

UDK 636.4.082.43

**BIOCHEMICAL PROFILE OF BLOOD SERUM OF YOUNG PIGS
OF DIFFERENT CATEGORYS IN THE QUALITATIVE COMPOSITION
OF THE LONGEST BACK MUSCLES**

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Наведено результати досліджень біохімічних показників сироватки крові молодняку свиней різної диференціації за ніжністю, вологоутримуючою здатністю, інтенсивністю забарвлення та вмістом жиру у м'язовій тканині.

Встановлено, що для раннього прогнозування якісних показників найдовшого м'яза спини слід використовувати наступні біохімічні показники сироватки крові: вміст холестеролу ($r = 0,726$), активність АсАТ ($r = 0,659$) та активність АлАТ ($r = 0,593$).

Ключові слова: *молодняк свиней, сироватка крові, біохімічні показники, найдовший м'яз спини, фізико-хімічні властивості, хімічний склад, кореляція.*

The results of researches [1–3] and foreign scientists [4, 5] indicate that biochemical and morphological parameters of blood serum largely reflect the physiological condition of the animals, the nature of the metabolic processes occurring in the body.

Purpose – to investigate the biochemical indices of the blood serum of young pigs of different differentiation soft, moisture ability, the intensity of the color and fat content in muscle tissue.

Studies were conducted in conditions LTD "AF "Dzerzhinets" in Dnipropetrovsk region, JSC "Globinsky meat plant", Poltava region, zootechnical laboratory analysis at the Institute of pig and AIP NAAS of Ukraine, scientific research center for biosafety and environmental control of resources AIK.

Physical-chemical properties and chemical composition of the longest back muscles was studied according to the methods of Polivoda A. M. and others [6].

Comprehensive evaluation of the quality of the meat was determined according to the method of A. M. Polivoda [7] (tabl.1).

In the serum of young pigs were determined the following biochemical parameters: total protein content – beuretov's method, the concentration of creatinine – colored on the Jaffe reaction, the activity of aspartate aminotransferase (AsAT) and alanine aminotransferase (AlAT) – kinetic's method, the concentration of cholesterol – enzymatic's method [8].

The research results are processed by variation statistics according to method N. A. Plo-hinskiy [9]. The difference between the arithmetic mean of the two sample populations were considered as reliable when the condition $B > 0,90$, $B > 0,95$, $B > 0,99$, $B > 0,999$.

The study of biochemical parameters of blood serum of young pigs showed that the ani-mals of experimental group the content of total protein was $71,73 \pm 1,886$ g/l ($C_v = 9,10$ %), crea-tinine concentration – $148,68 \pm 5,354$ mmmol/l $C_v = 12,47$ %), AsAT – of $1,30 \pm 0,132$

mmol/ h/l (Cv = 34,95 %), AlAT – $1,89 \pm 0,060$ mmol/h/l (Cv = 11,12 %), the cholesterol content is $2,01 \pm$ reached 0,245 mmol/l (Cv = accounting period by 42,08 %).

1. Scale of assessment of meat quality by physical-chemical parameters

Estimation	Evaluation of indicator of the quality of the meat				
	moisture retention capacity	the color intensity (the ratio extent $\times 1000$)	tenderness, seconds	fat, %	melting poin degree
limits	46,8–71,8	27–119	5,8–15,5	0,7–4,8	23,5–46,8
high quality	67,0 and more	83 and more	7,9 and less	3,1 and more	-
normal quality	53,0–66,0	48–82	8,0–12,0	1,2–3,0	32,5–41,5
low quality	52,0 and less	47 and less	12,1 and more	1,1 and less	41,6 and more 32,4 less

Samples of the longest back muscles was as follows: moisture capacity was $59,38 \pm 1,517$ (Cv = 8,84 %), the intensity of the color – $71,67 \pm 2,869$ units of Ext. $\times 1000$ (Cv = 15,90 %), % tenderness is $9,42 \pm 0,419$ s (Cv = for 15,42 %), fat content of $2,39 \pm 0,647$ % (Cv = 93,45 %), pH of $5,62 \pm 0,019$ units acidity (Cv = 1,20 %).

The category of "high quality" in terms of moisture ability" owned 8,3 % of samples of the longest back muscles, "tenderness" – 8,3 %, the "color intensity" – 25,0 %, content of fat is 8,3 %.

Found that in animals with low levels of tenderness there is a tendency to increase in the blood serum the content of total protein (18,86 g/l) and cholesterol (2,48 mmol/l). A higher concentration of creatinine (by 19,85 mmol/l), the activity of AsAT (0,73 mmol/h/l) and AlAT (0,57 mmol/h/l) detected in the serum of an opposing group (the high quality of the longest back muscles in terms of "tenderness") (tabl. 2).

