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EFFECT OF BROILER FASTING TIME DURING PRE-SLAUGHTER

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ABSTRACT

In poultry slaughterhouses, the establishment of pre-slaughter fasting strategy is essential for meat yield and quality. Moreover, it is known that long fasting period increases bird stress, especially during capture, loading and transport. This study aimed to evaluate the effect of pre-slaughter fasting at different times (8, 10 and 12 hours) on body weight loss and cut yield of broilers at 42 days. Therefore, 432 commercial strain male chickens from six consecutive flocks (72 birds/flock) were weighed, identified and processed for evaluation. During pre-slaughter, the birds remained in floor pens on wood shaving litter with free access to drinking water for six hours prior to loading and transport to the slaughterhouse. A three phase feeding program was used and diets were formulated to meet the nutritional requirements of birds in each development stage based on a corn-soybean meal feed in crumbled form. A completely randomized block design was used, each box representing an experimental unit, with 3 birds/box. Data were submitted to analysis of variance and compared by T-Test analysis. Results showed a significant linear increase of body weight loss at pre-slaughter fasting time of 8, 10 and 12 hours (3.2±0.15; 4.4±0.19 and 5.0±0.19), respectively ($P<0.05$). Additionally, it was observed that eight hours fasting time was sufficient for complete emptying of the gizzard. Searching for production sustainability and animal welfare, it may be concluded that the pre-slaughter fasting period should overcome as little as possible eight hours.

KEYWORDS: animal welfare, fasting strategy, poultry slaughterhouses

INTRODUCTION

Pre-slaughter fasting comprises the period from feed withdrawal at the farm and considers the time spent through the process of bird catching, transport, resting area, hanging at the slaughter line and finally reaching the stunning. Although fasting is related to stress, it is usual to submit broiler chickens to a period of 8 to 12 hours of feed withdrawal in order to obtain advantages on carcass contamination (ORLIC *et al*., 2007). Recommendation of HAS (2012) is that feed should be withdrawn for no longer than twelve hours prior to slaughter. In addition UBA (2008) in their welfare protocol for chickens and turkeys recommends a twelve hour pre-slaughter fasting period as a guide for broiler producers.

The risks of carcass contamination increase greatly when intestinal perforation occurs during the evisceration process, which is a direct effect of full gastrointestinal tracts. According to Northcutt (2001), the intestine of full feed birds takes up a great deal of space in the abdominal cavity, such that the intestinal loop is easily cut during vent opening. However, if the fasting period is too long, there are negative consequences on contamination because of intestine weakening and higher bile contamination (NORTHCUTT, 2001; CONTRERAS-CASTILLO *et al*., 2007), in addition to increase in body (CONTRERAS-CASTILLO *et al*., 2007; KING *et al*., 2007) and carcass weight loss (KING *et al*., 2007) and undesirable welfare issues.

Therefore, fasting period should be planned with care considering time consumed in all the pre-slaughter period, in order to contribute to reduced carcass contamination and improved welfare. In general, studies have considered long fasting periods (SCHETTINO *et al*. 2006; HASLINGER, *et al*., 2007; GOMES *et al*. 2008). Although such studies let to conclusions related to general physiological behavior as a result of fasting, not enough details are generated at the critical period when the advantages outweigh the negative part of feed withdrawal. Additionally, because of logistic issues and the speed of the slaughter line, it is necessary to determine a desired range of fasting time that allows the entire flock of birds to be considered. This study aimed to evaluate the effect of pre-slaughter fasting at different times (8, 10 and 12 hours) on body weight loss and carcass yield of broilers at 42 days.

MATERIALS AND METHODS

A total of four hundred and thirty two commercial male broilers chickens, from six consecutive flocks (72 broilers/flock), were used in this experiment. The experiment was carried out from October/2010 to July/2011, and the intervals among flocks were 14 days. At rearing, a three phase feeding program was used and the diets formulated to meet the nutritional requirements in each development stage according to Rostagno *et al*. (2011). A corn-soybean meal type feed was used in a crumbled form. A completely randomized block design was used, each of the 24 pens representing an experimental unit, with 3 birds sampled per pen.

