NSAP 47th Annual Conference (JOS 2022) CONFERENCE PROCEEDINGS
THEME: SECURING ANIMAL AGRICULTURE AMIDST GLOBAL CHALLENGES

ORGANOLEPTIC CHARACTERISTICS OF THE DIFFERENTLY PROCESSED CHICKEN MEAT PRODUCTS (BROILER)

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Abstract: This study was conducted to examine the organoleptic characteristics of the differently processed chicken meat (broiler) products. The sensory evaluation of the processed chicken meat was done at the end of the feeding trial. A total of 16 birds were used for the experiment with four breast muscles for treatment. The design of the experiments completely randomized design with T_1 as the control, T_2 Ginger T_3 Garlic, T_4 Ginger and Garlic. At the end of the experiment, T_4 had the highest in all the parameters measured, appearance (7.85), tenderness (7.77), juiciness (7.50), flavour (6.62) and general acceptability (7.73). The one processed with Ginger and Ginger (T_4) had the highest in all the parameters measured. This could be as a result of the synergetic effect of ginger and garlic. It is therefore recommended that T_4 (Broiler meat processed with Ginger and Garlic) be recommended among others.

Key words: Organoleptic, Broiler, Processed, Meat and Chicken.

INTRODUCTION

A man's health is majorly a reflection of what he/she eats which is summarized as lifestyle, since it has been noted that the use of antibiotic in cockerel and broiler production has serious health implication because of their residual effects. To have a healthier broiler chicken, it is inevitable according to researchers that the use of phytobiotic in cockerel and broiler chicken production is one of the sure means of achieving one's goal.

The potential of natural feed additives like ginger and garlic as replacement for synthetically produced antibiotic, growth promoters in broilers chicks diet was discovered to be the bioactive substance. Natural feed additives are known to contain bioactive substances like (Oleoresin) which aid physiological performance of the body and organs of broiler chicks (Zhang, Yang, Wang, Jiang, and Gai, 2009). Also contained in ginger and garlic roots are vitamins, minerals and enzymes which are capable of boosting immune system.

The fibre in ginger and garlic has been found to improve broiler chick appetite and also serve as bacteriostatic agent in birds (Zomrawi, Abdel-Atti, Dousa and Mahala 2012). During the processing of cockerel and broiler chicken meat the use of ginger and garlic could also serve as taste enhancer and in the long run could improve the quality of the processed meat. Though, so much medicinal benefits of ginger root have been discovered by various researchers (Zomrawi *et al*., 2012) but definite desirable levels of inclusion is yet to be determined and there is a dearth of information on their use (ginger and garlic) either singly or combined as quality enhancer in broiler chicken meat.

MATERIALS AND METHODS

This study was conducted through the method below:

Sensory Evaluation

This stage involved assessing the effect of various meat spices (ginger and garlic) on the sensory or organoleptic properties of cockerel meat (Breast Muscle). At the end of the feeding trial, the birds (2 per replicate) were immediately slaughtered and the breast muscles were extracted and then washed before dry curing with salt and (Ginger, Garlic, and mixture of Ginger). They were allowed to cure properly before frying with groundnut oil, oven drying with cooking gas and smoking with charcoal as a source of heat. Twelve trained panelists were selected among staff and students in the Faculty of Agriculture, Ambrose Alli University, Ekpoma for the evaluation test. A nine (9) point Hedonic scale of; 1 dislike extremely and 9 like extremely as described by Larmond (1999) was used. This was compared to the effects of the various treatments.

The panelists were told to detect accurately the sensory attributes of processed chicken breast meat with the ginger, garlic and mixture of ginger and garlic including the identification of appearance, tenderness, flavour, Juiciness, general acceptability and ranking of samples (Okaka, 2010).

RESULT

Sensory Evaluation of Broiler Chicken Fed and cured with Ginger, Garlic and Mixture of Ginger and Garlic Powder.

The results of the effects of dietary treatments T_1, T_2, T_3 and T_4 on broiler meat are presented in the table below. The results showed that meat from birds fed diets T_2, T_3 and T_4 are not significantly different ($P>0.05$) from the meat of those fed with the T_1 for all the sensory parameters considered in this study except with respect to appearance where meats obtained from T_1, T_3, and T_4 had significantly higher ($p<0.05$) score than the meats obtained from T_2. Meat products obtained from birds fed T_4 had the highest scores for all sensory parameters considered.

Sensory Evaluation of Broiler Fed and Cured With Ginger, Garlic, and Mixture of Ginger and Garlic Powder.

Sensory parameters	T_1 G/G (0%)	T_2 GRP (2%)	T_3 GBP (2%)	T_4 MGGP (1:1%)
Appearance	7.69±0.07[a]	7.22±0.29[b]	7.81±0.15[a]	7.85±0.22[a]
Tenderness	7.42±0.16	7.56±0.30	7.72±0.15	7.77±0.16 [ns]
Juiciness	7.36±0.13	7.29±0.23	7.33±0.16	7.50±0.20 [ns]
Flavour	7.56±0.12	7.39±0.20	7.35±0.20	7.62±0.19 [ns]
General Acceptability	7.58±0.13	7.44±0.27	7.67±0.20	7.73±0.15 [ns]

Mean on the same row with different superscripts are significantly different ($P<0.05$)

G/G = Ginger and Garlic

GRP= Ginger Root Powder

GBP = Garlic Bulb Powder

MGGP = Mixture of Ginger Root and Garlic Bulb Powder.

DISCUSSION

Sensory Evaluation of Broiler Meat Products using Different Processing Methods.

The results of this study showed that the different temperatures of the different processing methods greatly influenced the sensory parameters of the final meat products. Just as found in cockerel meat the oven dried broiler meat products had highest scores for all sensory parameters and thus had more preference than smoked and fried meat products. This as usual is attributable to the fact that oven dried meat whether that of cockerel or broiler as it is the case in this study was done under constant high temperature which helped to maintain the meat quality characteristics. Thus the earlier studies of Palka and Daun (1999) and Pankaj and Anthony (2016) on high and constant temperature is further corroborated by the result of the present study.

Fried meat was least preferred from the results of the sensory characteristics observed in this study. As Pankaj and Anthony (2016) had earlier reported, the use of oil or fat serves as heat transfer medium during frying. Since the food product is in constant contact with the oil, the frying temperature to influence the appearance, juiciness, flavour, cooking time and weight loss of the products.

CONCLUSION

From the above study, it can be concluded that the sensory evaluation of the meat-type chicken confirmed that meat processed with mixture of ginger and garlic powder had the highest score for all the parameters considered.

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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.