Analysis of biochemical parameters of blood serum of young pigs with different different-tiation ability moisture shows that animals with low quality muscle, an increase in the content of total protein (2,75 g/l), creatinine concentration (by 21,86 mmol/l) and the amount of cholesterol (0,2 mmol/l).

The difference in the activity of AsAT and AlAT between animals with low and high levels for moisture ability was between 0,31 and 0,12 mmol/h/l in favor of the latter.

The results show that the samples of the longest back muscles in the intensity of coloration are classified as "high quality" (25,0 %) and "normal" (75,0 %) quality. The difference between the animals of these categories in the activity of AsAT was 0,7 mmol/h/l (td = 2,18, B>0,95), AlAT –

2. Biochemical profile of blood serum of young pigs of different differentiation in the qualitative composition of the longest back muscles

Index	Biometric index	Quality longest back muscles		
		high	normal	low
1	2	3	4	5
Quality index of the longest back muscles – tenderness, sec.				
The total protein, g/l	n	1	10	1
	$\bar{X} \pm S\bar{X}$	58,67	$72,46 \pm 1,700$	77,53
	Cv, %	-	7,41	-
Concentration creatinine, mmol/l	$\bar{X} \pm S\bar{X}$	149,36	$150,53 \pm 6,129$	129,51
	Cv, %	-	12,87	-
The activity of AsAT, mmol/h/l	$\bar{X} \pm S\bar{X}$	1,65	$1,31 \pm 0,150$	0,92
	Cv, %	-	36,19	-
The AlAT activity, mmol/h/l	$\bar{X} \pm S\bar{X}$	2,19	$1,89 \pm 0,060$	1,62
	Cv, %	-	10,05	-

Cholesterol, mmol/l	$\bar{X} \pm S\bar{X}$	1,99	1,77 ± 0,120	4,47
	Cv, %	-	21,54	-

continuation of table 2

1	2	3	4	5
Quality index of the longest back muscles – moisture, %				
The total protein, g/l	n	1	8	3
	$\bar{X} \pm S\bar{X}$	71,37	71,25 ± 2,516	74,12 ± 0,110
	Cv, %	-	10,59	0,21
Concentration creatinine, mmol/l	$\bar{X} \pm S\bar{X}$	131,57	149,53 ± 6,740	153,43 ± 9,155
	Cv, %	-	13,52	8,43
The activity of AsAT, mmol/h/l	$\bar{X} \pm S\bar{X}$	1,40	1,34 ± 0,172	1,09 ± 0,140
	Cv, %	-	38,44	18,16
The AlAT activity, mmol/h/l	$\bar{X} \pm S\bar{X}$	1,92	1,91 ± 0,076	1,80 ± 0,155
	Cv, %	-	11,99	12,14
Cholesterol, mmol/l	$\bar{X} \pm S\bar{X}$	1,60	2,11 ± 0,322	1,80 ± 0,200
	Cv, %	-	45,84	15,71
Quality index of the longest back muscles – the intensity of color, unit. extr. × 1000				
The total protein, g/l	n	3	9	-
	$\bar{X} \pm S\bar{X}$	71,17 ± 7,162	71,92 ± 1,493	-
	Cv, %	17,43	6,23	-
Concentration creatinine, mmol/l	$\bar{X} \pm S\bar{X}$	148,39 ± 9,446	148,78 ± 6,716	-
	Cv, %	11,02	13,54	-
The activity of AsAT, mmol/h/l	$\bar{X} \pm S\bar{X}$	1,83 ± 0,316	1,13 ± 0,090	-
	Cv, %	29,91	24,08	-
The AlAt activity, mmol/h/l	$\bar{X} \pm S\bar{X}$	2,07 ± 0,080	1,83 ± 0,067	-
	Cv, %	6,74	10,88	-
Cholesterol, mmol/l	$\bar{X} \pm S\bar{X}$	1,72 ± 0,135	2,11 ± 0,321	-
	Cv, %	13,62	45,64	-
Quality index of the longest back muscles – fat content, %				
The total protein, g/l	n	1	8	3
	$\bar{X} \pm S\bar{X}$	65,64	71,54 ± 2,467	74,30 ± 3,452
	Cv, %	-	9,75	8,04
Concentration creatinine, μmol/l	$\bar{X} \pm S\bar{X}$	144,69	148,76 ± 6,191	149,90 ± 16,399
	Cv, %	-	11,77	18,94
The activity of AsAT, mmol/h/l	$\bar{X} \pm S\bar{X}$	0,96	1,46 ± 0,173	1,00 ± 0,052
	Cv, %	-	33,57	8,95
The AlAT activity, mmol/h/l	$\bar{X} \pm S\bar{X}$	1,98	1,94 ± 0,079	1,75 ± 0,092
	Cv, %	-	11,54	9,16
Cholesterol, mmol/l	$\bar{X} \pm S\bar{X}$	2,27	1,80 ± 0,124	2,48 ± 0,988
	Cv, %	-	19,43	69,56