At 42 days of age, the chickens were distributed in three treatments (24 birds each), weighed (body weigh before fasting) and properly identified. The birds were then returned to the pens where they stayed for six hours without feed but with free access to water. After this initial fasting period, all birds were removed to cages in three separate groups (8, 10 and 12 h) in order to complete the fasting period (now also without water). The first group of broilers (8 h) was immediately transported to the processing plant where they stayed 1:30 h at the resting area. Before submitted to the slaughter line, body weight was obtained again (body weight after fasting). Similar procedures were followed for the other treatment groups, except that the fasting period in the cages before transport was prolonged (2 or 4 h) according to the treatment. Data were submitted to ANOVA procedure (SAS 2003-2008) and T test was used for comparisons of the means.

RESULTS AND DISCUSSION

Table 1 presents the effects of different feed withdrawal periods (8, 10 and 12 h) on average data of body weight before (BWbf) and after fasting (BWaf), body weight loss during fasting (BWL), carcass, breast with bone, gizzard content and liver.

As expected, there was a highly significant ($P<0.0001$) treatment effect on body weight loss during the fasting period. This weigh loss has been observed earlier (CONTRERAS-CASTILLO *et al*., 2007; GARCIA *et al*., 2008; KING *et al*., 2007) and was confirmed as relative to the body weight before fasting (Table 2). The primarily reason of body weight loss is expected to be the result of gastrointestinal content excretion. Interestingly, when data of the gizzard content were analyzed, no difference among treatments was observed indicating that after 8 hours there would also be no crop content. Therefore, if any fecal contamination potential remains, it would rely on the intestinal content.

Fasting implicated not only losses of gastrointestinal tract content. Reduction of carcass weight with longer fasting (Table 1) indicates metabolic usage of carcass tissue. Although the effect on carcass was not observed on a relative basis (Table 2), such effect was reported by KING *et al*. (2007). One of the metabolic needs is energy, required as homeostasis maintenance, which is initially satisfied by glycogen then by fat stores. Reductions in liver weight (Table 1) may be involved in mobilization of both of this energy sources. There is possibly also a contribution of the carcass supplying energy out of its fat stores.

Table 1 - Average data (g) of body weight before (BWbf) and after fasting (BWaf) , body weight loss during fasting (BWL), carcass, breast with bone, gizzard content and liver.

Variables (g)	Treatments			Pr > F	CV
	8 h	10 h	12 h		
BWbf	2896.0±22.1	2897.4±24.0	2903.5±29.4	0.7848	1.67
BWaf	2804.5±22.9a	2773.1±25.4b	2757.9±30.2b	0.0010	1.85
BWL	91.48±4.14c	126.1±5.0b	146.1±5.4a	<0.0001	16.16
Carcass	2161.8±16.0a	2140.9±12.8ab	2129.0±15.3b	0.0192	1.83
Breast	770.0±10.4	760.2±10.8	762.9±12.8	0.2593	3.41
Gizzard content	5.54±0.36	5.66±0.32	5.57±0.33	0.9551	30.50
Liver	52.81±0.58a	51.21±0.63b	50.43±0.69b	0.0059	6.02

Means followed by different letters in rows differ significantly by t test ($p \leq 0.05$).

There was no treatment effect on breast at both weight or relative basis (P>0.05), showing that no significant tissue mobilization occurred on this muscular part of the carcass during the fasting periods evaluated.

Table 2 - Average data (%) of body weight loss during fasting (BWL), carcass, breast with bone and liver.

Variables (%)	Treatments			Pr > F	CV
	8 h	10 h	12 h		
BWL	3.2±0.15c	4.4±0.19b	5.0±0.19a	<0.0001	16.05
Carcass	74.01±0.22	74.07±0.23	74.46±0.23	0.1002	1.29
Breast	27.42±0.19	27.38±0.18	27.59±0.20	0.3891	2.52
Liver	1.89±0.02	1.85±0.02	1.83±0.03	0.0911	5.69

Means followed by different letters in rows differ significantly by t test ($p \leq 0.05$).

