

STUDIES ON THE EVOLUTION OF REFRIGERATED POULTRY MEAT

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Abstract

The study aimed at assessing the quality of poultry meat stored under the refrigeration conditions (temperature of +4°C and moisture of 95%) through a series of tests on sensorial characteristics, and the evolution in easily hydrolysable nitrogen content and hydrogen sulphide. Investigations were made on chicken broiler carcasses, packed in polyethylene bags and stored for 6 days. From each carcass were gathered samples from the breast and thighs. The scores for the 4 sensory attributes analyzed (presence of mucus, odour, colour, elasticity) were decreasing compared to the first day. So was found an extension sticky surface of samples and the appearance of a faint odour (sulphurs); instead colour and elasticity of muscle were kept at specific levels of relatively fresh meat. Easily hydrolysable nitrogen content increased by 76.70% compared to initial samples taken from the breast and with 56.06% for those in thighs muscle.

Key words: freshness, poultry meat, sensorial characteristics, easily hydrolysable nitrogen, refrigeration

INTRODUCTION

Poultry meat is a highly perishable food and loses freshness between 4 and 10 days under refrigeration conditions [5].

Shelf-life of refrigerated fresh poultry can be evaluated through sensory attributes and chemical indicators. Reduced quality of these attributes, determines the non-acceptance by the consumer of meat [4, 3]. To identify the first signs of alteration in meat, different indicators were proposed for consideration, most important being the organoleptical characteristics, easily hydrolysable nitrogen and hydrogen sulphide identification [2].

On a longer period of time under refrigeration, meat begins to spoilage; this process is due to the action of microorganisms and biochemical transformation that occur inside the product [7].

MATERIAL AND METHOD

Biological material is represented by carcasses of broiler chickens, packed in polyethylene bags, sealed with aluminium clips, storage in the original package at a

temperature of 4°C and relative moisture of air about 95% during a period of 6 days.

To realize the qualitative determinations, from each carcass were gathered 3 samples from pectoral muscles and 3 samples from thighs muscles, samples were gathering daily at the same hour.

The analysis of sensory attributes was determined according to STASS for the characteristics of chilled meat. Evolution of sensory characteristics was done by assessing the scoring method which assumes distribution of a number of points to each attribute in part from 1 to 3 (1 for the worst score and 3 the best attribute).

Easily hydrolysable nitrogen was determined according to STAS 9065/7-74, in hot weakly alkaline medium, low ammonia released is driven by water vapour and is collected in a given volume of acid solution with known titre. Excess of acid was titrated with a base of the same normality. Based on the volume of acid used to neutralize the ammonia it was calculated the quantity of ammonia that resulted in the sample studied.

The presence of hydrogen sulphide was identify as a qualitative response by the test with lead acetate to hydrogen sulphide leading to a brown-black sulphide.

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RESULTS AND DISCUSSIONS

The evolution organoleptic characteristics of meat

Following analyzes conducted on meat samples gathered from the pectoral musculature, in the first day of storage attributes presented the corresponding characteristics of fresh meat. At the third check carried out after 72 hours of storage, is observed a slight presence of mucus.

At the end of the experiment was found an extended sticky surface on the samples and the presence of a faint odour (sulphurs type), instead colour and elasticity of muscle were kept at specific levels of relatively fresh meat.

In the case of thigh muscles, the state of freshness remained after 48 hours. From on the third day is found mucus on surface of samples, the scores being lower than the first day, so at the end of 6 days, the samples having the characteristics of a relatively fresh meat (fig. 1).

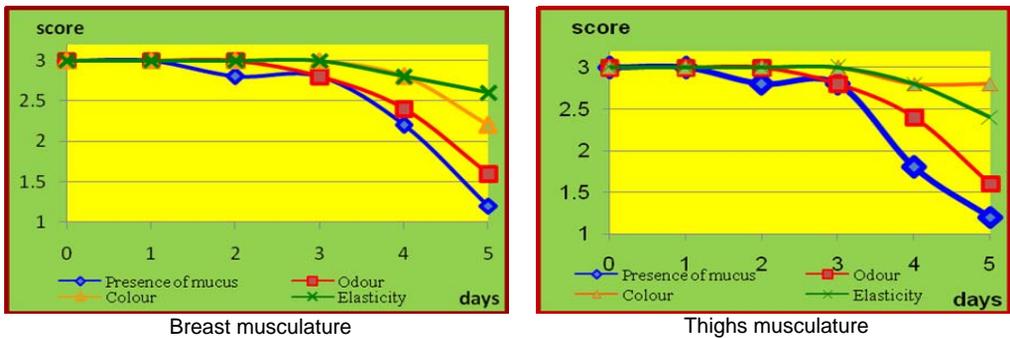


Fig. 1 Organoleptic evolution of the two muscles types

Variation content of easily hydrolysable nitrogen

During the 6 days of storage was taking daily 10 g of meat for the determination of easily hydrolysable nitrogen, the content increased progressively throughout the storage, in the case of the pectoral and thighs musculature.

