
EFFECT OF GRADED LEVELS OF GUSTOR BP70^R ON SENSORY AND MEAT QUALITY ATTRIBUTES OF BROILER CHICKENS

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ABSTRACT

The increase in demand for antibiotic-free livestock products and ban on antibiotic growth promoters necessitate the poultry feed industry to search for alternative means of enhancing growth in poultry species. Sodium butyrate is used as a source of butyric acid, which is known for its beneficial effects in the gut of monogastric animals. This study investigated sensory and meat quality attributes of broiler chickens fed diets supplemented with graded levels of Gustor BP70R. Ninety- six (96) day old broiler chicks were randomly allotted into four (4) treatments of twenty-four (24) chicks per group which were replicated thrice to contain eight birds each. The dietary treatments were formulated to include Gustor BP70R at 0g, 0.20g, 0.30g and 0.40g as control (T1), T2, T3 and T4 respectively in a completely randomized design. At the end of the feeding trials, three birds were randomly selected per treatment, slaughtered, then the carcasses were weighed, recorded and used for sensory properties and meat quality attributes. Data obtained were subjected to one- way analysis of variance. Result for sensory properties revealed no significant ($P<0.05$) in appearance for breast muscle, appearance and taste for drumstick while thigh muscle showed no significance in all parameters investigated. However, for meat quality attributes, significant ($P<0.05$) differences were observed in thermal shortening cold shortening and chilling loss across the treatment among all carcass parameter evaluated. In conclusion, diets with inclusion of 0.40g of Gustor BP70R enhances sensory and meat quality attributes of broiler chickens.

Keywords: Sodium butyrate, Gustor BP70, broiler meat, sensory properties, quality attributes.

INTRODUCTION

Poultry meat production and consumption has grown worldwide for several years (Fraser, 2008). This growth has mainly been attributed to the general perception that this type of meat is healthier than red meat (Spiller *et al.*, 2010). In the past few decades, specialized chicken breeds have been selected to achieve a higher performance at a comparably low cost (Zuidhof *et al.*, 2014). During the decades, antibiotics have widely been used in poultry production as a growth promoter to enhance the performance. However, in 2006, EU and many countries have banned using antibiotics as growth promoter in animal nutrition. This action encourages many investigators to search for alternatives to enhance performance. Sodium salts of butyric acid are commonly used in animal feeding due to their stability, easy use and relatively less odour (Ahsan *et al.*, 2016). Sodium butyrate is readily transformed into butyric acid within the digestive tract of the birds where it improves the intestinal health through various mechanisms. It is involved in the development of gut wall tissues and modulates the growth of symbiotic intestinal microflora (Friedman and Bar-Shira, 2005). It improves body weight, feed conversion ratio (FCR), beneficial bacterial populations, and reduces the colonization of harmful bacteria in the digestive tract of broilers (Hernandez *et al.*, 2013). Gustor BP70 contains a unique formation of butyric acid that improves feed digestibility by rejuvenating the intestinal epithelial cells (IECs) responsible for absorbing the nutrients. It contains 70% coated sodium butyrate in a form of granulated powder that is easily added and mixed with the feed or the vitamin and mineral premix. Hence, this study was conducted to investigate the effect of graded level of Gustor BP70 on sensory and meat quality attributes of broiler chickens.

Materials and Method:

The experiment was carried out at the Poultry Unit, Teaching and Research Section of the Federal College of Animal Health and Production Technology, Moor Plantation, Ibadan, South West, Nigeria. The Gustor BP70^R was purchased from Agro-Bar Magen Nigeria Limited Ibadan. The experimental diets were formulated to include recommended doses of Gustor BP70^R as T1 (0g), T2 (0.20g), T3

(0.30g), T4 (0.40g) respectively and each treatment was in triplicate of eight (8) chicks per replicate in a Completely Randomized Design (CRD). Birds were raised on partitioned deep litter pen and the experiment lasted for a period of 49 days. The day-old chicks were brooded for 2 weeks prior to the commencement of the study. Feed and water were supplied *ad libitum*. Routine vaccination and management practices were strictly adhered to. At the end of the feeding trials, three (3) birds from each treatment indicating a bird per replicate were carefully selected, slaughtered and the weight of the carcasses was recorded. Data on sensory properties were obtained with a 7- point hedonic scale using trained panelists while for meat quality attributes, data were collected from the primal cuts (breast, thigh, drumstick), 2g of each meat samples according the method described by Omojola and Adesehinwa (2007). All data collected for sensory properties was subjected to descriptive statistics and one-way analysis of variance (ANOVA) for meat quality attributes while treatment means were separated using DUNCAN multiple range test.

