UDC 636.4.082

Physico-chemical and chemical indicators muscle tissue and subcutaneous fat young pigs depending on the concentration of creatinine and glucose in the serum

Khalak V.I.
State Institute of Agriculture of the steppe zone of Ukraine NAAS

At the present stage of development of the pig industry speed up the selection process is performed on the basis of work with native breeds and animals foreign genotypes. Relevant here is the study and implementation of effective methods for assessing the breeding value of pigs, and the search for biological markers for early prediction of productive qualities.

The aim of our research was to study the content of creatinine and glucose in the serum of young pigs of large white breed, physico-chemical and chemical characteristics of the longest back muscle and subcutaneous fat, as well as to conduct correlation and regression analysis between quantitative traits.

The experimental part of the research conducted in the conditions of breeding reproducer breeding pigs of large white breed LLC "AF "Dzerzhinets" Dnepropetrovsk region, scientific research center for Biosafety and environmental control of resources APK Dnipropetrovsk state agrarian economic University, meat processing LLC “Globinsky meat" of Poltava oblast, laboratory livestock analysis Institute of pig breeding and agricultural production NAAS of Ukraine in 2012-2013.

For experience took away the young pigs of large white breed of foreign breeding fattening pursued until they reach a live weight of 120 kg, the study of biochemical parameters of blood serum was carried out at the age of 6 months. The creatinine was determined by a color reaction of Jaffa, the concentration of glucose using on-toluen.

The formation of experimental groups was carried out on the basis of their distribution in the concentration of creatinine and glucose. In the modal class (Mo) included individuals with interior indicators is 0,67 is, animals with values below these limits is attributed to the class of negative variant (M-), and higher - class plus option (M+).

Physico-chemical and chemical characteristics of the longest back muscle and subcutaneous fat were investigated in the laboratory livestock analysis Institute of pig breeding and APT NAAS of Ukraine. Biometric processing results of research carried out by the method. Merkureva and others (1991) using the program module data Analysis in Microsoft Excel.

It is established that the animals in the experimental group (n=12), the average concentration of creatinine in serum was 148,68±5,354 μmol/l (Cv=12,47 %), glucose concentration - of 3,33±0,277 mmol/l (Cv=28,88 %).

Samples of the long back muscles and subcutaneous fat was characterized by such physical-chemical and chemical indicators: fat - 2,39±0,647 %, pH - 5,62±0,019 units of acidity, moisture ability 59,38±1,517 %, the intensity of color - 72,83±3,343 units of ext. × 1000, tenderness - 9,42±0,419 c.

Indicators total content of moisture, protein loss during heat treatment, the content of phosphorus, calcium and energy values of muscle tissue were respectively 73,07±0,551%, 23,18±0,551%, 22,41±0,916 %, 0,131±0,0060 %, 0,047±0,0012 % and 126,66±4,992 kcal.

Initial and final melting point of the subcutaneous fat ranged from 27,00±0,150 to 37,16±0,233 °C. the Number of refraction of subcutaneous fat, the content of hygroscopic moisture in subcutaneous fat were at 8,19±0,246% and 1,4589 units.

It is established that the samples of muscle tissue and subcutaneous fat in animals with creatinine concentration 118,72-131,57 μmol/l were characterized in comparison with peers who have this interior indicator ranged from 164,25 to 182,35 μmol/l greater moisture ability (3,62 %, td=0,74; P<0,95), pH (0,05 units of acidity, td=0,65; P<0,95), losses during heat treatment (2,36 kcal, td=0,73; P<0,95), phosphorus (0,022, td=2,84; P>0,95) and hygroscopic moisture subcutaneous fat (by 1,38 %, td=2,83; P>0,95). However, in terms of tenderness, colour intensity, the total moisture content and calcium content had the advantage animals with creatinine concentration 164,25-182,35 μmol/l of 2,08 (td=2,94, P>0,95), 7,68 per unit ext. × 1000 (td=0,89; P<0,95), 0,06 % of (td=0,14; P<0,95) and 0,004 % (td=3,84; P>0,95).

The pork samples obtained from animals with creatinine concentration 137,86-162,59 μmol/l was characterized by a high quality for tenderness (8,73±0,284) and fat content (3,17±1,246) and had a high protein content (23,47±1,216 %) and energy value (135,16±8,867 kcal).

Physico-chemical parameters of subcutaneous fat (hygroscopic moisture subcutaneous fat, the initial melting temperature of the subcutaneous fat, the final melting temperature of the subcutaneous fat, the number of refraction subcutaneous fat) significant difference between samples of muscle tissue and subcutaneous fat of animals with different concentration of creatinine is not installed. The coefficient of variation of physico-chemical and chemical parameters of muscle tissue and subcutaneous fat, depending on the concentration of creatinine ranged from 0,32 (total moisture content) to 96,12% (fat).

The results of the research aimed to investigate the relationship of glucose concentration in blood serum with the physico-chemical and chemical indicators of muscle tissue and subcutaneous fat testify that the pork samples obtained from animals on glucose concentration of 1,84-2,69 mmol/l were characterized by quality indicators tenderness (8,56±0,589) and intensity of staining (79,00±3,055 units of ext. × 1000) (table.2). The phosphorus content and energy value they prevailed animals in which glucose concentration ranged from 4,04 to 4,99 mmol/l to 0,032 % (td=2,940; P>0,95) and 4,73 kcal (td=0,49; P<0,95). The difference in protein and calcium in muscle tissue between animals with maximum (4,04-4,99 mmol/l) and minimum (1,84-2,69 mmol/l) concentrations of glucose in serum 0,12% (td=1,78; P<0,95) and 0,003 % (td=0,76; P<0,95).

The maximum pH, moisture ability longest back muscle, protein content and minimum values of the loss during heat treatment, hygroscopic moisture subcutaneous fat, the initial melting temperature of the subcutaneous fat, the final melting temperature of the subcutaneous fat had animals in which the glucose concentration ranged from 2,71 to 3,70 mmol/l.

Specific patterns of changes in the number of refraction of subcutaneous fat, depending on the concentration of creatinine and glucose is not installed.

Significant coefficients of pair correlation between the measures of interior and qualitative composition of pork established for such pairs: calcium - creatinine concentration - +0,549±0,2043 (tr=2,68), phosphorus - concentration glucose - −0,628±0,2460 (tr=2,55), the number of refraction of subcutaneous fat - the concentration of glucose - −0,542±0,2571 (tr=2,26 and).

The direct correlation between creatinine concentration, concentration glucose in the serum of young pigs and physico-chemical and chemical characteristics of muscle tissue and subcutaneous fat, respectively 40,0 and 26,6 %.

The calculation results of linear regression coefficients between the traits we have studied, show that the maximum value of Rx/y installed between, moisture ability, colour intensity, energy density and glucose concentration, Ry/x - pH × creatinine concentration, glucose concentration, tenderness × creatinine concentration; calcium and phosphorus × creatinine concentration, glucose concentration; end melting temperature of the subcutaneous fat × creatinine concentration; number of refraction of subcutaneous fat × creatinine concentration, the concentration of glucose.