



L. Fihurska PhD. Sc., Associate Professor, E-mail: fihurska@gmail.com

<https://orcid.org/0000-0002-5555-6888>, Researcher ID: C-5633-2016

O. Tsiundyk, PhD. Sc., Associate Professor, E-mail: malik2008ts@gmail.com

<https://orcid.org/0000-0003-1846-3110>, Researcher ID: C-1401-2016

I. Chernega, PhD. Sc., Associate Professor, E-mail: ilonamalaki@gmail.com

<https://orcid.org/0000-0002-9507-8489>, Researcher ID: C-1457-2016

Department of grain and compound feed technologies

Odesa National University of Technology, 112, Kanatna Str., 65039, Odesa, Ukraine, +38487124113

STATUS AND DEVELOPMENT PROSPECTS OF PRODUCTION OF MIXED FEEDS FOR SWINE OF DIFFERENT AGES

Abstract

The article discusses the types of pig feeding in Ukraine. The quality result of piglet fattening is 60...70% influenced by the feed itself, about 20% by animal genetics, 10% by veterinary care, and about 10% by housing conditions. The number of pigs was analyzed. In Ukraine, according to the State Statistics Service, as of January 1, 2023, the pig population was 4.95 million heads. The world pig population in 2021 was approximately 1.02 billion heads, the largest pig population in China - more than 400 million heads. The total pig population in the EU in 2022 was 237 million heads. The production of compound feed for pigs in Ukraine is analyzed. According to the State Statistics Service of Ukraine, the production of compound feed for pigs in 2021 amounted to 1.2 million tons. China, the USA, Brazil, Spain and Mexico are among the countries that produce compound fodder for pigs in the world. The consumption of feed and water by pigs depending on the daily gain was considered, as well as the scheme of feeding piglets with full-rational compound feed per day. It is necessary to observe the daily rate of consumption of nutrients and biologically active substances depending on the age of young pigs. The modern organization of pig fattening, which involves one-, two- or three-phase feeding systems, is considered. The need for the production of compound feeds for pigs that meet feeding standards and restrictions on the introduction of components is substantiated. Types of compound feed and their advantages are presented. Such technological methods of production of compound fodder for pigs as granulation, extrusion, expansion were analyzed. Due to the high temperature and pressure, the nutritional value of compound feed improves. When feeding mixed fodder by the wet-heat treatment method, minimal mechanical losses occur, feed costs are reduced by 7...8%, and the growth energy of young animals increases by 6...12%. When fed with balanced feed, the productivity of animals increases by 12...15%, and when enriched with microelements and other substances, by 25...30% in relation to feeding with certain types of grain.

Key words: mixed feeds, feeding, pig population, wet-heat treatment, pelleting, extrusion.

Introduction

The profitability of pig farming is determined by the quality of fattening of young pigs. Pigs can produce a significant amount of meat in a relatively short period of time. According to the Food and Agriculture Organization of the United Nations (FAO), the world pig population in 2021 was approximately 1.02 billion heads, with the largest pig population in China being more than 400 million heads. The total number of pigs in the EU in 2022 was 237 million heads.

The increasing demand for pork across the world, food safety concerns, and trends such as animal health and welfare, sustainability and environmental impact stand out as the main driving factors in the swine feed market.

In Ukraine, according to the State Statistics Service, as of January 1, 2023, the pig population was 4.95 million heads (Fig. 1) [1].

In Ukraine, the largest number of pigs is in

the Kyiv region - 639.1 thousand heads (Table 1) [1].

Since 2022, the pig population has decreased, but there is still potential for the development of pig farming in Ukraine, especially given the growing demand for pork products in the domestic market. According to the State Statistics Service of Ukraine, the production of compound feed for pigs in 2021 amounted to 1.2 million tons (Fig. 2, Table 3) [1].