RESULTS AND DISCUSSION

Result of meat quality attributes of broiler chicken fed diets supplemented with graded levels of Gustor BP70^R is presented in Table 1. There were significant ($P<0.05$) differences in thermal shortening, chilling loss and cold shortening among meat quality attributes evaluated. This agreed with the findings of Odetola and Adetola, (2022). For thermal shortening, significant ($P<0.05$) value was recorded in thigh muscle with T₁ (12.57) and T₄ (14.54) having the highest values, followed by T₃ (9.95) while T₄ had the least value (3.29) respectively. Drumstick sample had significant ($P<0.05$) difference for chilling loss which ranges from 1.55% to 6.87%. T₄ recorded the highest value followed by T₃ while T₁ and T₂ had the least value. Breast sample had the significant ($P<0.05$) difference for cold shortening which ranges from 8.80% to 22.34% T₄ recorded the highest value followed by T₃ while T₁ and T₂ had the least value. This showed that Gustor BP 70^R had significant effect on the quality of broiler meat. No significant ($P>0.05$) value for recorded for cooking loss across the treatment means. This contradicts the findings of Wheeler *et al.*, 2001 who stated that there is an improvement on the cooking loss in his study on meat quality characteristics of broiler chickens fed different levels of clove seeds. The higher numerical values recorded for water holding capacity in this present study corroborates with the findings of Castellini *et al.*, 2002 and Fanatico *et al.*, 2005. The non-significant effect on water holding capacity in this study contradict the report of Wihelm *et al.*, 2010 who stated that there is an improvement on the water holding capacity on meat quality characteristics of broiler chickens fed different levels of clove seeds. Sensory evaluation of primal meat samples from broiler chicken fed graded levels of Gustor BP 70^R supplemented diets are presented in Table 2 with graphical presentation on figures 1, 2 and 3 respectively. This represent the values obtained for color, appearance, flavor, texture, taste and overall acceptability for all the meat samples as judge by the panelists. The result showed significant ($P<0.05$) difference in breast and drumstick samples among all samples investigated. For breast sample, appearance was significant and the highest ($P<0.05$) value was recorded in T₄ (6.03) followed by T₂ (6.30) and T₁ (5.50) while T₃ had the lowest value of 4.87. Drumstick had significant difference in the appearance and taste. For the appearance highest ($P<0.05$) value is recorded in T₂ followed by T₄ and T₃ while T₁ had the lowest value. However, T₂ had the highest ($P<0.05$) value followed by T₄ and T₁ while the lowest value was recorded in T₃ for taste. Figure 1 showed similarities in the parameters assessed for breast muscle with appearance statistically higher than other treatment group. Similar trend was observed for drumstick while the dietary treatment does not have any influence on the thigh muscle. This present finding is contrary to the report of Muhammad *et al.*, 2020 who examine carcass traits, meat quality and sensory attributes of broilers given outdoor access at different ages: Lan *et al.*, 2020 who investigated that Sodium butyrate as an effective feed additive to improve performance, liver function, and meat quality in broilers under hot climatic condition and Martin *et al.* 2014 who evaluated the sensory properties of breast meat from broiler chicken after application of different additives However, this study confirms the report of Odetola and Adetola, (2022) that addition of additives improves the quality of breast meat sample as well as the sensory properties of the broiler carcass.

