests that the components of feed additives used for feeding gestating sows reduce the motivation to eat feed, provided that the animals' nutrient requirements are met, as in the specific experiment. According to the research results of R. Faustovet *et al.* (2022), the use of a complex feed additive based on milk thistle, active feed yeast, clinoptilolite, and selenium in the compound feed alters the feeding behaviour of fattening pigs, significantly improving their live weight gain and biochemical blood parameters, effectively neutralising the negative effects of mycotoxins without disrupting the vitamin balance in the body. V. Reznichenko *et al.* (2024) asserted that the complex feed additive "Gepasorbex" in the diet of sows during different periods of farrowing and lactation significantly improves their reproductive performance, promoting an increase in the reproductive index and offspring survival, creating a favourable nutritional environment that reduces the effects of feed toxins and stimulates the physiological mechanisms of growth and development in piglets.

Therefore, based on the aforementioned experimental results, it has been established that due to the saturation of diets with the components of the feed additive, there is a constant absorption of nutrients and greater microbial fermentation in the intestines, which, in fact, increases the satiety of sows. However, according to available information resources, there is insufficient material on the behaviour of sows during farrowing when using innovative feed additives. In this regard, the aim of the conducted research was to determine the nature of changes in the behavioural responses of gestating sows under the influence of the feed additive "Gepasorbex".

Materials and Methods

In groups of sows kept by the group method, the effect of the complex feed additive "Gepasorbex" on animal behaviour was evaluated in the conditions of industrial technology of the private-rental enterprise (hereinafter – PRE) "Victoria" in the Mykolaiv region according to the experimental scheme (Table 1). In total, 62 heads of two-breed sows (Large White (LW) × Landrace (L)) were used in the experiment in combination with boars of the "*Maxter*" terminal line.

Table 1. *Scheme of use of feed additives in diets of gestating and sow diets*

	Group	*n*	Breed		Feeding conditions
			sows	boar	
I	control	19	LW × L	*Maxter*	BD* "Empty, sows"
II	experimental	22	LW × L	*Maxter*	BD "Empty, sows" + 0.15% by weight of feed "Gepasorbex" *
III	experimental	21	LW × L	*Maxter*	BD "Empty, sows" + 0.15% by weight of feed "Commercial analogue" **

Note: * – basic diet; ** – experimental feed additives were introduced into the diet directly in the farm's feed shop when making these recipes

Source: compiled by the authors

Sows were kept in group pens (with a stocking density of 2.1 m² per animal), and were fed 2.5-2.7 kg of feed per head per day using compound feed of the "Dry and Gestating Sows" type, with the following nutritional content: crude protein – 144.9 g/kg; metabolisable

energy – 2914.7 kcal/kg. The basic diet (BD) consisted of compound feed produced in-house using premixes and protein-mineral-vitamin supplements manufactured by LLC "Tsekhave" (Ukraine) with the corresponding composition for "Dry and Gestating Sows" (%): wheat – 34.0; barley – 45.0; sunflower meal – 14.5; soya bean meal – 3.0; premix "Tsekhavit Sou Suporos" – 3.5; "Lactating Sows" (%): wheat – 43.5; barley – 30.0; sunflower meal – 10.0; soya bean meal – 11.5; premix "Tsekhavit Sou Laktatsiya" – 5.0.

The composition of 1 kg of the feed additive "Gepasorbex" (LLC "VetServisProdukt", Ukraine) contained the following active components (%): silicon dioxide – 60.2-70.8; aluminium oxide – 8-12; magnesium carbonate – 1.0-2.5; titanium dioxide – 0.8-0.15; selenium – 0.32-0.35; clinoptilolite – 4.2-4.5; active feed yeast – 8-10; milk thistle – 18-20%. The composition of the "Commercial Analogue" feed additive was: silicon dioxide (SiO_2), kaolinite clay, magnesium silicate, inactivated yeast (*Saccaromyces Cerevisiae*), sugar kelp (*Laminaria saccharina*), wild chicory and marigold extracts, dry matter – 954.0 g (Reznichenko *et al*., 2024). The main compound feed used for feeding the pigs in the experimental groups was recognised, according to laboratory tests by LLC "Expertnyi tsentr "Biolaites", as slightly toxic in terms of aflatoxin, ochratoxin, and zearalenone.