Global pig feed production was estimated at 256 million metric tons in 2020, according to the Alltech

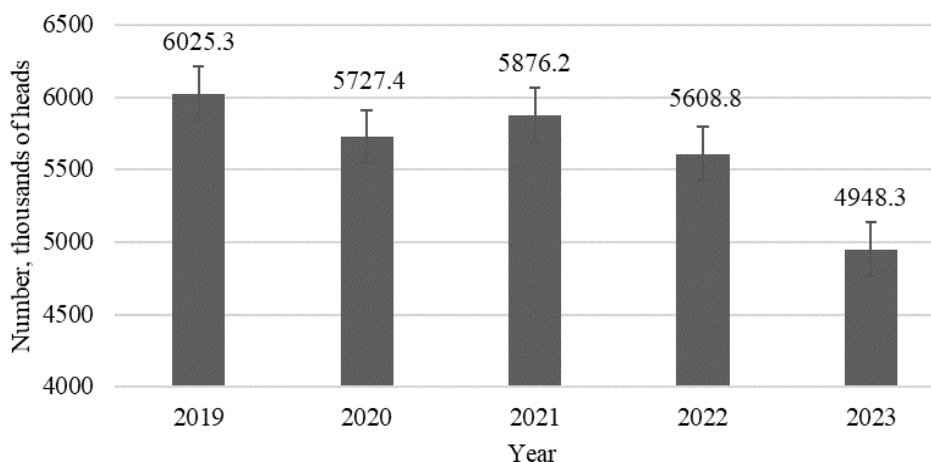


Fig. 1. The number of pigs in farms of all categories of Ukraine (as of January 1), thousand heads

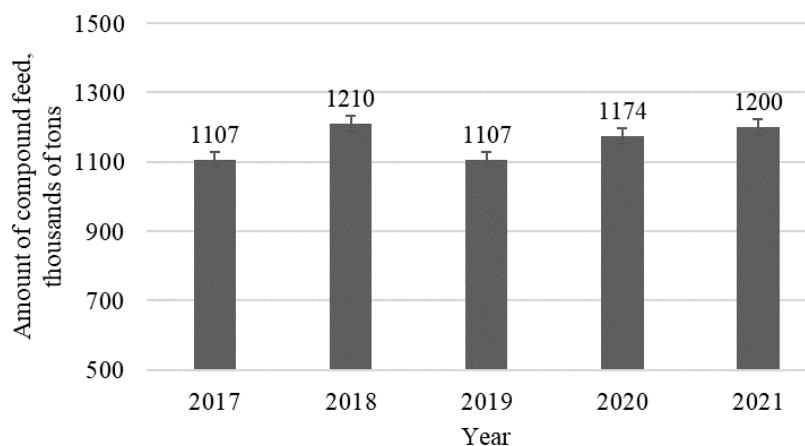


Fig. 2. Production of compound feeds for pigs, thousand tons

Table 1 – Number of pigs in all regions of Ukraine, thousand heads

Region	Year			
	2019	2020	2021	2022
Kyiv	480.7	519.7	555.4	639.1
Lviv	417.3	332.4	362.7	435.3
Ternopil	339.3	298.9	354.3	387.3
Khmelnitsky	325.9	312.2	324.4	357.4
Cherkasy	358.8	334.8	346.6	327.9
Poltava	322.2	273.7	321.9	318.8
Dnipropetrovsk	363.3	342.5	332	296.8
Ivano-Frankivsk	310.7	304.6	306.1	287.5
Volyn	285.9	270.4	250.8	237.4
Transcarpathia	242.7	248.8	252.2	221.3
Rivne	243.7	235.5	226.2	220.9
Vinnitsa	251.4	245.6	240.2	203
Kirovohrad	220.5	213.5	203.8	195.9
Chernihiv	178	195	208.1	189.2

Global Feed Survey. China, the USA, Brazil, Spain and Mexico are among the countries that produce compound fodder for pigs in the world [2].

Pig feed production was down globally in 2022 by almost 3%. African swine fever and high feed prices depressed pig production in many countries. However, in Vietnam, China, South Africa, Brazil and Mexico, better

pork prices and other market conditions led to growth in the sector.