Table 1: Effect of graded level of Gustor BP70® on meat quality attribute of broiler chicken

Parameters	T ₁ (0)	T ₂ (0.20)	T ₃ (0.30)	T ₄ (0.40)	SEM	P-value
Cooking loss						
Thigh	29.14	30.65	29.98	30.66	0.61	0.84
Drumstick	27.53	24.68	25.19	26.25	0.95	0.78
Breast	29.96	30.17	32.91	32.69	0.83	0.49
Thermal shortening						
Thigh	12.57 ^a	3.29 ^b	9.95 ^{ab}	14.54 ^a	1.68	0.06
Drumstick	12.45	18.18	9.05	5.68	2.27	0.26
Breast	51.52	45.04	54.88	58.03	2.99	0.51
Chilling Loss						
Thigh	1.99	2.24	2.17	1.52	0.19	0.64
Drumstick	2.00 ^b	1.55 ^b	3.17 ^{ab}	6.87 ^a	0.80	0.04
Breast	19.57	11.29	23.01	19.64	6.26	0.95
Cold shortening						
Thigh	6.03	13.49	8.70	7.95	1.45	0.34
Drumstick	11.25	19.43	16.59	27.58	2.90	0.26
Breast	9.12 ^b	8.80 ^b	18.02 ^{ab}	22.34 ^a	2.19	0.04
Water Holding Capacity						
Breast	73.00	61.67	74.00	69.67	2.28	0.22

^{ab}means along the same row with different superscript are significantly (P<0.05) different

Table 2: Effect of graded levels of Gustor BP70® on Sensory quality of broiler Chicken Meat

Parameters	T ₁ (0)	T ₂ (0.20)	T ₃ (0.30)	T ₄ (0.40)	SEM	P-value
Breast						
Appearance	5.50 ^{ab}	6.30 ^a	4.87 ^b	6.03 ^a	0.21	0.04
Aroma	5.33	5.27	4.87	5.70	0.15	0.27
Taste	5.27	5.70	4.87	5.00	0.19	0.45
Texture	5.43	5.53	5.10	5.40	0.13	0.75
Overall Acceptability	6.30	5.70	5.70	6.27	0.12	0.10
Drumstick						
Appearance	4.27 ^b	5.80 ^a	4.80 ^{ab}	5.33 ^{ab}	0.09	0.24
Aroma	4.77	5.27	5.27	5.30	0.44	0.13
Taste	4.90 ^{ab}	5.33 ^a	4.18 ^b	5.10 ^a	0.04	0.17
Texture	5.16	5.43	5.27	4.93	0.81	0.17
Overall Acceptability	5.30	5.70	5.20	5.46	0.79	0.17
Thigh						
Appearance	4.70	5.90	5.03	4.97	0.23	0.21
Aroma	5.27	5.43	5.10	4.60	0.47	0.19
Taste	5.03	5.20	5.20	5.50	0.78	0.15
Texture	5.27	4.93	5.47	5.20	0.75	0.16
Overall acceptability	6.00	6.27	5.87	5.93	0.28	0.08

^{ab}means along the same row with different superscript are significantly (P<0.05) different

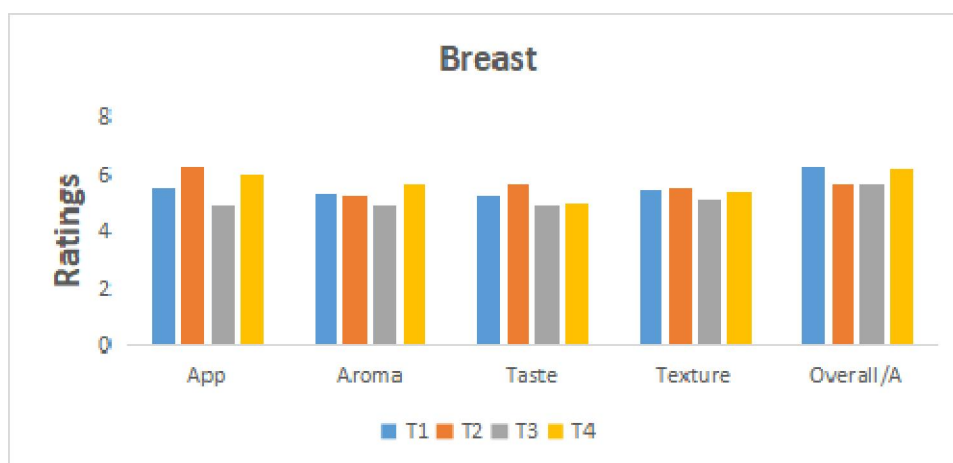


Fig 1: Sensory quality of breast muscle from broiler chickens fed Gustor BP70 graded diets

