

## Feeding piglets in alive mass of 12 – 20 kg at intensive production of pork

I. Riznychuk,  
Candidate of Agricultural Sciences  
Odessa State Agrarian University

**The purpose.** To study influence of all-in-one feed for piglets in alive mass of 12 – 20 kg with minimum dose of calcium and phosphorus and the heightened dose of lysine, methionine + cystine and threonine on change of alive mass of piglets in the age of 41 – 60 days and productivity of feedstuff. **Methods.** Conventional zootechnical and analytical. **Results.** Use of all-in-one feed for piglets in alive mass of 12 – 20 kg with minimum dose of calcium and phosphorus and the heightened dose of lysine, methionine + cystine and threonine ensures deriving minimum alive mass of piglets in 60-day age at the level of 20 kg and average daily increase of alive mass for 400 g, and conversion of 1,75 kg of feed compound for 1 kg of increase of piglets. **Conclusions.** At use of all-in-one feed for piglets in alive mass of 12 – 20 kg with the heightened dose of lysine, methionine + cystine and threonine they observed a trend of decrease of expenditures of feed compound for the term of feeding piglets in the age of 41 – 60 days from 15 to 14 kg and lowering of its conversion for 1 kg of increase of piglets (from 1,9 to 1,75 kg) in comparison with the use of all-in-one feed with the standard content of the above indicated amino acids. The gained productivity indexes of piglets conform the requirements of intensive} production of pork and are characterized by positive economic efficiency.

**Key words:** *feeding of piglets, all-in-one feeds, PVMA, lysine, methionine, threonine, conversion of feed compound.*

The main direction in pig production development at the present stage is the intensification of the industry through scientific and reasonable use of feed and feed additives and organization of norm, limit and free access animals feeding.

The introduction of new principles of pigs feeding ensures a high profitability of pork production, efficient use of feed and the optimum duration of piglets growing and young pigs fattening periods.

According to the results of previously conducted researches, we had established that the use of modern approaches in the organization of norm feeding of pigs, the qualitative selection of feed and feed additives and complete feed which are produced on their basis, create opportunities for intensification of pigs feeding technology for pigs with a live weight of 20-40 kg at the age period from 2 to 3 months and average daily gain of 650g [1].

While piglets at the age of 2 to 4 months with an average daily gain of 330 g are related to group with traditional system of pork production; the existing intensive systems of pig production include piglets from 61 to 104 days of birth with an average daily gain of 455 g [2-5].

However, in further practical use of complete feed for pigs with a live weight of 20-40 kg and under fierce competition with foreign manufacturers of feed additives, it was found that during the overall reduction of growing period of pigs with a live weight up to 40 kg, 90 days instead of 104-120 days, the question remains open as to the feed conversion reduction per 1 kg piglets gain.

Considering the above mentioned the minimum level of lysine for piglets with a live weight of 20-40 kg from 9 g to 10 g per 1 kg of complete feed at the maintenance of optimum amino acids ratio such as methionine + cystine and threonine was increased due to the state standard by us [3,5,6].

Before the beginning of researches some calculation was conducted in order to determine how such increased level of lysine, methionine with cystine and threonine influences on the current recommendations for the optimal balance of other essential amino acids in piglets diets, at the per cent by lysine.

It is known that the protein of living organism consists of amino acids chains, their sequence is coded genetically, and the absence of even one essential amino acid leads to the disruption of protein synthesis. The primary structure of protein is destroyed and unused amino acids are included in the process of energy production, they do not perform their primary function – a structural one.

For the most effective assimilation of feed protein, it is necessary that essential amino acids which are included in the feed ration must be in certain proportions among themselves [7-10].

Optimal and factual correlations of essential amino acids in mixed fodders for piglets with a live weight of 20-40 kg are shown in the table 1.