According to Agri-Food Outlook 2023 report, prepared by Alltech, global feed tonnage totaled 1.266 billion metric tons in 2022. 319.4 million tons of this is swine feed. This corresponds to about 25.6 percent of the total compound feed production in the world. According to the report, African swine fever (ASF) and high feed prices depressed pig production in many countries. As a result of this, global swine feed production, which was 322.2 million tons in 2021, decreased by 2.98% in 2022 to 319.4 million tons.

ASF remains a significant threat to other markets, such as Europe where the occurrence is confined predominantly to the wild pig population, and North America, considering its presence now in Central America [3].

Europe is the second largest producer of swine feed in the world. The countries in the region produced around 81.9 million tons of swine feed in 2021. However, this production amount decreased to 75.1 million tons with a record decrease of 8.25 percent in 2022.

ASF affected the Eastern European countries and Ireland, where feed tonnage was down 2.16%. Germany reported an 8% reduction in feed tonnage due to a ban on exports to Asia. Spain, the largest swine feed producer in the region, produced 15.8 million tons in 2022. In the region, high production costs and low pork prices affected pig producers, but prices are showing signs of recovery, according to the Alltech report [3].

There are different forecasts of the global commercial scale of the swine feed market. For example, according to swine feed market report by IMARC Group, the global swine feed market size reached US\$ 116.8 billion in 2022. Looking forward, IMARC Group expects the market to reach US\$ 141.2 billion by 2028, exhibiting a growth rate (CAGR) of 3.3% during 2023-2028. Mordor Intelligence also makes close predictions. According to the company's report, the global swine feed market size is expected to grow from US\$ 103.49 billion in 2022 to US\$ 128.96 billion by 2028, at a CAGR of 4.50% during the forecast period (2023-2028).

Table 2 - Global swine feed production was down in 2021/2022

Region	Sum of 2021 pig feed tonnage (MMT*)	Sum of 2022 pig feed tonnage (MMT*)	Growth (MMT)	Growth, %
Africa	3.319	3.317	(0.002)	-0.05
Asia-Pacific	143.537	140.377	(3.159)	-2.20
Europe	81.871	75.117	(6.754)	-8.25
Latin America	35.450	36.167	0.717	2.02
Middle East	0.007	0.007	0.000	0.00
North America	63.600	62.984	(0.616)	-0.97
Oceania	1.401	1.414	0.013	0.93
Grand Total	322.185	319.383	(9.801)	-2.98



Statistics MRC points to much higher market sizes and growth rates compared to the other two research companies. According to the company's report, the global swine feed market is accounted for US\$ 136.30 billion in 2022 and is expected to reach US\$ 183.28 billion by 2028 growing at a CAGR of 5.06% during the forecast period [4, 5, 7].

The production of compound feed for pigs is an important component of the Ukrainian compound feed industry. The growth and development of the pig industry in Ukraine is closely related to the availability and quality of pig feed, and efforts to improve the production and quality of pig feed will be critical to the competitiveness and sustainability of the industry.

According to Statistics MRC, there are three major constraints in the market: the price volatility of raw materials, the growing veganism trend and animal diseases. According to the company's report, the market's expansion may be hampered by the high price volatility of the raw materials and additives used in the manufacturing of feed. For instance, a considerable increase in maize prices may adversely affect the owners of small and medium-sized pig farms' capacity to pay it. The demand for pig meat is expected to be hampered by the increased number of people choosing vegan and vegetarian diets and giving up animal products, which would further negatively impact the industry [4, 6, 7].

