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MEAT QUALITY OF BROILERS CHICKEN FED LACTIC ACID BACTERIA

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ABSTRACT

*The aim of this study was to evaluate the meat quality of broiler chicken fed LAB. Broiler chickens were completely randomized into five treatment groups**;** Treatment 1 birds were given LAB 1, Treatment 2 were given LAB 2 while Treatment 3 was given the combination of LAB 1 and 2. Treatment 4 and 5 were control groups. Treatment 4 was the positive control group (this group was given antibiotics) and Treatment 5 was the negative control group (this group was not given any antibiotics or LAB). A total of twenty-five (25), five dressed carcasses from each treatment were randomly selected from the five treatment groups. The breast cuts were generally trimmed of bones, overlying skin, and visible subcutaneous fats, then subjected for meat quality evaluations. Data were analysed using ANOVA at α0.05. Broiler chickens fed without LAB/Antibiotics (negative control) had the least extract released volume and while extract released volume for treated broiler chickens and water holding capacity were the same statistically (P>0.05). Meat from broiler chickens fed LAB 1 had the highest score for aroma, flavor, juiciness, tenderness and overall acceptability with meat from broiler chicken fed no LAB and antibiotics had the least score for aroma while LAB 2 had the least score for colour, flavor juiciness and overall acceptability. LAB 1 could be added to the diet of broiler chickens due to its improved quality on both the meat quality and sensory characteristics which showed no adverse effect.*

Keywords: LAB, meat quality, extract released volume, broilers, and sensory evaluation

INTRODUCTION

Currently, prevention measures using antimicrobial agents have been questioned due to the evolution of antimicrobial resistance among pathogenic bacteria. It is imperative that today's poultry industries be proactive in improving animal health and growth, and the safety of poultry products in a sustainable way. Probiotics, prebiotics, and synbiotics are proposed as natural and safe alternatives to antibiotic growth promoters in order to solve the intestinal problems of birds through the modulation of the composition and function of the intestinal microbiota, therefore improving the health and performance of birds (Yang *et al*., 2009; Ducatelle *et al.*, 2015). Accordingly, probiotics are being considered as the best option to fill the gap and are already used by some farmers in preference to antibiotics Griggs *et al*. (2005) and khan *et al.* (2013). In addition, probiotic application has been reported in the poultry industry with an emphasis on their influence on the growth performance of chickens and their carcass compositions Ignatova *et al.* (2009) and Sarangi (2016). Besides, probiotic supplements in chicken also improve pH, colour, water-holding capacity, fatty acid profile, and oxidative stability in fresh meat Hossain et al. (2012) and Saleh (2014). Therefore, the study evaluated the meat quality and physicochemical properties of broiler chicken fed LAB.

MATERIALS AND METHODS

Experimental site

The research was carried out in the MEDICOM laboratory Jos, Jos Plateau State, Nigeria, a private laboratory with standard equipment and procedure.

Experiment materials

The bacterial (LAB 1 and 2) isolates used in this research study were isolated from three different sources viz Vegetable market dump site Faringada, Corn mill waste dumpsite Tudun Wada and Cereal production waste site at Grand cereal all in Jos and environment.

Housing and feeding management

Deep litter was used for the feeding of the birds for the period of eight (8) weeks. A commercial feed was used for both starter and finisher phases. The chicks were properly housed under standard management practices and vaccination schedules followed appropriately as recommended**.** There were five treatment groups**;** Treatment 1 birds were given LAB 1, Treatment 2 were given LAB 2 and Treatment 3 was given the combination of LAB 1 and 2. Treatment 4 and 5 were the control group. Treatment 4 was the positive control group (this group was given antibiotics) and Treatment 5 was the negative control group (this group was not given any antibiotics or LAB).

Meat quality parameters

A total of twenty-five (25), five dressed carcasses from each treatment were randomly selected from the five treatment groups. The meat was conventionally prepared and the weight of each chicken was recorded before and after processing and used to determine percentage loss and product yield of each sample. The meat was cut from the breast portions of the carcass and used for the meat quality. The breast cuts were generally trimmed of bones, overlaying skin, and visible subcutaneous fats, then subjected for meat quality evaluations.

Determination of Extract Release volume (ERV)

The technique was first described in 1964, has been shown to be of value in determining incipient spoilage in meat as well as in predicting refrigerator shelf life.

Interpretation:

ERV (ml) Meat quality
> 25 ml Good quality
> 20 ml Incipient spoilage
< 20 ml Spoiled meat

Sensory evaluation

A total of 20 trained individuals aged between 20 and 40 years were used to assess two replicates of the prepared sausage. The samples were evaluated using a 9-point hedonic scale for flavor, colour, juiciness, tenderness, and overall acceptability The scale had a maximum score of 9 while the lowest score of 1 was assigned to the poorest condition (Mahendraker *et al.*, 1988).