The monitoring of behavioural responses was carried out using a *Mobotix 6MP* network video camera (*MOBOTIX AG,* "*Langmeil*", Germany), equipped with "fisheye" lens, motion detection, and infrared illumination. Observations were conducted over two weeks during daylight hours (07:00 to 17:00) with three repetitions. For identification, each sow was marked with special tags, which allowed for the analysis of video footage. The duration (in minutes) of the main behavioural acts was assessed, such as: movement, resting (standing, sitting, ventral and lateral lying), feeding, chewing, exploratory activity, play behaviour, as well as the manifestation of stereotypies (sham chewing, signs of hunger, biting equipment) in accordance with generally accepted methods (Ibatulin & Zhukovskyi, 2017; Ladyka & Khmelnychiy, 2023).

The housing conditions of the experimental animals complied with the Departmental norms of technological design: Pig enterprises (complexes, farms, small farms) (2005) and the recommendations of genetic companies regarding housing. The rules for handling the experimental animals complied with Ukrainian legislation "Requirements for the welfare of farm animals during their keeping" (Order of the Ministry..., 2021). Ventilation was carried out using exhaust shaft fans and aerodynamic inlet valves and operated by creating negative pressure in the room. Manure removal from the room was carried out by means of a vacuum-gravity periodic action system from baths located under the slatted floor. All veterinary treatments were identical in both the experimental and control groups, according to the accepted scheme on the farm. The research results were processed using statistical methods (Kramarenko *et al*., 2019; 2024) with the use of computer equipment and applied software packages. The distribution of all variation series corresponded to the criteria of normality.

Results and Discussion

For the effective implementation of technological methods in industrial pork production, it is necessary to take into account the behavioural characteristics of animals. They help to predict future performance, promote pig welfare, optimise care and reduce labour costs. An important factor in the comfortable behaviour of gestating sows is their position in the pen and the frequency of changes in body position. Creating favourable conditions and reducing unnecessary motor activity facilitates animal observation, efficient feeding regulation and, most importantly, improves fertility. Monitoring of sow behaviour in the course of experimental studies made it possible to determine the key parameters of their behavioural acts, which are shown in Table 2.

Table 2. *Main indicators of behavioural repertoire of gestating sows as a result of the experiment*

Behavioural parameter	Definition
Movement	Changing the position of the sow's body or its individual parts through the locomotor system in order to interact with the environment.
Rest	A behavioural act aimed at acquiring a body position in the stall to restore the normal state of the body.
Standing	A static act of rest, when the ligaments of the supporting limbs are stretched, the rest of the body's muscles are consistently resting, and, therefore, no active locomotor activity takes place.
Sitting	The position of an animal in which a pair of hind limbs are relaxed on the floor, and the animal fixes the body position with its forelimbsц.
Ventral lying down	The animal's limbs are placed under the body while lying on the floor.
Lateral lying down	An animal lying on the floor has its limbs extended to the side.
Urination	Urinary act of elimination behaviour, the animal arches its back, spreads its pelvic limbs and squats slightly.
Defecation	The process of removing faeces from the body.
Foraging activity	It refers to feeding behaviour and consists of actually taking in the feed and chewing it in the mouth.
Imitation of chewing	Physical mobility of the oral cavity in the absence of food.
Indication of hunger	This is the behaviour of searching for and waiting for feed outside of feeding time.

Source: authors' development

In the course of video monitoring, it was found that the sows of the II experimental group spent the least time on mobility (186.5 min), followed by their counterparts of the III experimental group (196.8), which convincingly indicates stable hierarchical behaviour in group pens and the absence of operant reactions (Fig. 1). Significantly ($p < 0.001$) higher mobility was observed in sows of the first control group and, accordingly, outperformed their peers of the second experimental group by 102.7 min, and the third experimental group – by 92.4 min. Such increased locomotor activity has a number of dangers for animals (injuries, reduced productivity, risk of fetal loss, stress, aggression) and is a signal for pork production technologists to analyse and timely correct this act of behaviour in order to minimise undesirable effects on their productivity and welfare (Sun *et al.*, 2014).

The experimental sows of the II and III groups spent significantly ($p < 0.01$) more time on rest, respectively, by 4.18 % and 6.41 %, compared to the animals of the control group. There is an assumption that the presence of mycotoxin adsorbents in the diets of sows of the experimental groups reduces stress, physiological stress on the body, stabilises hormonal levels, and promotes the accumulation of energy for the body, which in turn leads to an increase in the period of rest of animals.