Table 3 – Regional distribution of pig feed production in Ukraine, thousand tons

Region	Pig feeds
Kyiv	200.7
Poltava	142.9
Khmelnitsky	111.0
Ternopil	95.2
Dnipropetrovsk	85.1
Lviv	57.1
Zaporizhzhia	54.4
Vinnitsa	50.9
Kirovohrad	42.6
Kharkiv	41.7
Chernihiv	33.8
Cherkasy	28.4
Volyn	25.0
Sumy	13.9
Mykolaiv	13.2
Kherson	11.8
Odesa	6.9
Transcarpathia	4.2
Rivne	3.9
Zhytomyr	0.3
Ivano-Frankivsk	0.2
Chernivtsi	0.2
Ukraine	1263.7

Worldwide producers are making efforts to reduce the environmental impact of swine production, particularly in terms of water and air pollution. As consumer and corporate concerns about sustainability continue to grow, swine producers face increasing pressure to reduce their footprint and adopt more sustainable practices to cater to the demands of their downstream customers [3].

Consumers are becoming more concerned about the origin and quality of their food, leading to a rise in demand for products from animals raised in humane and sustainable conditions. This trend is driving the adoption of new feeding practices and technologies that promote animal welfare and reduce environmental impacts. High awareness, the growing demand for animal nutrition, and the ban of antibiotics in many regions are prompting players in the livestock industry and meat manufacturers to use good quality feed and are anticipated to drive the swine feed market globally [4].

The purpose and objectives of the research

The purpose of the study is to analyse the feasibility and economic attractiveness of the production of compound feed for pigs of different ages, the peculiarities of feeding and the state of production of domestic compound feed for pigs.

Research results and their discussion

Proper organization of pig fattening helps to increase pork production and reduce its cost. Depending on the final products produced, the following types of pig fattening are distinguished [8]:

- 1) meat fattening - begins at 3.5...4.0 months of age and ends at 7.0...7.5 months of age for weights of 95...110 kg. The piglets are fed with complete ration compound feed, which should ensure an average daily gain of 400 g, at the end of fattening it is 700 g. For the meat type of fattening, pigs are kept in groups of 100 heads;
- 2) bacon fattening gives high quality pork. For this purpose, piglets of precocious breeds weighing 25.0...30.0 kg are selected at the age of 3.0 months and finish fattening at 6.0...7.0 months with a weight of 90...100 kg. When fed with compound feed, pigs give high average daily gains and high-quality meat. For bacon-type fattening pigs are kept in groups of 50 heads;
- 3) lard fattening - special fat breeds of pigs are used, as well as culled main sows and breeding boars. Sows are fattened to a weight of 160...200 kg, boars - 250...300 kg. The specific mass of lard in the carcass should be at least 50%. Compound feed for this type of fattening contains the optimal percentage of components for the formation of tasty lard with good technological parameters for salting, freezing, smoking. For lard type fattening pigs are kept in groups of 30 heads;
- 4) semi-fatty fattening - they use mainly one-time queens and castrated boars, which are fattened to a weight of 130...150 kg at the age of 10...12 months, the fat mass is 40...45% of the carcass weight.

In order for pigs to quickly gain weight, it is necessary to choose an animal with good characteristics. At the same time, it is necessary to take into account the

**Table 4 – Feed and water consumption**

Week	Weight, kg	Daily gain, g	Feed consumption, g	Water consumption, g
1	–	240...270	–	500
2	–	240...270	–	600
3	6.6...12.0	240...270	–	700
4	8.2...8.9	230...240	230...250	800
5	10.4...11.3	315...340	440...480	1000
6	12.9...14.0	355...385	580...620	1700
7	15.7...17.2	400...455	700...750	2200
8	19.0...20.0	470...500	820...880	2500
9	22.6...24.7	515...570	960...1030	3000
10	27.0...30.0	585...640	1110...1190	3400

Table 5 – Scheme of feeding piglets with complete ration compound feed, g per head/day

Age, days	Compound feed	Feed mixture	Juicy and green fodder
10...15	25	25	–
16...20	50	50	–
21...25	100	75	–
26...30	225	150	20
31...35	350	250	50
36...40	450	350	100
41...45	550	450	150
46...50	650	600	180
51...55	750	700	200
56...60	850	800	300

breed, state of health, age, sex, conditions of maintenance.

Feeding of young pigs should be sufficient to meet the needs of animals in all nutrients and biologically active substances according to age and live weight.