**1. Optimal and factual correlations of essential amino acids in mixed fodders for piglets with a live weight of 20-40 kg, at the percent by lysine**

Indicators	Lysine	M+C	Threonine	Tryptophan	Isoleucine	Leucine	Histidine	P+T	Valine	Arginine
According to recommendations	100	60	65	20	60	110	39	120	75	42
Standard mixed fodder	100	60	67	20	65	124	42	132	75	98
Intensive mixed fodder	100	60	66	18	59	112	38	119	68	89

In accordance with the conducted calculations shown in table 1, we can argue that the additional lysine, methionine and threonine introductions into mixed fodders for piglets with a live weight of 20-40 kg do not exceed recommended norms for the other essential amino acids correlations due to lysine in per cent and do not lead to the breaking expansion between amino acids.

The aim of the research was to investigate the effect of complete feed with a high content of lysine, methionine with cystine and threonine on the changes in live weight of piglets 20-40 kg and on the mixed fodder conversion per 1 kg of piglets gain.

To solve this goal it was necessary to define age period for achieving a live weight of 20 kg and 40 kg, to establish the average daily gain of piglets with a live weight of 20-40 kg, to calculate the feed cost per gain unit of piglets live weight and the economic efficiency of researches.

The research was conducted in LLC «Vladvivske Podvirya» of Ivanivka District, Odessa Region.

Piglets with a live weight of 20-40 kg and complete feed for them were materials for the study.

For the experiment, we selected 100 heads of weaned piglets, which were divided into 4 sections, each section had 25 animals.

Unpelled mixed fodders for piglets with a live weight of 20-40 kg were made from grain, soybean meal and 10 % of protein-vitamin additives prepared in LLC «Ukrainian technologies in animals feeding» of Ovidiopol District, Odessa Region.

**The results of the research.** In accordance with previously conducted researches feeding of piglets with a live weight of 20-40 kg by complete feed was carried out in the age period from 2 to 3 months.

The norm feeding of piglets with a live weight of 20-40 kg was carried out according to the content of metabolizable energy, dry matter, crude protein, lysine, methionine+cystine, tryptophan, crude fiber, crude fat, salt, calcium, phosphorus, iron, copper, zinc, cobalt, manganese, iodine, selenium, vitamins A, D, E, B<sub>1</sub>, B<sub>2</sub>, B<sub>3</sub>, B<sub>4</sub>, B<sub>5</sub>, B<sub>6</sub>, B<sub>7</sub>, B<sub>10</sub> and B<sub>12</sub>. Besides the increased minimum content of lysine and methionine with cystine in complete feed for piglets, the innovation, of the research was regulation of amino acid supplying due to threonine content, its rate was determined on the base of the optimal essential amino acids correlation in per cent by lysine.

Analyzing complete feeds for piglets with a live weight of 20-40 kg such factors as feed conversion, the content of metabolizable energy in dry matter of mixed fodder, energy-protein ratio, the amount of crude protein per 1 MJ of metabolizable energy, the content of crude fibre in the dry matter of the ration, the correlation of lysine to metabolizable energy, the content of lysine, methionine + cystine and threonine in a crude protein ( % ), correlation of essential amino acids in per cent by lysine, the ratio of calcium to phosphorus were taken into account.

Nutritional value of 1 kg of a complete standard feed for piglets with a live weight of 20-40 kg is 13.5 MJ of metabolizable energy. And 1 kg of mixed fodder feed contains 860 g of dry matter, 170 g of crude protein, 9 g of lysine, 5.5 g of methionine+cystine, 6 g of threonine, 1.8 g of tryptophan, 35 g of crude fiber, 35 g of crude fat, 5 g of salt, 7 g of calcium and 5 g of phosphorus.

1 kg of a complete intensive feed for piglets with a live weight of 20-40 kg contains 13.5 MJ of metabolizable energy, 860 g of dry matter, 170 g of crude protein, and 10 g of lysine, 6 g of methionine+cystine, 6.5 g of threonine, 1.8 g of tryptophan, 35 g of crude fiber, 35 g of crude fat, 5 g of salt, 7 g of calcium and 5 g of phosphorus.