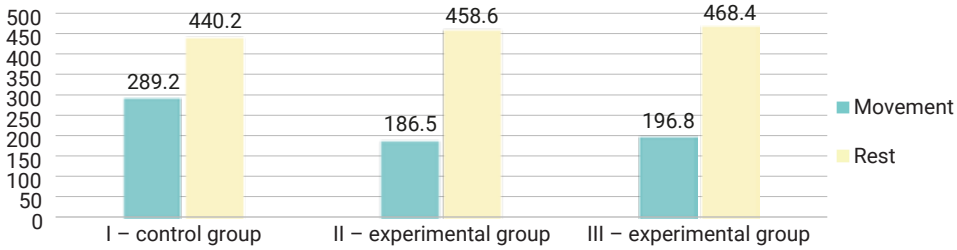

Figure 1. *Timekeeping of user actions of experimental sow groups during the experiment, min*

Source: authors' development

Sows, regardless of the group assignment, spent 13-15 s of time on urination during the experiment, and the number of urination acts was up to 6 times during video monitoring, which corresponds to the physiologically normal state of animals. Finally, the duration of the defecation act in gestation sows of different groups during the monitoring period was 5-7 s in 3-4 approaches, and the sows took a physiological posture during this act. It should be emphasised that the components of the rest indicator of gestation sows varied and depended on the purpose of the groups (Fig. 2). The timing of the components of the rest elements shows that sows of the II experimental group spent 40 min ($p < 0.05$) less time standing, and sows of the III experimental group spent 24 min less (difference not significant) standing compared to control sows. A possible explanation for the reduced standing time in sows of the experimental groups is an increase in postprandial satiety due to the presence of mycotoxin adsorbents in their diets and their powerful action in the intestine. The time spent on sitting by sows of the II-III experimental groups was higher and exceeded the same indicator of the I control group by 37.0-38.8 minutes ($p < 0.05$). An increase in the period of rest in the form of both ventral and lateral lying was characteristic of animals of the II and III experimental groups, which exceeded the sows of the control group by 11.7-12.5 min and 6.5-7.1 min, respectively.

Visualisation of the feeding behaviour of sows (Fig. 3) shows that the feeding activity of the II and III experimental groups of sows by the time spent on it was higher due to feed intake – 18.3-22.5 min compared to control counterparts, and by the time spent on chewing the feed, no significant difference was found in the groups.

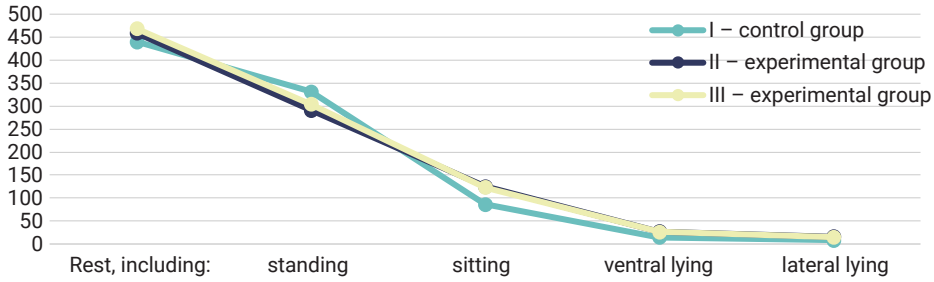

Figure 2. *Timekeeping of the components of behavioural acts of rest of experimental sow groups during the experiment, min*

Source: authors' development

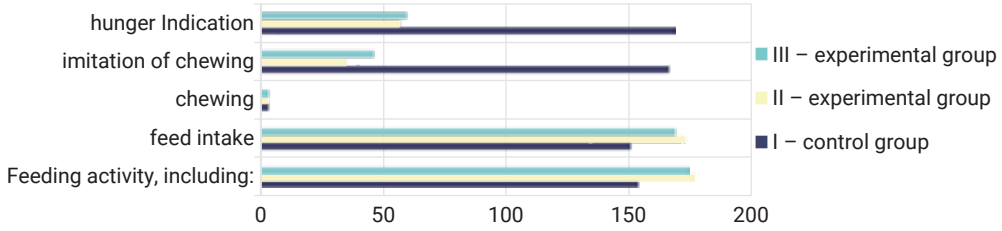

Figure 3. *Feeding behaviour of experimental groups of sows during the experiment, min*