Experimental design

A completely randomized design was used for this study.

Statistical analysis

In this research, data were statistically analyzed with the SPSS program for Windows (SPSS VERSION 25, SPSS Inc., Chicago, IL, USA). Duncan's multiple range test was used to compare the differences between means.

RESULTS

Physicochemical properties and meat quality of broiler chickens fed with LAB and without LAB are shown on Table 1. Broiler chickens fed without LAB/Antibiotics (negative control) had the least extract released volume and while extract released volume for treated broiler chickens and water holding capacity were the same statistically (P>0.05).

Table 1: Meat quality of broiler chicken fed with LAB and without LAB

Parameters	LAB 1	LAB 2	LAB 1 +LAB 2	Antibiotics (positive control)	Without LAB/Antibiotics (negative control)	SEM
Extract Released volume (%)	28.25[a]	22.25[a]	22.75[a]	28.00[a]	12.50[b]	1.64

[abcd] means with different superscripts on the same row differ significantly (P< 0.05)

SEM = Standard error of mean

Figure 1 shows the sensory evaluation of broiler chickens fed with LAB and without LAB. Meat from broiler chickens fed LAB 1 had the highest score for aroma, flavor, juiciness, tenderness and overall acceptability with meat from broiler chicken fed no LAB and antibiotics had the least score for aroma while LAB 2 had the least score for colour, flavor juiciness and overall acceptability.

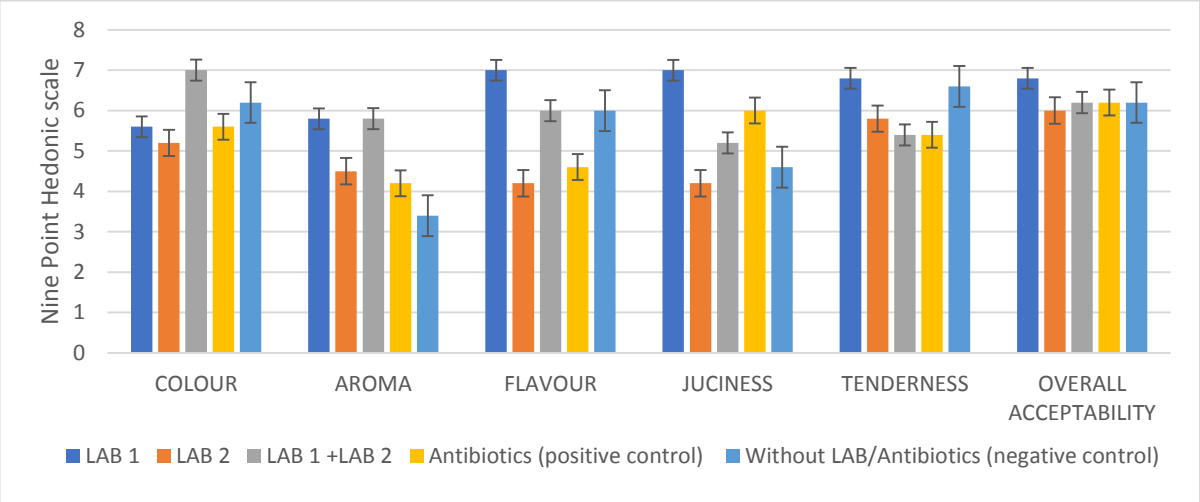


Figure 1: Sensory evaluation of broiler chickens fed with LAB and without LAB

DISCUSSION

The extract released volume (ERV) is a measurement of meat quality and spoilage. When the ERV value obtained is higher, it shows that the meat is of good quality but when the values obtained is low, it shows that meat is of poor quality. In this study both LAB 1 and 2 with its combination promote good meat quality compared to meat from broiler chicken fed no LAB and antibiotics. Meat from broiler chickens fed LAB 1 had the highest score for aroma, flavor, juiciness, tenderness and overall acceptability with meat from broiler chicken fed no LAB and antibiotics had the least score for aroma while LAB 2 had the least score for colour, flavor juiciness and overall acceptability. This findings in this study was in line with the result obtained by Kabir (2009). Mahajan et al. (2000) stated in their study that the scores for the sensory attributes of the meat balls; appearance, texture, juiciness and overall acceptability were significantly higher and those for flavour were lower in the probiotic (Lacto-Sacc) fed group. However, the present results differ from Loddi *et al.* (2000) who observed that neither probiotic nor antibiotic affected sensory characteristics (intensity of aroma, strange aroma, flavour, strange flavour, tenderness, juiciness, acceptability, characteristic colour and overall aspects) of breast and leg meats.

CONCLUSION

LAB 1 could be added to the diet of broiler chickens due to its improvement quality on both the meat quality and sensory characteristics which showed no adverse effect.

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