Unbalanced feeding leads to inhibition of growth of pigs and worsens fattening indicators. The quality result of piglet fattening is 60-70% influenced by the feed itself, about 20% by animal genetics, 10% by veterinary care, and about 10% by housing conditions.

At first, weaned piglets are fed up to five times a

day, then the amount is gradually reduced feeding up to three per day. Feeding should be carried out at the same time. During the first 10 days of life, the live weight of piglets increases by almost 2.0...2.5 times (Table 4), in 30 - by 6.0...8.0, in 60 days - 16.0...22.0 times or more. In the first 3 weeks of a piglet's life, mother's milk provides 100% nutrition, later its share gradually decreases and by the age of 8 weeks is approximately 30%. Also, piglets need water in the amount of 165...200 ml per 1 kg of live weight. The water should be clean and the temperature should not be lower than +12...15°C [8].

Depending on the technology used, piglets can be weaned in 28, 30, 45 or 60 days. It is believed that the acidity of gastric juice normalizes before this period, it is better to feed - they act, the immunity of the young person is formed. It is better to feed fully-rational combined fodder. First, the prestarter is fed, which allows the gastrointestinal tract of dairy piglets to quickly adapt to feed of plant origin.

The weight of piglets at weaning at 21 days should be more than 6 kg, at weaning at 28 days - more than 8 kg. The live weight of piglets on the day of weaning significantly affects the cost of rearing, 1 kg of additional weight of piglets at weaning is a 7-10 day reduction in fattening, and therefore a reduction in cost by approximately 5% [8]. An approximate scheme for feeding piglets is given in the table. 5.

When feeding pigs, it is necessary to adhere to the daily rate of compound feed in order to obtain high gains and good digestibility of feed. Excessive feeding leads to obesity, loss of feed, deterioration of appetite. The size of the daily norm depends on the age, biological characteristics of pigs, weather conditions and microclimate parameters. Piglets with a live weight of 5 kg should receive 6.3 MJ of energy per day, 10 kg - 10.9 MJ and 20 kg - 16.8 MJ, the older the piglet, the higher the exchangeable energy content (Table 6). It is necessary to adhere to the amount of energy in the daily ration of piglets, otherwise, if there is a shortage, they lose weight quickly, as they use the body's reserves to support life, growth retardation, exhaustion occurs [9].

Table 6 – Feeding standards for fattening pigs with an average daily gain of 650 g, per head per day

Показники	Body weight, kg						
	40	50	60	70	80	90	100...120
	Average daily gain, g						
	550	600	650	700	800	900	700
Fodder units	2.2	2.6	2.9	3.2	3.6	3.8	4.1
Exchange energy, MJ	24.5	29.0	32.4	35.6	38.8	42.5	45.4
Dry matter, kg	1.8	2.13	2.38	2.56	2.81	2.99	3.2
Crude protein, g	293	347	388	402	424	451	483
Lysin, g	13	15.3	17.1	17.4	17.7	19.7	21.1
Methionine+cystine, g	7.8	9.2	10.3	10.4	10.6	11.8	12.7
Crude fiber, g	108	128	143	175	197	209	224
NaCl, g	10	12	14	15	17	18	20
Ca g	15	18	20	21	23	24	26
P, g	12	15	16	18	19	20	21



The minimum requirement for crude protein for piglets is 5...15 kg - 18% of DM, the maximum requirement is 22%. Lack of protein leads to a decrease in protein synthesis, which significantly affects the growth and development of piglets. Carbohydrates are the source of energy for the vital functions of piglets - lactose, sucrose, starch, such carbohydrates as mannose, galactose and others - play the role of structural material for cell synthesis. The number of intestinal enzymes that break down carbohydrates gradually increases up to five weeks of age, ensuring the digestion of starch and polysaccharides that come with grain feed. The level of fiber in the rations of piglets must be controlled, it should be no more than 2...3% of the dry matter of the ration. Fats in the body of piglets serve as a source of energy and reserve substances of the body. Essential fatty acids (linoleic, linolenic and arachidonic) are not synthesized in the body of piglets, so they must be supplied with feed. Many life processes are supported by minerals. Calcium and phosphorus are important in piglets' diets. For every 1.5 g of calcium in the diet, there should be one part of phosphorus. The need for calcium is 1% of the dry matter of the feed [9].