Source: authors' development

Typically, gestating sows are fed in limited quantities, and they show high motivation to eat after their daily allowance is consumed, which leads to the development of stereotypic behaviour

(regularly repeated movements that are morphologically identical and have no obvious function). In sows, stereotypical behaviour is often associated with feeding: imitation of chewing, indication of hunger, which confirms the connection with the motivation to feed. As can be seen from the experiment, sham or vacuum chewing was visualised to a greater extent in sows of the control group I, which spent significantly more time on this behavioural act – 131.1 min ($p < 0.001$) compared to the experimental group II and 120.2 min ($p < 0.001$) – to the experimental group III. Imitation of chewing is obviously associated with a combination of insufficient satiety and a disorder of feed search or intake behaviour, as in the case of sows of the control group I (Fig. 4).

Figure 4. *Stereotypical behaviour of sows – "imitation of chewin"*
Source: photo by the authors of the study

The stereopathy of gestating sows "hunger indication" is usually manifested in the search and expectation of feed outside the feeding time and is visualised by sniffing (Fig. 5), licking (Fig. 6) the feeder in the absence of feed. It should be noted that sows of the first control group spent the most time on this consumptive behavioural act – 168.6 min, which significantly exceeded the time spent by 111.8 min ($p < 0.01$) for the peers of the second experimental group and 109.0 min ($p < 0.01$) – respectively, for the sows of the third experimental group.

Figure 5. *Stereotypical behaviour of gestating sows – "hunger indication" in the form of sniffing the trough in the absence of feed*
Source: photo by the authors of the study

Figure 6. *Stereotypical behaviour of gestating sows – "hunger indication" in the form of licking the trough in the absence of feed*
Source: photo by the authors of the study

At the same time, the experiment increased the frequency of cases of non-feeding oral behaviour of sows of the first control group in the form of biting the rods of the group pen, which accounted for up to 17 minutes during the experimental timing (Fig. 7).

Figure 7. *Non-feeding oral behaviour of gestating sows in the form of biting the bars of a group pen*
Source: photo by the authors of the study

A time-and-motion study of the components of resting behaviour showed that the gestating sows in the second experimental group spent 40 minutes less time standing ($p < 0.05$), and their counterparts in the third experimental group stood for 24 minutes less (the difference was not statistically significant) compared to the control sows. An increase in the resting period, both in terms of ventral and lateral lying, was characteristic of the animals in the second and third experimental groups, which exceeded the control group sows in the time spent on this behavioural indicator by 11.7-12.5 minutes and 6.5-7.1 minutes, respectively.

In modern pig farming, effective management of technological processes involves not only optimising housing conditions but also considering the behavioural responses of animals as a key element in ensuring their welfare and productivity, as highlighted by researchers J.C. Jang & S.H. Oh (2022). The behaviour of gestating sows, in particular: locomotor activity, duration of rest, feeding motivation, and the manifestation of stereotypies, are closely related to the physiological state of the organism and reflect the degree of adaptation to housing and feeding conditions, as evidenced by the precision feeding programmes for gestating sows in the study by R.L. Domingos *et al.* (2024). The obtained results of the current experiment convincingly demonstrate that the use of the complex feed additive "Gepasorbex" in the diet of gestating sows positively affects their behavioural repertoire, reducing the level of stress load on the body and contributing to the maintenance of farrowing.

It was established that the lowest level of locomotor activity was observed in the sows of the second and third experimental groups, which likely indicates a stable social hierarchy and a low level of distress in group housing conditions. This aligns with the conclusions of the research by J.C. Jang & S.H. Oh (2022), who noted that increased locomotor activity can be a sign of anxiety, stress, and even the risk of foetal loss. Thus, the reduction of unnecessary movements in sows can be interpreted as a sign of improved physiological and psycho-emotional state of the animals when using the complex feed additive "Gepasorbex".