0,24 mmol/h/l (td = 2,40, B > 0,95) in favor of the animals category high quality color intensity of the longest back muscles. For other biochemical parameters of blood serum, the difference ranged from 0,26 (concentration of creatinine, mmol/l; td = 0,03, B < 0,90) to 18,48 % (cholesterol, mmol/l; td = 1,14, B < 0,90).

It was found that the opposite of differentiation ("high quality", "low quality") for fat, total protein, albumin in blood serum ranged from to of 74,30 of 65,64 g/l (lim = 11,65 %), creatinine concentration from 144,69 to 149,90 mmol/l (lim = 3,47 %), AsAT activity from 0,96

to 1,00 mmol/h/l (lim = 4,0 %), the cholesterol content is from 2,27 to 2,48 mmol/l (lim = 8,46 %).

Reliable the difference between animals of the categories of "normal quality" and "low quality" on the fat content established for the activity of AsAT (0,46 mmol/h/l; $t_d = 2,70$, $B > 0,95$).

Correlation analysis showed the existence of different direction and strength of relations between the biochemical parameters of blood serum and qualitative composition of the longest back muscles (tabl. 3).

3. The coefficients of pair correlation between the estimated indexes, characteristics of fattening and meat qualities of young pigs, $n = 12$

Correlation indications		$r \pm S_r$	t_r
x	y		
Tenderness, sec.	The total protein, g/l	$0,412 \pm 0,2881$	1,43
	Concentration creatinine, mmol/l	$-0,418 \pm 0,2873$	1,46
	The activity of AsAT, mmol/h/l	$-0,238 \pm 0,3071$	0,77
	The AlAT activity, mmol/h/l	$-0,350 \pm 0,2962$	1,18
	Cholesterol, mmol/l	$0,726 \pm 0,2175^{**}$	3,34
Moisture ability, %	The total protein, g/l	$0,054 \pm 0,3158$	0,17
	Concentration creatinine, mmol/l	$-0,332 \pm 0,2983$	1,11
	The activity of AsAT, mmol/h/l	$0,327 \pm 0,2988$	1,09
	The AlAT activity, mmol/h/l	$0,207 \pm 0,3094$	0,67
	Cholesterol, mmol/l	$-0,264 \pm 0,3050$	0,87
The color intensity (the ratio extent $\times 1000$)	The total protein, g/l	$0,052 \pm 0,3158$	0,16
	Concentration creatinine, mmol/l	$0,340 \pm 0,2974$	1,14
	The activity of AsAT, mmol/h/l	$0,659 \pm 0,2378^*$	2,77
	The AlAT activity, mmol/h/l	$0,593 \pm 0,2546^*$	2,33
	Cholesterol, mmol/l	$-0,297 \pm 0,3020$	0,98
Fat, %	The total protein, g/l	$-0,400 \pm 0,2998$	1,38
	Concentration creatinine, mmol/l	$-0,042 \pm 0,3159$	0,13
	The activity of AsAT, mmol/h/l	$-0,204 \pm 0,3096$	0,66
	The AlAT activity, mmol/h/l	$0,187 \pm 0,3106$	0,60
	Cholesterol, mmol/l	$0,020 \pm 0,3162$	0,06

* $> 0,95$; ** $> 0,99$.

Thus, the number of feedbacks is 45,0 %, direct – 55,0 %, weak (0,25) – 40,0 %, and medium (from 0,26 to 0,74) – 60,0 %, strong – 0.

Significant coefficients of pair correlation is established between the following pairs: soft $\times$ cholesterol ($r = 0,726$, $t_r = 3,34$ $B > 0,99$), the color intensity $\times$ activity of AsAT ($r = 0,659$, $t_r = 2,77$, $B > 0,95$) is the color intensity $\times$ activity of AlAT ($r = 0,593$, $t_r = 2,33$, $B > 0,95$).

Conclusions

1. Biochemical parameters of blood serum of young pigs of large white breed of foreign origin corresponds to the physiological norm of clinically healthy animals of this species.

2. The basic physical-chemical properties and the chemical composition (taking into account the average of the sample) meat of animals of the experimental group belongs to the high and normal quality.

3. The number of valid coefficients of pair correlation between biochemical parameters of blood serum and qualitative indicators of the longest back muscles equal to 15,0 %.

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