The composition of a complete combined feed for pigs can include up to two dozen different components. Compound feed for pigs is produced for different age groups: pre-starters - for piglets in the suckling period from 5 days of age up to 12 kg; starters - for young animals from 12 to 30 kg; growers - for piglets from 30 to 65 kg; finish - for fattening pigs from 65 kg to 115 kg and more; sows (barren, farrowing, lactating); boars.

Under the modern organization of fattening pigs, one-, two- or three-phase feeding systems are provided.

One-phase pig fattening system - use of one compound feed recipe and regulation of the level of nutrient and biologically active substances in the animal's body according to the daily rate of compound feed feeding. Such a system is effective in the household, but does not improve feed conversion rates [10].

The two-phase pig fattening system involves two phases - the start and the finish. The starting phase lasts 30...35 days - until reaching 70 kg of live weight. The level of energy relative to the level of protein in compound feed should be lower. The final phase lasts 40...45 days - until reaching 105...120 kg of live weight. The level of energy relative to the level of protein in compound feed is, on the contrary, higher. The two-phase system is economically feasible for use in pig farms with up to 2,000 livestock [10].

The three-phase pig fattening system is relevant in pig farms where 1 thousand or more productive sows are raised. Such a system includes the starting, growing and finishing phases. The starting phase lasts from 30 kg and ends when the weight is 60 kg, the diet for such a phase has a low energy-protein ratio. Growth phase - from 60 to 90 kg, diet - with the same ratio of energy and protein. The final phase is until the weight of 110...115 kg is reached, a diet with more energy, but with less protein. The three-phase pig fattening system involves three recipes of compound feed and obtaining high productivity, minimal costs per unit of live weight gain [10].

Peculiarities of the technological process of the production of compound fodder for pigs

The production of compound feed for pigs begins with the cleaning and grinding of grain raw materials.

The process of grinding cereal grains effective in enhancing feed utilization and reducing excretion of dry matter (DM), nitrogen (N), and phosphorus (P). Decreasing particle size increases, the surface area of grain particles, facilitating greater interaction with digestive enzymes. The size, hardness, moisture content, and fiber content of grain kernels, as well as factors like the feeding rate into the grinder, mechanical aspects such as hammer tip speed, wear on hammers and screens, screen openings, roller speed, and the number of corrugations, can collectively impact the resulting particle size. The rise in stomach ulcers associated with fine grinding is believed to be linked to the heightened fluidity of stomach contents and elevated levels of pepsin and digestive acids. This leads to prolonged contact with the sensitive esophageal region of the stomach. Such occurrences of being out-of-feed can diminish pig feed intake and growth performance, inducing additional stress that may contribute to the development of ulcers in pigs. Depending on the volume of grain processed in the mill, it is advisable to regularly assess particle size, ranging from daily to monthly intervals. The identification of whole kernels or partial kernels during these checks may serve as indicators of potential issues such as a hole in the screen or misalignment of rolls [11].

The primary grain processing choices, a hammermill or roller mill, are both commonly employed for swine diet formulation, yielding satisfactory products. Nevertheless, distinctions in processing capacities, efficiency, and maintenance exist between these mills. Hammermills demonstrate effectiveness in grinding a diverse array of feedstuffs and can achieve a wide range of particle sizes. It's important to note, however, that hammermills may be characterized by noise, dust, and heat generation during the grinding process [11].

The next stage of compound feed production is the technological processes of dosing and mixing.

The precision of dosing has gained significance due to the necessity to adhere to contemporary high-quality standards in feed manufacturing. Dosing plays a crucial role in ensuring the uniformity of the mixture, ultimately affecting the quality parameters of the feed [12].