CONCLUSION

According to the literature, a fasting period of eight hours is sufficient to minimize risk of carcass contamination. The present study was conducted to evaluate the effect of additional fasting time, aiming on not negatively impact other important variables. Based on the results, fasting time longer than eight hours implicates in continuous and linear body weight and carcass weight losses. As a conclusion, the total fasting period should overcome as little as possible eight hours.

REFERENCES

CONTRERAS-CASTILLO, C., PINTO, A.A., BERAQUET, N.J., AGUIAR, A.P., CIPOLLI, K.M.V.A.B., MENDES, C.M.I. and **ORTEGA, E.M.** (2007) Effects of feed withdrawal periods on carcass yield and breast meat quality of chickens reared using an alternative system. *J. Appl. Poult. Res.* 16:613-622.

GARCIA, R.G, CALDARA, F.R., DE VARGAS JUNIOR, F.M., GRACIANO, J.D., DE FREITAS, L.W., SCHWINGEL, A.W., MARIN, D. and **AMADORI, A. H.** (2008) Feeding fasting pre-slaughter in yield and quality of carcass of broilers type griller. *Agrarian* 1:113-121.

GOMES, H.A., VIEIRA, S.L., REIS, R.N. FREITAS, D.M., BARROS, R., FURTADO, F.V.F. and **SILVA, P.X.** (2008) Body weight, carcass yield, and intestinal contents of broilers having sodium and potassium salts in the drinking water twenty-four hours before processing. *J. Appl. Poult. Res.* 17:369-375.

HASLINGER, M., LEITGEB, R., BAUER, F., ETTLE, T. and **WINDISCH, W.M.** (2007) Slaughter and meat quality of chicken at different length of preslaughter feed withdrawal. *Die Bodenkultur* 58:1-4.

KIM, D.H., YOO, Y.M., KIM, S.H., JANG, B.G., PARK, B.Y., CHO, S.H., SEONG, P.N., HAH, K.H., LEE, J.M. KIM, Y.K. and **HWANG, I. H.** (2007) Effect of the Length of Feed Withdrawal on Weight Loss, Yield and Meat Color of Broiler. *Asian-Aust. J. Anim. Sci.* 20:106-111.

HAS - HUMANE SLAUGHTER ASSOCIATION. (2012) www.hsa.org.uk. Accessed on March 29th.

NORTHCUTT, J.K. (2001) Preslaughter factors affecting poultry meat quality. Chapter 2, p.5-18. In: Sams, A. R. (2001) *Poultry meat processing*. CRC Press, Boca Raton, Florida. 334p.

ORLIC, D., KAPETANOV, M., POTKONJAK, D. and **STOJANOVIĆ, D.** (2007) In: Lucrări Stiinłifice Medicină Veterinară. v. Xl, 512-516. TIMISOARA. Scientific Veterinary Institute "Novi Sad", Novi Sad, Rumenacki put 20, Serbia.

ROSTAGNO, H.S., ALBINO, L.F.T., DONZELE, J.L., GOMES, P.C., OLIVEIRA, R.F.M., LOPES, D. C., FERREIRA, A.S., BARRETO, S.L.T., EUCLYDES, R.F. *Tabelas Brasileiras para Aves e Suínos - Composição de Alimentos e Exigências Nutricionais*. 3. ed. Visconde do Rio Branco, MG: Suprema, 2011. v. 01. 252 p.

SAS INSTITUTE INC. (2003-2008) System for Microsoft Windows, Release 9.2, Cary, NC, USA. (cd-rom).

SCHETTINO, D.N., CANÇADO, S.V., BAIÃO, N.C., LARA, L.J.C., FIGUEIREDO T.C., SANTOS, W.L.M. (2006) Effect of pre-laughter fasting periods on the carcass yielding of commercial broilers. *Arq. Bras. Med. Vet. Zootec.*, v.58, n.5, p.918-924

UBA- UNIÃO BRASILEIRA DE AVICULTURA. (2008) Protocolo de Bem-Estar para frangos e perus. 2008/jun. www.uba.org.br.