An increase in the duration of rest, particularly in the form of ventral and lateral lying, was characteristic of the animals in the second and third groups, which is consistent with the research by S. Huang *et al.* (2020), who pointed out the importance of minimising locomotor activity in gestating sows to prevent complications during farrowing. The decrease in standing time in the experimental animals is likely due to an increased level of postprandial satiety, which promoted physiological rest and reduced the risk of developing limb pathologies, consistent with the studies conducted by T. Kramer *et al.* (2023). As the authors M. Priester *et al.* (2020) stated, "feeding, pig farming and ethology no longer need to be considered separately", and therefore, the feeding activity of the gestating sows in the experimental groups should be considered.

The feeding activity of the sows that received the complex feed additive "Gepasorbex" was directed towards efficient feed consumption with a simultaneous reduction in the manifestations of stereotypical behaviour, in particular: sham chewing, indications of hunger, and aggressive reactions, which were most frequently recorded in the animals of the control group. The aforementioned phenomenon is typical for a restricted feeding regime, which is confirmed by the work of L. Vargovic *et al.* (2021), which noted that pregnant sows with high feed motivation demonstrate pronounced stereotypies in the case of feed deficiency or an unbalanced diet. The addition of mycotoxin adsorbents, in particular the multicomponent preparation "Gepasorbex", contributed to the stabilisation of the animals' mental profile, which is indirectly confirmed by a decrease in stress-associated behaviour. Similar results are presented in the studies by T. Feyer *et al.* (2021), who found that the use of sorbents in pig diets helps to improve behavioural responses and reduce aggression in group housing conditions.

The recording of behaviour within the framework of experimental monitoring also made it possible to establish a decrease in the manifestations of non-nutritive oral behaviour in the animals of the second and third experimental groups. In particular, the reduction in the time spent biting bars is a positive indicator of a decrease in frustration resulting from restricted access to feed or stress-inducing influences. This aspect was also considered in the study by S. Do *et al.* (2023), which noted that disturbances in feeding behaviour can be early signs of reduced welfare in pig farming. The occurrence of stereotypical behaviour reflects increased feed motivation after feeding and is interpreted as a sign of impaired welfare, and hunger and frustration in feeding motivation consequently increase aggression and competition for feed in group housing systems (Sapkota *et al.*, 2016; Shang *et al.*, 2019).

An additional argument in favour of using the "Gepasorbex" additive is its effect on reducing the risk of metabolic distress, which often accompanies intensive culling in pig farming. As R. Faustov *et al.* (2022) noted, mycotoxin adsorbents are capable not only of binding toxins in the gastrointestinal tract but also of reducing their systemic effects, lowering the activity of the hypothalamic-pituitary-adrenal axis. This indirectly contributes to a decrease in the production of cortisol – the stress hormone – which has a direct impact on the behaviour, appetite, and reproductive performance of sows. Considering the above, it becomes obvious that the improvement of behavioural responses in sows is not only an ethological but also a physiologically justified consequence of using a high-quality multicomponent additive in the diet (Slama *et al.*, 2019). It is also worth noting that the improvement of behavioural characteristics under the influence of "Gepasorbex" may also have a positive effect on rank relationships within groups in general. Reducing the level of aggression, competitive struggle for feed, manifestations of stress and frustration contributes to the formation of more stable social interactions between sows. This is particularly important in industrial housing conditions, where stocking density and limited space can be additional risk factors (Jang & Oh, 2022). Thus, the complex additive indirectly affects not only the individual behaviour of animals but also the harmonisation of relationships within the group, reducing the need for intervention by personnel.

Overall, the research results demonstrate that the use of the complex feed additive "Gepasorbex" allows not only to optimise metabolic processes (Krogh *et al.* 2016) in gestating sows but also significantly affects their behavioural acts. This has practical significance in the context of improving farrowing maintenance and increasing animal welfare. Thus, the use of a complex feed additive based on mycotoxin adsorbents is an effective tool for implementing the principles of humane treatment of animals and rational pig farming in intensive production conditions.

Further research will be aimed at a deeper study of the neuroendocrine mechanisms of the

influence of feed additives on the behaviour of gestating sows, particularly in the context of stress-induced reactions and metabolic homeostasis. It is also advisable to involve broader biochemical markers that reflect the level of stress, satiety, and adaptive potential of animals in industrial conditions.