Mixers need to be structured to accommodate a suitable filling rate at the complete batch volume to achieve optimal mixing homogeneity within the designated mixing duration. In feed mills, mixers come in sizes ranging from less than one tonne to 10 tonnes, and the mixing time can vary from approximately 60 seconds to four to five minutes or even longer. The duration depends on the design of the mixer and the desired quality standards. A paddle mixer can attain a similar level of homogeneity in under 60 seconds, whereas achieving a satisfactory Coefficient of Variation in a double ribbon mixer may take more than 200 seconds. Taking into account the time needed for both mixer filling and discharging, the total cycle times could range from two to six minutes.



This could lead to the production of approximately 10 to 30 batches per hour [12].

An acceptable mix of the diet would be considered when variation between samples is less than 10%. In general, horizontal mixers tend to require less time to attain a uniform mix. A well-maintained horizontal mixer typically achieves a 10% variation within 3 to 4 minutes, while a standard single-screw vertical mixer may need 8 to 12 minutes to reach a uniform mix after the last ingredient is added. The speed of the mixer, measured in RPM (rotations per minute), directly influences the time required for mixing, with higher RPM resulting in a faster achievement of 10% variation. In the case of under-mixed feed, this poses a greater challenge for young pigs, given their limited feed intake. Larger pigs, due to their higher feed consumption, may be less affected by marginally mixed feed [11].

Compound feed for pigs is divided into loose and molded, made by the method of wet-heat processing. This method includes the technological processes of pelleting, extrusion or expansion. The use of these technologies has a number of certain advantages. Pelleting represents a cost-efficient technology capable of enhancing feed efficiency, minimizing diet segregation, raising bulk density, lowering dust levels, enhancing feed handling properties, and mitigating challenges associated with feed bridging [11]. Pelleting increases the palatability of compound feed, which stimulates its greater consumption and digestion by young pigs compared to loose compound feed. This is manifested in their more intensive growth and development. The temperature in the granulation process should not exceed +60...90 °C, the pressure - 0.2...0.3 MPa. During feeding, minimal mechanical losses occur, feed costs are reduced by 7...8%, and the growth energy of young animals increases by 6...12% [13]. The pelleting process leads to a slight improvement in diet digestibility, as the steam heat involved in pelleting causes the gelatinization of some starch and opens up the starch and protein matrices, allowing for increased hydrolysis by digestive enzymes. Additionally, pelleting the diet provides a secondary advantage of reducing dry matter and nitrogen excretion by 10 to 20%, a result of the decreased feed wastage and the overall improvements in feed efficiency and digestibility [11].

By the technological process of extrusion, the raw material increases dramatically in volume, as a result of mechanical loads and wet-heat treatment, chemical indicators, physical properties improve and harmful microflora dies, which positively affects the gastrointestinal tract of young pigs. In extruders, raw materials are subjected to short-term (10...12 s), but very intense mechanical and thermal exposure. Due to friction and high pressure (2.0...3.0 MPa), it heats up to +120...140 °C, as a result of which free and bound moisture is released. Extruded feed is recommended to be used primarily for the

preparation of compound feed-starters for young animals the growing period.

Expansion is a technological process that increases the nutritional value of compound feed and improves its sanitary quality. During expansion, starch is broken down by 50%, which is appropriate for stimulating and developing the enzyme system of young pigs. The expansion takes place at a temperature of +90...115°C, the total time of the product passing through the expander is a few seconds. High temperature and pressure, which are created in the process of wet-heat processing, cause significant changes in the fatty-acid composition of feed lipids, the content of unsaturated, especially polyunsaturated, fatty acids decreases. The energy value of fat is provided by the carbohydrate chain of high-molecular fatty acids. When fed with balanced feed, the productivity of animals increases by 12...15%, and when enriched with microelements and other substances, by 25...30% in relation to feeding with certain types of grain. Feeding young pigs with compound feed is a practical and cost-effective way of providing them with the necessary nutrients for growth and productivity. The use of compound feed simplifies feeding management, reduces storage costs, and also optimizes the use of feed resources.