In samples of pectoral musculature in the first day of storage was obtained a content of

15.41 mg NH₃/100 g which increased up to 27.23 mg NH₃/100 g, value resulting at the end of the investigation. In sample of thighs musculature, easily hydrolysable nitrogen content ranged from 16.73 mg NH₃/100 g (the first day of storage) to 26.11 mg NH₃/100 g (in the sixty day) increasing the NH₃ content is due to bacterial decomposition of amino acids in the process of spoilage (fig. 2).

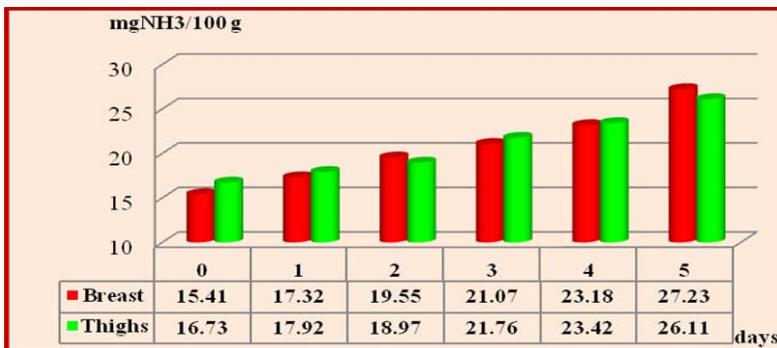


Fig. 2 NH₃ content variation in breast and thighs

Our data could be consider normal if we have in view the fact that in similar experimental conditions [1], found a content of

23.48 mg NH₃/100 g (the first day of storage) and 31.39 mg NH₃/100 g (in the sixth day).

Identify the presence of hydrogen sulphide during storage. In advanced stage of degradation of proteins through the action of putrefying microorganisms on sulphur amino acids (cysteine, cystine, methionine) on other sulphide compounds from product analyzed, is formed and hydrogen sulphide [6].

In regard to H₂S present in meat taken for the pectoral musculature tests carried out indicates that the state of freshness is maintained until the fourth, on the fifty day and some changes were found to be concretized in weakly positive reactions of

generating hydrogen sulphide, which indicates a degree of microbial contamination with sulphide reducing bacteria.

The meat samples from thighs musculature maintained their state of freshness rendered by absence of hydrogen sulphide, until 4th day. Following the analyzes on samples it was noticed on the fifty day of storage under refrigeration that the meat loses its freshness through weak positive reactions for formation of sulphide with triggering bacterial process of desulphurisation of amino acids (tab. 1).

Table 1 Assess the degree of freshness of pectoral and thighs musculature

		During storage (days)					
Type of muscle	Sample	0	1	2	3	4	5
Pectoral musculature	sample 1	+	+	+	+	+	±
	sample 2	+	+	+	+	±	±
	sample 3	+	+	+	+	±	±
	sample 4	+	+	+	+	+	±
	sample 5	+	+	+	+	+	±
Thighs musculature	sample 1	+	+	+	+	+	±
	sample 2	+	+	+	+	±	±
	sample 3	+	+	+	±	±	±
	sample 4	+	+	+	+	±	±
	sample 5	+	+	+	+	+	±

+ fresh; ± relatively fresh

CONCLUSIONS

Following determination carried out to assess the state of freshness of chilled poultry meat, were remarked the following aspects:

Organoleptic characteristics are influenced by the experimental factors (temperature and relative humidity). The state of freshness taken into study is maintained until the fourth day end after six days, according to the sensory attributes, meat is relatively fresh.

Easily hydrolysable content increased with 76.70% compared to initial samples for the breast muscles, and with 56.06% for thighs muscles.

Easy presence of hydrogen sulphide was found in case of samples analyzed in the fifth day when meat lost its relative freshness.

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