0,5 % premix, which is a part of protein-vitamin-mineral supplements, satisfies demand of piglets with a live weight of 20-40 kg in micronutrients, fat soluble and water soluble vitamins and other biologically active substances.

Depending on the provision of vegetable protein fodders in the conditions of experimental farms, organizing feeding of various industrial groups, protein-vitamin-mineral supplements 5 %, 10 %, 20 % and 25 % in conjunction with the required number of soybean meal are used.

80 % of cereal grain forages (wheat, barley, corn), 10 % of soybean meal and 10% of protein-vitamin-mineral additives, by weight are included in the composition of 1 kg of complete intensive feed for piglets with a live weight of 20-40 kg.

Raw material for protein-vitamin-mineral additives production, manufactured in the conditions of LLC «Ukrainian technologies in animal nutrition» is high protein soybean meal, synthetic lysine, methionine, threonine, salt, feed chalk, feed limestone, mono calcium phosphate, sorbet, organic acidifier and 0.5 % complete grower premix for piglets containing micronutrients, vitamins, enzyme complex, antioxidant and adsorbent.

Nutritional value of 1 kg of protein-vitamin-mineral standard additives for piglets with a live weight of 20-40 kg is 10.5 MJ of metabolizable energy, 900 g of dry matter, 310 g of crude protein, 41 g of lysine, 13 g of methionine+cystine, 20 g of threonine, 3.5 g of tryptophan, 35 g of crude fiber, 45 g of crude fat, 50 g of salt, 62 g of calcium and 21 g of phosphorus.

Nutritional value of 1 kg of protein-vitamin-mineral intensive supplements for piglets with a live weight of 20-40 kg are 10.5 MJ of metabolizable energy containing 900 g of dry matter, 320 g of crude protein, 51 g of lysine, 17 g of methionine+cystine, 25 g of threonine, 3.5 g of tryptophan, 35 g of crude fiber, 45 g of crude fat, 50 g of salt, 62 g of calcium and 21 g of phosphorus.

Protein-vitamin-mineral standard and intensive supplements are balanced by the content of micronutrients and vitamins and contain enzymes, acidulent, antioxidant and adsorbent.

The impact of complete feeds with a high content of lysine, methionine and threonine on productive qualities of piglets with a live weight of 20-40 kg are shown in table 2.

## 2. The impact of complete feeds with a high content of lysine, methionine and threonine on productive qualities of piglets with a live weight of 20-40 kg

Indicators	Productive qualities of piglets:	
	Standard mixed fodder	Intensive mixed fodder
Live weight of piglets at the age of 2 months	20	20
Live weight of piglets at the age of 3 months	40	40
Average daily gain of piglets with a live weight of 20-40 kg	650	650
Mixed fodders conversion, kg/kg of piglets gain	2,1	1,8

According to the data shown in table 2, we can make a conclusion that feeding piglets with a live weight of 20-40 kg by complete unpelleted mixed fodders with a high content of lysine, methionine and threonine, which contain various grains, vegetable protein concentrates, essential amino acids, mineral supplements, vitamins, enzyme complexes and other biologically active substances, provides a high dynamics of growth and duration of growing period of pigs at the age from 2 to 3 months, the reduction of feed conversion up to 1,8 kg comparing with 2,1 kg and when standard complete feed is used.

The economic efficiency of piglets feeding at the intensive technology of pork production is shown in table 3.