Conclusions

The key determinant in achieving quality results in piglet fattening is attributed significantly to the feed itself, constituting approximately 60-70% of the influencing factors.

The statistical overview of the pig population in Ukraine, as of January 1, 2023, reveals a count of 4.95 million heads, contributing to the broader context of the global pig population, which exceeded 1.02 billion heads in 2021. China holds the largest pig population, surpassing 400 million heads, while the EU had a total of 237 million heads in 2022.

The article underscores the importance of observing daily nutrient and biologically active substance consumption by pigs, particularly considering their age. The organization of pig fattening through one-, two-, or three-phase feeding systems is discussed, highlighting the need for producing compound feeds that align with feeding standards and incorporate advanced technological methods like granulation, extrusion, and expansion. These methods, especially wet-heat treatment, are shown to enhance the nutritional value of compound feed, reduce feed costs, and improve the growth energy of young animals.

In summary, the data underscores the complex interplay of factors influencing pig feeding outcomes, from population statistics to compound feed production methods, emphasizing the need for a comprehensive and standards-aligned approach for optimal pig husbandry and performance.

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Фігурська Л.В., канд. техн. наук, доцент, E-mail: fiurska@gmail.com
 Цюндик О.Г., канд. техн. наук, доцент, E-mail: malik2008ts@gmail.com
 Чернега І.С., канд. техн. наук, доцент, E-mail: ilonamalaki@gmail.com

Кафедра технології зерна і комбікормів

Одеський національний технологічний університет, вул. Канатна, 112, м. Одеса, 65039, Україна

СТАН ТА ПЕРСПЕКТИВИ РОЗВИТКУ ВИРОБНИЦТВА КОМБІКОРМІВ ДЛЯ СВИНЕЙ РІЗНОГО ВІКУ

Анотація

У статті розглянуто види годівлі свиней в Україні. На якісний результат відгодівлі поросят на 60...70 % впливає сама годівля, близько 20 % – генетика тварин, 10 % – ветеринарний догляд, а також близько 10 % умови утримання. Проаналізовано кількість поголів'я свиней. В Україні за даними Державної служби статистики, станом на 1 січня 2023 року поголів'я свиней складало 4,95 млн голів. Світове поголів'я свиней у 2021 році становило приблизно в 1,02 млрд голів, найбільше поголів'я свиней у Китаї – понад 400 млн голів. Загальне поголів'я свиней у ЄС у 2022 році становило 237 млн голів. Проаналізовано виробництво комбікормів для свиней в Україні. За даними Державної служби статистики України, виробництво комбікормів для свиней у 2021 році становило в 1,2 млн тонн. До країн-виробників комбікормів для свиней у світі належать Китай, США, Бразилія, Іспанія та Мексика. Розглянуто споживання корму та води свинями в залежності від добового приросту, також розглянуто схему підгодівлі поросят повнораціонним комбікормом на добу. Необхідно дотримуватись добової норми споживання поживних і біологічно активних речовин в залежності від віку молодняка свиней. Розглянуто сучасну організацію відгодівлі свиней, яка передбачає одно-, дво- або трифазову системи годівлі. Обґрунтовано необхідність виробництва комбікормів для свиней, які відповідають нормам годівлі та обмеженням щодо введення компонентів. Представлено види комбікормів та їх переваги. Проаналізовано такі технологічні способи виробництва комбікормів для свиней, як гранулювання, екструджування, експандування. За рахунок високої температури і тиску покращується поживність комбікормів. При згодюванні комбікормів методом волого-теплової обробки відбуваються мінімальні механічні втрати, витрати кормів знижуються на 7...8%, а енергія зростання молодняка підвищується на 6...12%. При годівлі збалансованими кормами продуктивність тварин виростає на 12...15%, а при збагаченні їх мікроелементами та іншими речовинами на 25...30% по відношенню з годівлею окремими видами зерна.

Ключові слова: комбікорм, годівля, поголів'я свиней, волого-теплова обробка, гранулювання, екструджування.

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