

Influence of Ante-Slaughtering Factors on Broiler Meat Acidity

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Abstract

Our study evaluated the acidity of broiler meat in accordance with some ante-slaughtering factors such as: duration of transport from farm to slaughterhouse, broilers' density in transport shelves and ante-slaughtering rest time. To carry out the current study, three experimental batches were prepared; pH determination was made at 0.25, 12 and 24 h after slaughter. After slaughtering, dynamics of pH placed the carcasses of batches L1 and L2 in a safety interval, while carcasses from L3 batch presented signs of PSE. A possible explication of this cause-effect relationship could be the insufficient ante-slaughtering rest period (30 min.) and moderate density during transport (32 chicken/shelf), even if the distance was the shortest one (4 km).

Keywords: *acidity, ante-slaughtering, glycogen*

INTRODUCTION

Gathering, loading and operations implied in transport are stressful operations for birds, in which muscular activity is more intense. All of these determine an ante-slaughtering acceleration of ATP and glycogen consumption. The birds to be slaughtered have small quantities of glycogen and lactic acid, so the acidification of musculature will be lower, determining the incomplete decrease of pH (Pérez-Alvarez and Fernández-López, 2006; Pérez-Alvarez, 2006). Therefore, a rapid decrease of pH leads to defects in the meat (PSE and DFD), the final value of those parameters influencing preservation and technological features of meat (Prändl, 1994; Sayas-Barberá *et al.*, 2010).

AIMS AND OBJECTIVES

The aim of the current research was to evaluate the acidity of broiler meat under the effect of some ante-slaughtering factors (transport duration, density in shelves and the rest period in slaughter

house), correlated with a post-slaughtering dynamics.

MATERIALS AND METHODS

To carry out the study, three experimental batches were formed (100/experimental batch); the biological material was "ROSS 308" broilers, aged 42 days, gathered from three rearing farms: SIMILA farm, situated at a distance of 152 km, transport duration of 165 minutes with a chicken density in shelves of 28 and a rest time of 90 minutes after arrival in the slaughterhouse (L1); DOINA farm, situated at a distance of 107 km from the slaughterhouse, transport duration of 105 minutes with a chicken density in shelves of 30 and a rest time of 60 minutes (L2) and HENCI farm, placed 4 km from the slaughterhouse, transport duration of 15 minutes, with a chicken density in shelves of 32 and a rest time of 30 minutes (L3).

Tab.1 Chickens' meat acidity for experimental batches L1, L2, L3

Refrigeration time (h)	Exp. batch	HYBRID "ROSS-308" (n = 100/experimental batch)			
		$\bar{X} \pm s_{\bar{x}}$	V%	Min. – Max.	Interpretation of differences T-Test (2-tailed)
0.25	L1	6.64±0.032	1.525	6.46 – 6.73	L1-L2 t = 1.450; p = 0.181 ^{ns} .
	L2	6.57±0.041	1.965	6.39 – 6.79	L1-L3 t = 6.946; p = 0.000 ^{***}
	L3	6.25±0.048	2.443	6.05 – 6.52	L2-L3 t = 4.786; p = 0.001 ^{***}
12	L1	6.54±0.032	1.548	6.36 – 6.63	L1-L2 t = 1.450; p = 0.181 ^{ns} .
	L2	6.47±0.041	1.995	6.29 – 6.69	L1-L3 t = 6.946; p = 0.000 ^{***}
	L3	6.15±0.048	2.482	5.95 – 6.42	L2-L3 t = 4.786; p = 0.001 ^{***}
24	L1	6.27±0.087	4.367	5.86 – 6.66	L1-L2 t = 0.746; p = 0.474 ^{ns} .
	L2	6.16±0.136	8.030	5.62 – 6.58	L1-L3 t = 7.346; p = 0.000 ^{***}
	L3	5.61±0.028	1.606	5.46 – 5.74	L2-L3 t = 3.884; p = 0.004 ^{**}

T- test (2-tailed)- for each experimental batch: ^{ns}Insignificant differences (p>0.05); ^{*}significant differences (p<0.05); ^{**} distinct significant differences (p<0.01); ^{***} very significant differences (p<0.001).

Determination of the pH value for all those three batches was made at 0.25, 12 and 24 h after slaughtering in accordance with the analysis principle described by standard SR ISO 2917:2007.

RESULTS AND DISCUSSION

In the phase of *pre-rigor mortis*, 0.25 h after slaughtering, the meat gathered from the chickens was characterised by pH values, which had the means of 6.64±0.032 (L₁), 6.57±0.041 (L₂) and 6.25±0.048 (L₃), dynamics enlightened a parallelism between batches in the first 12 hours of refrigeration till mean values of 6.54±0.032 (L₁), 6.47±0.041 (L₂) and 6.15±0.048 (L₃).

At the end of the refrigeration period, pH values highlight an accentuated decrease in chicken from batch L₃ compared to the one observed at chicken from batches L₁ and L₂, a situation reflected by the calculated means: 6.27±0.087 (L₁), 6.16±0.156 (L₂) and 5.61±0.028 (L₃) (Table 1).

Primary statistical estimators calculated for the obtained data, which characterized the dispersion degree of slaughtered broilers' meat acidity values, were reduced, the variation coefficient displayed inferior values to the level of 10%, a fact which showed a very good homogeneity between individuals from each experimental batch (Table 1).

CONCLUSION

pH dynamics presented a descendant trend in the first 24 h post-mortem, the pH recorded values for carcasses of batch L3 having an accentuated decrease in comparison with the one observed at batches L1 and L2. Carcasses of batches L1 and L2 were in the safety interval, while carcasses of batch L3 presented PSE signs. A possible explanation for the cause-effect relationship could be the insufficient ante-slaughtering rest time (30 min.) and moderate density during transport (32 chicken/shelf) even if the distance was the shortest (4 km).

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