

THE DYNAMICAL VALUES OF SOME PHYSIC-CHEMICAL INDICATORS IN REFRIGERATED WILD BOAR MEAT

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Introduction

The meat derived from the different game species animals has some morphological and chemical particularities, determined by the wild animals' way of life, especially by the muscular effort – much more intense comparing to domestic animals. Generally, the meat of the game species animals has good developed muscular fibers, very dense and aponeurosis-like conjunctive tissue (especially the epimysium and the perimysium) and under-developed perimuscular and intramuscular adipose tissue. Due to these characteristics, the organoleptic characters of the game meat are the following: the aspect is dense, compact; the meat grain is thick and the marmoration caused by perimuscular and intramuscular adipose tissue is not present (2, 5). The chemical processes in the game meat are faster reported to those in the meat of the farm-raised animals. Specific for the game meat is that the animal is shot during a period of intense effort when the muscles are in the glycolytic (active) phase, therefore in the muscles accumulates a very large quantity of lactic acid. The direct consequence is the fast installation of the rigor (frequent the muscle rigidity occurs instantaneous). The conjunctival and myofibrillar proteins determine another specific issue of the chemical reaction in the game meat. The conjunctival proteins present a high degree of polymerization and densification and the myofibrillar proteins record higher quantity comparing to those determined in the slaughter animals. In addition, in the meat from the game species animals, the both categories of proteins are resistant to the action of the multi-catalytically enzymatic complex, the proteolysis is established late, after a long maturation period (2). Another particularity is represented by the specific microflora in the game meat, entered the muscles either at the same time with the formation of the shot wound (the bullet penetrate the skin and sometimes the intestine, taking over a series of bacteria and inseminate them profound in the muscles), either following the late evisceration that permits the bacterial invasion with digestive-borne germs (2, 4).

All these reasons explain the proceeding of some researches on the dynamic of the physic-chemical indicators of the game meat maintained in refrigeration temperatures. The

approach of this issue permits in the same time a correct understanding of some biochemical processes that take place in game meat.

Material and methods

For physic-chemical analysis of the refrigerated game meat the following parameters have been chosen: the chemical reaction (pH) on the meat as such and on the watery extract of meat, the free ammonium from the meat as such and from the watery extract of the meat (the Nessler reaction), the globulins presence (the Walkiewicz reaction), the peroxidase presence, the evaluation of the total nitrogen from the meat as such (distilling method) and the evaluation of the aminated nitrogen (the Sørensen – Gavrilov reaction).

The substantiations have been sampled from the wild boar right after the evisceration, on the same conditions of temperature that have been provided to the carcasses. In the laboratory, the samples have been stored and maintained at 2 – 4 0C temperatures. Daily, from every sample were taken section of muscle which immediately process in order to perform the laboratory analysis.

In a two years period it was analyzed a total number of 875 samples, which one being characterized by physic-chemical parameters for 30 days.

In order to evaluate the chemical reaction it was followed the electrometrical method (applied for the watery extract of meat) (9, 10 and 11).

The easy hydrolyzed nitrogen evaluation was performed using the distilling method and the further titration of the distillate by NaOH solution 0.1N. In order to reveal the free ammonium was used the Eber method (for the meat as such) and the Nessler method (for the watery extract). The globulins presence was revealed by Walkiewicz method for the watery extract. This reaction refers to the proteolysis factors that result from the scission of the polypeptidic structures. The peroxidase presence was revealed on the watery extract, following the color reaction with the benzidine in the presence of hydrogen peroxide. The total nitrogen from the meat as such was evaluated by the classical method Kjeldahl (9, 11). For the evaluation of the aminic nitrogen it had been used the Sørensen – Gavrilov titrimetric method which relies on blocking of the aminic radicals of the proteins and thus obtaining metilen acids derivates, which could be titrated by alkalis solution with known normal concentration (6,9).

Results and discussion

The statistical analysis of the laboratory researches followed the mathematical calculation of the average values for each physic-chemical revealed parameter and for the qualitative reactions it followed the statistical calculation in order to establish the most frequently type of reaction (positive, poorly positive or negative). The results obtained after the evaluations are exposed in table no. 1 following the dynamic of the physic-chemical parameters varying with the storage period.

Table 1. The dynamical values of investigate physic-chemical indicators in refrigerated wild boar meat

The refrigeration period	The analyzed physic-chemical indicators			
	Chemical reaction (pH)	Easy hydrolyzed nitrogen (mg NH ₃ %)	Total nitrogen (g %)	Aminic nitrogen (mg %)
24 h	5,2	9,4	5,4	98,7
2 days	5,4	10,2	5,2	142,5
4 days	5,6	12,7	4,6	181,6
6 days	5,9	14,2	4,7	246,1
8 days	5,9	16,1	4,1	358,2
10 days	6,0	16,9	3,8	362,1
12 days	6,0	17,2	3,2	380,7
16 days	6,2	19,4	2,9	421,4
20 days	6,4	22,7	2,1	452,3
25 days	6,6	24,5	1,7	478,4
30 days	6,7	27,8	1,2	496,5

The investigations have been revealed an easy growing up of pH: at the beginning the pH records a very low value (max. 5.2) followed by higher values after 6 – 8 days of storage, then the values are slowly growing up to the maximal value of 6.7 at the end of the 30 days period of storage. The easy hydrolyzed nitrogen records as well a slowly growing up to the maximum of 27.8 mg NH₃ % after a 30 days period of storage.

The most significant modification was recorded by the aminated nitrogen: from the initially value of 98.7 mg % to a 5 times higher values (496.5 mg %) at the end of the 30 days storage period.

The qualitative results are presented in table no. 2 by 4 categories of interpretation (positive reaction, poorly positive reaction, uncertain reaction and negative reaction). The qualitative physic-chemical parameters repeat the behavior of the quantitative parameters. The free ammonium decelated on meat as such and on the watery extract of meat become positive after 25 days of storage. The globulins (the peptidic structure globins that mark the beginning of the intense proteolysis process) are practically found after just 20 days of storage. The muscular peroxidase was active all the storage period in study, only about the end of the 30 days period becomes inactive.

Table 2. The dynamic of investigated qualitative physic-chemical reactions, from refrigerated wild boar meat

The refrigeration period	The analyzed physic-chemical indicators				
	Eber Reaction	Nessler Reaction	Walkiewicz Reaction		Peroxidase Reaction
			acidulate sublimate	non-acidulate sublimate	
24 h	-	-	-	-	+
2 days	-	-	-	-	+
4 days	-	-	-	-	+
6 days	-	-	-	-	+
8 days	+ / -	-	-	-	+
10 days	+ / -	+ / -	-	-	+
12 days	+ / -	+ / -	-	-	+
16 days	+ / -	+ / -	-	+ / -	+ / -
20 days	+ / -	+ / -	-	+	+ / -
25 days	+ / -	+ / -	+	+	+ / -
30 days	+	+	+	+	-

Conclusions

1. The biochemical transformations of the wild boar meat happen in a relatively slow dynamic, after a 30 days storage period at refrigeration temperature the quantitative physic-chemical parameters with hygienic value are framed in the admitted limits.
2. The aminated nitrogen dynamically assessed on a 30 days period shown an important growing up of the final value, for 5.03 times higher than the initial value.
3. The qualitative physic-chemical indicators with hygienic value (the free ammonium and the formation of the globulins) shown positive reaction relatively late, after the meat storage in refrigeration condition a period of 22 – 25 days.
4. The slow maturation (in refrigeration condition) of wild boar meat permits the preservation of the hygienic characters for 25 – 30 days long.

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