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The Quality of Poultry Meat in Various Type of Packaging Stored Under Refrigeration Conditions

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Abstract. The research was carried out on samples taken from thighs muscles, individually packed and stored for 10 days, at different parameters (Lc stored at +4°C, 95% RH, packed in polyethylene bags; Lexp-1 stored at +4°C, 95% RH packed in Stretch trays; Lexp-2 stored at +4°C, 95% RH packed in BDF (under a modified atmosphere) trays). During this period, was made daily determinations on color, pH and in easily hydrolysable nitrogen content. Our results showed that there was a directly correlation between muscle pH, color fluctuations and easily hydrolysable nitrogen content. Thus at the end of 10 days of storage for the group Lc was registered a pH of 6.64, a content of 28.21 mg NH_3/100 g and color values of L*-54.35, a*-10.27, b*-17.27), for samples packed in Stretch trays, pH was higher than the Lc with 2.6 and with 2.91 than Lexp-2. Regarding easily hydrolysable nitrogen content, Lexp-2 had content with 63.66% lower than Lc and with 56.64% beside Lexp-1. The final conclusion was that in order to preserve the freshness of poultry meat is recommended packaging in BDF trays (in a controlled atmosphere) and storage at +4°C/ RH 95%.

Keywords: meat quality, poultry, packaging, refrigerated

Introduction To the consumer, appearance is the major criterion for purchase selection and initial evaluation of poultry meat quality (Allen *et al.*, 1997). Broiler meat colors are influenced by numerous live production, handling, and processing factors as reviewed by (Fletcher, 1999) and (Froning, 1999). The ultimate pH of meat is highly dependent upon the amount of glycogen present in the muscle. This glycogen is depleted in the muscle of birds that have been exposed to stress prior to slaughter. Appropriate packaging of meat and meat products can bestow any number of benefits. Extended maintenance of quality can be achieved in a hermetic package through exclusion of contamination, delay of microbial spoilage, maintenance of desirable color and minimization of water loss (Egan *et al.*, 1988). Decomposition processes are manifested by a change in specific sensory properties of meat. In a majority of cases, the sensory changes and the degree of contamination with microorganisms, and their biochemical activity, are in correlation with the meat ammonia content (Baeza, 2004).

Aims and Objectives. This study was conducted to determine whether a relationship exists between thigh meat colors, pH, along with the packaging on meat quality.

Materials and Methods. Samples from thighs muscle (n=15) were wrapped individually in polyethylene bags (Lc), Stretch trays (Lexp-1), BDF trays (Lexp 2) (under a modified atmosphere) and stored for a period of 10 days (temperature +4°C and 95% moisture) in which is determinate pH value, color and content in easily hydrolysable nitrogen. For measuring the *pH value* of meat was used a pH-meter Hanna Hi 98185 pH electrode with penetration knife. *Color measurement* was performed using a MiniScan XE Plus Hunter Lab, color expressed in terms of CIE values for lightness (L*), red-green color coordinate (a*), yellow-blue color coordinate (b*). *Easily hydrolysable nitrogen* was determined according to STAS 9065/7-74.

Results and Discussions. *pH evolution* for thighs muscle showed increasing this day by day under the influence of storage conditions assured. After the 10th days of storage, in the

case of packed in polyethylene bags the pH increased from 6.23 (at 24 hours after slaughter) to 6.64 (the tenth day of storage), from 6.32 to 6.90 in Stretch trays and the case of packed in BDF trays from 6.22 to 6.61 (*Tab. 1*). Baston in 2010 found pH values 6.24 (after 24 hours), 6.47 (in fifth day) and 6.90 (in tenth day of storage) in case of polyethylene bags. In this study, correlation coefficients between C.I.E. color readings and pH of thighs muscle were highly significant. L* and b* parameters were found to correlate negatively to pH, whereas a* parameter had a positive correlation. Thus, as the pH increased, L* and b* parameters values decreased, but a* parameter values increased. In samples of thighs muscle in the first day of storage was obtained a content of 13.34 mg NH_3/100 g in Lc group, 15.10 mg NH_3/100 g in Lexp-1 group and 8.57 mg NH_3/100 g in Lexp-2 group. After 10 days of storage for *easily hydrolysable nitrogen* was recorded the lowest in Lexp-2 group (24.96 mg NH_3/100 g). Next values are for the Lexp-1 (35.58 mg NH_3/100 g) and finally in the Lc group (28.21 mg NH_3/100 g) haze the highest values. Boltea *et. al*. observed over a period of 10 days as the content of hydrolysable nitrogen has varied between 23.84 mg NH_3/100 g (in first day) to 38.21 mg NH_3/100 g after 10 days of storage.

Tab. 1

Average values of indicators studied of thighs muscle

Storage period (days)	Group	Statistical estimators $\bar{X} \pm s_{\bar{X}}$				
		pH	L*	a*	b*	NH_3/100g
1	Lc	6.23±0.01	57.74±0.12	13.61±0.10	14.34±0.11	12.34±0.15
	Lexp-1	6.32±0.01	58.62±0.40	13.12±0.04	12.28±0.10	15.10±0.13
	Lexp-2	6.22±0.01	59.84±0.14	12.26±0.29	13.52±0.13	8.54±0.11
5	Lc	6.45±0.01	56.38±0.25	11.12±0.06	16.02±0.08	21.54±0.21
	Lexp-1	6.48±0.01	56.71±0.16	10.31±0.09	14.35±0.18	22.11±0.13
	Lexp-2	6.31±0.01	58.34±0.17	9.27±0.26	14.58±0.19	17.29±0.13
10	Lc	6.64±0.01	54.32±0.14	10.27±0.09	17.27±0.08	28.21±0.19
	Lexp-1	6.90±0.01	53.03±0.23	10.31±0.09	16.39±0.18	35.58±0.21
	Lexp-2	6.61±0.01	57.05±0.21	7.54±0.13	15.68±0.40	24.96±0.13

Conclusion. (1) Following the 10 days of storage in case of thigh muscle studied the pH values increased with 6.58% in group Lc, 9.17% in group Lexp-1 and 6.27% in group Lexp-2. **(2)** As the pH increased the L* and b* parameters values decreased, but we observed that a* parameter values increased. **(3)** Regarding easily hydrolysable nitrogen content, Lexp-2 had the content with 63.67% lower than Lc, respectively 56.65% compared to Lexp-1.

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REFERENCES

1. Allen, C.D., S.M. Russell, and D.L. Fletcher (1997). The relation of broilers breast meat color and pH to shelf-life and odor development. Poult. Sci. 76:1042-1046.

2. Fletcher, D.L. (1999). Poultry meat color, Poultry Meat Science, UK, 25: 159-175.

3. Froning, G.W. (1995). Color of poultry meat. Poult. Avian Biol. Rev. 6:83-93.

4. Egan, A.F., I.J. Eustace and B.J. Shay (1988). Proceedings of Industry Day: Part of the 34th International Congress of Meat Science and Technology, Birsbane 29 Aug-2 Sept, 68-75.

5. Baeza, E. (2004) Measuring quality parameters. In: Poultry meat processing and quality. Woodhead Publ., England, 304-332.

6. Baston, O. (2010) Freshness evaluation of poultry meat. Ed. Stef, Iasi.

7. Boltea F, Bretan Laura and Ketney O. (2010). Freshness determination of poultry meat. Carpathian Journal of Food Science and Technology. Vol. 2(2) December.