## 3. Economic efficiency of piglets feeding at the intensive technology of pork production

Indicators	Economic efficiency:	
	standard mixed fodder	intensive mixed fodder
Mixed fodder's (standard) consumption, kg	42	-
Mixed fodder's (intensive) consumption, kg	-	36
Cost of 1 kg of mixed fodder (standard), UAH	10,40	-
Cost of 1 kg of the mixed fodder (intensive), UAH	-	10,80
Total funds of mixed fodder (standard) consumption, UAH	437	-
Total funds of mixed fodder (intensive) consumption, UAH	-	389

Analyzing the data presented in table 5 we can see that feeding of piglets with a live weight of 20-40 kg by complete feeds with a high content of lysine, methionine and threonine is economically justified. So, in general, during the growing period the feed cost per 1 head amounts 36 kg or 389 UAH, comparing with the standard conditions of feeding, one head consumes 42 kg of mixed fodder 437 UAH.

### Conclusions.

1. Feeding of piglets with a live weight of 20-40 kg by complete unpelleted mixed fodders with a high content of lysine, methionine and threonine provides a high growth dynamics and the duration of the growing period in pigs at the age from 2 to 3 months, the reduction of the feed conversion to 1.8 kg comparing with 2.1 kg when standard complete feed is used.

2. The use of complete feed with a high content of lysine, methionine and threonine in feeding of piglets with a live weight of 20-40 kg, is economically justified. So, in general, during the growing period the feed cost per 1 head amounts 36 kg or 389 UAH, comparing with the standard conditions of feeding, one head consumes 42 kg of mixed fodder 437 UAH.

At present, the investigations concerning the development program of feeding pigs with a live weight of 40 kg at the intensive pork production, such as feeding suckling piglets, weaned piglets, piglets with a live weight of 12-20 kg and 20-40 kg are being carried out.

### **Bibliography**

1. Riznychuk I. F. Yak hoduvaty porosiat pry intensyvnomu vyrobnytstvi svyny/I. F. Riznychuk, O.K. Kyshlaly, A. T. Stepanenko, V. O. Riznychuk//Tvarynnytstvo Ukrainy. – 2015. - № 10. – S. 39-44.
2. Hodivlia silskohospodarskykh tvaryn: pidruchnyk/[Ibatullin I. I., Melnychuk D. O., Bohdanov H. O. ta in.] ; za red. I. I. Ibatullina. – Vinnytsia: Nova Knyha, 2007. – 616 s.
3. Kombikormy povnoratsionni dlia svynei. Tekhnichni umovy: DSTU 4124-2002. – [Chynnyi vid 2004-01-01]. – K.: Derzhspozhyvstandart Ukrainy, 2003. – 13 s.
4. Normy hodivli, ratsiony i pozhyvnist kormiv dlia riznykh vydiv silskohospodarskykh tvaryn: dovidnyk/[Provatorov H. V., Ladyka V. I., Bodnarchuk L. V. ta in.]. – Sumy: TOV VTD «Universytetska knyha, 2007. – 616 s.
5. Rekomendatsii z normovanoi hodivli svynei/[Bohdanov H. O., Rudenko Ie. V. Kandyba V. M. ta in.] ; za red. Ie. V. Rudenka, H. O. Bohdanova, V. M. Kandyby. – K: Ahrarna nauka, 2012. – 112 s.
6. Kombikormy-kontsentraty dlia svynei. Tekhnichni umovy: DSTU 4508-2005. – [Chynnyi vid 2008-01-01]. – K.: Derzhspozhyvstandart Ukrainy, 2007. – 11 s.
7. Durst L. Kormlenie selskohozyaystvennyih zhyvotnyih/L. Durst, M. Vittman/Pod red. I. I. Ibatullina, G.V. Provatorova. – Vinnitsa, Nova Kniga, 2003. – 384 s.
8. Futterberechnung für Schweine. – Bayerische Landesanstalt für Tierzucht , 1996. - № 10. – P. 7.
9. Futterberechnung für Schweine. – Freising: Institut für Tierernährung und Futterwirtschaft, 2004. - № 14. – P. 9.
10. Ferkelfütterung. Aktuelle Versuche Versuchsergebnisse 2004. – Freising: Institut für Tierernährung und Futterwirtschaft, 2004. – 50 p.