Conclusions

In commercial production pig farms, in order to adapt the methods of controlling limited dietary intake according to detailed regulations and the associated stereotypical behaviour in pregnant sows, it is necessary to apply the case of practical solutions to sow feeding with the use of complex feed additives of mycotoxin adsorbents. In our case, it is "Gepasorbex", which reduces the apparent motivation to feed gestating sows and improves their welfare.

Monitoring the behaviour of sows in group housing systems makes it possible to assess their welfare, predict productivity and minimise the risks associated with excessive physical activity, stress and injury. The study found that sows of the II and III experimental groups showed lower mobility, which indicates stable social behaviour, lack of operant reactions and a reduced likelihood of stress factors that can negatively affect the preservation of farrowing.

The addition of mycotoxin adsorbents to the diet helped to reduce the stress load on the body, which is confirmed by an increase in the duration of rest in sows of the experimental groups. Animals of groups II and III spent more time sitting and lying down, which had a positive effect on their general physiological condition. The physiological parameters of urination and defecation in all groups were normal, which confirms the absence of a negative effect of the studied factors on the functioning of the sows' body.

In the control group, more manifestations of stereotypical behaviour were recorded, including mock chewing, hunger indication and biting equipment, which indicates increased motivation to feed and the presence of stress factors. Instead, in the experimental groups, these behavioural deviations were observed much less frequently, which may be due to better saturation and stabilisation of the physiological state due to feed additives. Thus, the use of mycotoxin adsorbents in feeding helps to improve the overall welfare of sows, reducing stress and aggression in group housing systems.

In the future, a promising direction is to study the neurobiochemical mechanisms by which the feed additive "Gepasorbex" affects the behavioural reactions of gestating sows. In particular, it is advisable to monitor the levels of cortisol, serotonin, leptin and other biomarkers that reflect stress response, feeding motivation and adaptive capabilities of pigs. Of particular scientific value is the study of the impact of feed additives on the development and behavioural characteristics of offspring, including the assessment of viability, growth rates and stress resistance of newborn piglets, which will allow a more complete assessment of the long-term effectiveness of such dietary correction in gestating sows.

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Conflict of Interest

None.

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Технологічні рішення для покращення благополуччя поросних свиноматок при груповому утриманні

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Анотація. Сучасне свинарство орієнтується на підвищення благополуччя свиноматок шляхом оптимізації умов утримання та впровадження натуральних кормових добавок із гепатопротекторною дією. Метою дослідження було визначити вплив комплексної кормової добавки «Гепасорбекс» на поведінкові реакції поросних свиноматок. Експеримент проводився за умов групового утримання тварин у промислових умовах приватно-орендного підприємства «Вікторія» (Миколаївська область). Експеримент проведено на 62 головах двопородних свиноматок (велика біла × ландрас), запліднених кнурами термінальної лінії «*Maxter*». Свиноматки були розподілені на три групи: контрольну (основний раціон), дослідну II (основний раціон + 0,15 % «Гепасорбекс») та дослідну III (основний раціон + 0,15 % комерційного аналога). Оцінка поведінкових реакцій проводилася за допомогою відеомоніторингу (мережева камера *Mobotix 6MP*) протягом двох тижнів. Встановлено, що додавання кормової добавки «Гепасорбекс» до раціону сприяло зниженню рухової активності (186,5 хв у дослідній II групі проти 289,2 хв у контрольній, $p \leqslant 0,001$), збільшенню часу відпочинку (на 4,18-6,41 % більше, порівняно з контролем, $p \leqslant 0,01$) та зменшенню проявів стереотипної поведінки, зокрема фіктивного жування (зниження на 120,2-131,1 хв, $p \leqslant 0,001$) та індикації голоду (на 109,0-111,8 хв, $p \leqslant 0,01$). Застосування препарату «Гепасорбекс» як функціональної кормової добавки для поросних свиноматок продемонструвало ефективність у покращенні їхнього поведінкового

профілю, що підтверджує доцільність використання натуральних гепатопротекторів у програмах підвищення рівня благополуччя тварин. Результати дослідження свідчать про те, що включення до раціону адсорбентів мікотоксинів сприяє зниженню стресових реакцій, підвищенню комфортності утримання та загального добробуту свиноматок. Отримані дані можуть бути використані для оптимізації технологічних рішень у системах промислового свинарства

Ключові слова: адсорбенти мікотоксинів; благополуччя свиней; відеомоніторинг; групове утримання; компоненти комбікормів; кормова добавка