

INFLUENCE OF BIOLOGICALLY ACTIVE PREPARATIONS ON RESISTANCE AND BIOCHEMICAL PARAMETERS OF ANIMALS DURING STRESS

V.I. IVASHOV, Yu.V. TATULOV, L.L. BORTKEVICH, L.F. KARMYSHOVA, T.M. ILYINA, T.V. KOSACHEVA  
All-Russian Meat Research Institute, Talalikhina 26, 109316 Moscow, Russia

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Recent investigations have shown that among a great number of exogenic and endogenic factors, having negative influence on yield and quality of meat, stress is the most important one. Hence, large losses of meat raw materials at stages of raising and pre-slaughter handling of animals (1-3).

Transportation of cattle from farms to slaughterhouse is not only a physical, but also a psychical load that traumatizes animals and leads to decrease of yield and quality of meat. Depending on conditions and time of transportation of animals and on character and intensity of stress, the losses and quality defects of meat raw materials can reach significant values (4). Negative influence of stress during transportation and other external loads can be reduced by means of preparations maintaining the resistance of animals to stress under extreme conditions. In previous work we have studied the influence of cholinechloride on welfare of animals and quality of muscle tissue of pigs during transportation (5, 6).

In the present experiments the resistance and carbohydrate metabolism of animals were studied as a result of simultaneous administration of cholinechloride and nicotinic acid (vitamin PP), which was used to enhance the effect of cholinechloride. The influence of these preparations on welfare of pigs during transportation, and on yield and quality of meat was also studied.

**Materials and methods.** The resistance was studied on 127 white mice with the weight  $20 \pm 2$  g. To the control group distilled water was preliminarily administered per os, to the experimental group - cholinechloride at 0.1 g/kg of weight and a mixture of cholinechloride with nicotinic acid at a ratio of 1:1, 10:1 and 100:1. The degree of resistance was assessed by the time of swimming of mice in water with a load (5% of weight of animal).

To study the influence of preparations on carbohydrate metabolism, white, not thoroughbred, rats with the weight of about 185 g were used. Aqueous solution of cholinechloride was preliminarily administered per os to the experimental rats at 105 g/kg of weight, and a mixture of cholinechloride with nicotinic acid at ratio 10:1. 5 hours after administration of preparations the animals were weighed and the stress was induced. The stress was induced by adrenaline injected into peritoneum in a dose corresponding to weight of each animal at 500  $\mu$ g/kg. No stress was induced in the control group of rats. To compare the state of the animals, the content of glucose in blood and glycogene in liver were determined. In commercial conditions the preparations were tested on similar groups of pigs.

For last feeding, prior to transportation, cholinechloride and its mixture with nicotinic acid was introduced into the feed for the experimental group, and the appropriate amount of water, to the control group <sup>to get the</sup> equal volume of feed mass. The animals were delivered by vehicles for cattle transportation at a distance of 140 km at environmental temperature 10-15°C. The time of delivery was 2.5 hours. After processing in slaughter-house the carcasses were weighed, and meat quality was assessed.

**Results and discussion.** Studies of resistance of the animals have shown that the time length of swimming of mice, which received cholinechloride, was significantly greater as compared to the control mice, receiving distilled water. Increase in resistance, on average by 20 and 50%, depending on ratio of preparations, was observed in mice, taking cholinechloride in combination with vitamin PP. The data obtained show, that the preparation with the ratio of cholinechloride to nicotinic acid 10:1 affects most favourably the time length of mice swimming in water. The Table shows results of determination of amounts of glucose in blood and glycogen in liver of laboratory white rats under stress. It can be seen that glucose level

in blood of animals, subjected to stress by adrenaline injection increased significantly.

Table

Influence of antistress preparations on carbohydrate components in organism of laboratory animals

| Groups of animals | Introduced preparations                 | Content of glucose in blood |       |              | Content of glycogen in liver |        |              |
|-------------------|---|-----------------------------|-------|--------------|------------------------------|--------|--------------|
|                   |   | Number of samples           | mg%   | % to control | Number of samples            | mg%    | % to control |
| O                 | Distilled water, physiological solution | 6                           | 138.2 | 100.0        | 4                            | 3040.1 | 100.0        |
| A                 | Distilled water, adrenaline             | 4                           | 188.8 | 136.6        | 4                            | 1896.5 | 62.4         |
| Ch                | Cholinechloride, adrenaline             | 4                           | 146.1 | 105.7        | 4                            | 2762.5 | 90.9         |
| Ch.PP             | Cholinechloride, vitamin PP, adrenaline | 6                           | 146.7 | 106.1        | 4                            | 2210.2 | 72.7         |

Peroral administration of cholinechloride and its mixture with vitamin PP prior to stress, essentially makes the level of glucose in blood normal. The level of glucose in blood of animals subjected to stress, without administration of preparations rose almost by 37%, as compared to control. Both experimental groups of animals having cholinechloride alone or in combination with nicotinic acid, have shown little increase of glucose in blood, approximately by 5-6%.

Thus, owing to cholinechloride and its mixture with vitamin PP, the concentration of glucose in blood decreased by 31 and 29%, respectively. No significant differences were found between two experimental groups, as far as this index is concerned.

As far as glycogen is concerned, one can say that during stress its content in liver of the animals of group A decreased abruptly and was 62% from content of the control. Utilization of antistress preparations (see Table) delays breakdown of glycogen, helping to maintaining this carbohydrate component in liver in stress situations. Positive results of research made the ground for carrying out experiments for studying the influence of antistress preparations on slaughter animals during transportation. Experimental transportation at a distance of 55 km in winter and summer climatic conditions have shown, that the yield of meat from animals having the preparations, was greater than in control, depending on climatic and other external factors, by 1-2.4%. The quality attributes of meat from pigs of experimental groups were in all cases normal and met the standards.

The data obtained show, that a single administration of cholinechloride and its compositions with nicotinic acid in feed during final feeding before transportation contributes to increasing the yield and preservation of meat quality.

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