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CONTROL OF THE SAFETY OF THE MEAT OF SLAUGHTER ANIMALS DURING ITS ADULTERATION WITH SODIUM HYDROCARBONATE SOLUTION

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Abstract. The developed express method of establishing the adulteration of the meat of slaughter animals as a result of treatment with a solution of sodium bicarbonate was based on the use of an alcoholic solution of chromium dark blue with a mass concentration of 0.5 %. The results of the research established that the stability of the color intensity indicators during adulteration of the meat of slaughtered animals by treatment with sodium bicarbonate solution was 99.9 %.

Key words: beef, pork, lamb, goat meat, safety, quality, express method, adulteration, chrome dark blue, sodium bicarbonate.

Introduction. One of the prerequisites is the protection of food products from foreign impurities and risk-oriented control over the processes of production, storage and circulation of the meat of slaughtered animals, namely, the chemical hazardous factor. Also, for the production of meat for slaughter animals and their circulation, the most demanded today, in addition to (GMP), is proper hygienic practice (GHP) [1].

Falsification of meat and meat products is a social problem. As a result of sheltering a low-quality and dangerous food product, there are violations and non-compliance with sanitary and hygienic requirements during the production, storage and circulation of meat from slaughter animals at the facilities for their production and circulation – wholesale bases, agro-food markets, supermarkets [2–5].

Therefore, it is now relevant to develop and apply simple tests to establish the safety of meat by detecting its adulteration with a sodium bicarbonate solution due to the avoidance of meat spoilage, namely slowing down the development of microorganisms.

The purpose of the work is to conduct a safety test of the meat of slaughtered animals to establish its falsification with sodium bicarbonate solution.

Materials and methods. The material for the study was meat samples of slaughtered animals: beef – 24, pork – 28, lamb – 10, goat meat – 9, which were sold in the agro-food markets of the Kyiv region. For the first time, the developed express method for determining the adulteration of slaughtered animal meat (beef, pork,

lamb, and goat) was used by treating it with a solution of sodium bicarbonate with the help of an alcoholic solution of chrome dark blue with a mass concentration of 0.5 % [6].

The method is based on the determination of the remains of sodium bicarbonate solution on the surface of muscle tissue with an area of 2.0x2.5 cm in order to eliminate signs of deterioration and reduce insemination by microorganisms, on which 0.1–0.2 cm³ of an alcohol solution of chromium dark blue was applied with a graduated pipette with a mass concentration of 0.5 % and after 1–2 seconds, the presence of a pale pink color was established – in the absence of treatment of meat with sodium bicarbonate (negative reaction) or the presence of a light purple to dark purple color – in the presence of sodium bicarbonate according to amounts during meat processing up to 5.0 % (weakly positive reaction) and 5.1 % or more (positive reaction).

Results and discussion. The meat of slaughtered animals, which was sold in agro-food markets, was examined at different times of sale: immediately after the slaughter of livestock (cooled), which was subjected to cooling after separating the carcasses to a temperature not higher than 12°C: the surface of the meat had a drying crust, the smell specific to this species of animal, without extraneous odors, elastic consistency, the color of beef and lamb is dark red, goat meat is bright red, and pork is pale pink. According to the cooking test, beef, pork, lamb and goat corresponded to the fresh degree. Research was also conducted during the cooling of the meat of slaughter animals at temperatures from 0 to 6°C for 2 and 3–4 days during its sale in agro-food markets. Non-observance of sanitary and hygienic requirements and terms of sale of meat leads to its spoilage, accumulation of volatile fatty compounds, hydrogen sulfide, ammonia and an increase in the content of mesophilic aerobic and facultatively anaerobic microorganisms.

Therefore, in the chilled meat of slaughtered animals on the 3–4-th day of sale at a temperature of 0–6 °C, the content of KMAFAnM probably increased ($p < 0.001$), relative to the indicators on the 2nd day, respectively: in beef – by 1.44 times, in pork – by 1.35, lamb – 1.37 times, goat meat – 1.55 times.

Table 1

Indicators of falsification of the meat of slaughter animals with a solution of sodium bicarbonate with the use of chrome dark blue according to the intensity of the color of the solution, n=83

Type of meat	The color intensity of the meat surface according to the developed express method and the number of samples (n) and the ratio in %		
	pale pink (not fake meat)	light purple (applying up to 5.0% soda)	dark purple (application of 5.1% and more soda)
beef, n=24	18/75.00	4/16.67	2/8.33
pork, n=28	15/53.57	6/21.43	7/25.00
lamb, n=10	7/70.00	2/20.00	1/10.00
goat, n=9	7/77.78	2/22.22	–

According to the data in Table 1, it was established that the largest number of meat samples from slaughtered animals were not treated with sodium bicarbonate solution – from 53.57 to 77.78 %. Samples of meat from slaughtered animals were treated with a solution of sodium bicarbonate up to 5.0 % applied to the surface of the meat (light purple) for 3-4 days during sale at temperatures from 0 to 6 °C – from 16.67 to 22.22 %. The least amount of meat samples was found to be applied to the surface of the meat with sodium bicarbonate solution (dark purple color) 5.1 % and more – from 8.33 to 25.00 %.

Conclusions. The developed express method of establishing the adulteration of the meat of slaughter animals with a solution of sodium hydrogen carbonate was based on the use of an alcoholic solution of chrome dark blue with a mass concentration of 0.5 %, which was applied to the surface of muscle tissue, and after 1–2 seconds the presence of a pale pink color was established – in the absence of treatment of meat with sodium hydrogen carbonate or the presence of a light purple to dark purple color – in the presence of sodium hydrogen carbonate, depending on the amount during meat treatment up to 5.0 % and 5.1 % and more. The results of the research established that the stability of the color intensity indicators during adulteration of the meat of slaughtered animals by treatment with a solution of

sodium bicarbonate was 99.9 %. This developed express method is recommended for regional state laboratories of the State Production and Consumer Service.

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