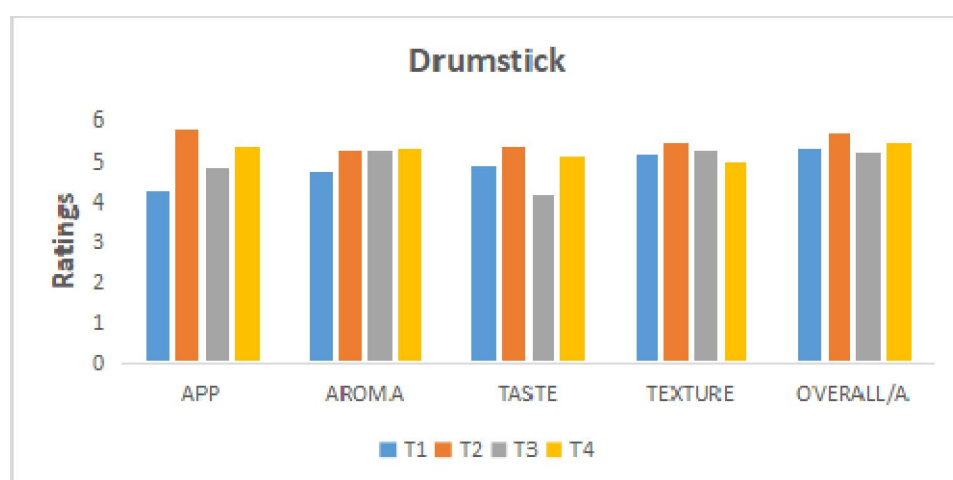


Fig 2: Sensory quality of drumstick muscle from broiler chickens fed Gustor BP70 diets

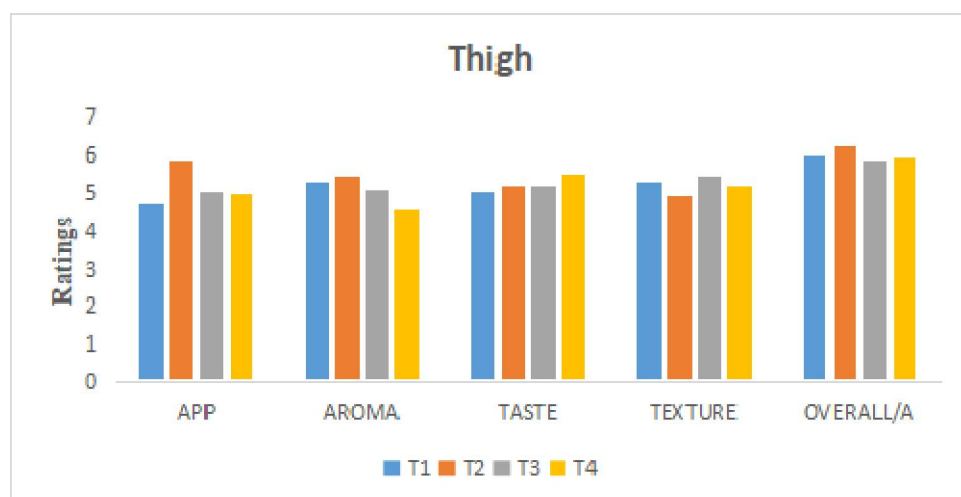


Fig 3: Sensory quality of thigh muscle from broiler chickens fed Gustor BP70 diets

Conclusion: It can be concluded that Gustor BP70 can be incorporated up to 0.40g in the diet of broiler chicken without any deleterious effect on sensory and meat quality attributes.

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