

EVALUATION OF *OCIMUM GRATISSIMUM* AND *OCIMUM CANUM* ON THE CARCASS AND ORGANOLEPTIC PROPERTIES OF BROILER CHICKENS MEAT

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ABSTRACT

The study was carried out to determine the effect of *Ocimum gratissimum* and *Ocimum canum* on the carcass characteristics and organoleptic properties of broiler chickens. A total of 396 day old Cobb 500 broiler chicks were randomly allotted to six dietary treatments each replicated thrice with 22 birds in a completely randomized design. Six treatment diets were formulated containing 0g of experimental materials as control, 400 and 800g of *O. gratissimum* (T2 and T3), 400 and 800g of *O. canum* (T4 and T5) while oxytetracycline as recommended by the manufacturer was used as positive control (T6). All data collected were subjected to analysis of variance and significant differences among treatment means were compared using Tukey procedures. Carcass characteristics of cut parts showed that birds on 400g of *O. gratissimum*, 800g of *O. canum* and antibiotics growth promoters (AGPs) had higher ($p<0.05$) drumstick and breast cut percentages. Organ weights were significantly higher ($p<0.05$) for birds fed diets containing *Ocimum spp.* at 800g/100kg diets. Abdominal fat were lower for birds fed diets containing *O. gratissimum* and *O. canum* at 800g/100kg diets. The result of sensory analysis showed that the meat of broiler chickens in the treatment groups supplemented with *O. gratissimum* and *O. canum* had higher eating and sensory attributes. Inclusion of *O. gratissimum* and *O. canum* in broiler chickens diets significantly improved carcass traits and eating quality.

Keywords: Sensory, quality, essential oil, antibiotics, phytochemicals.

INTRODUCTION

Antibiotics growth promoters (AGPs) have been used for about 50 years to enhance growth performance (Dibner and Richards, 2005). It has been used widely not only to prevent and treat poultry diseases, but also for the improvement of meat and egg production (Ogle, 2013). Natural growth promoters (NGPs) such as prebiotics, probiotics, synbiotics, enzymes and plant extracts can be used to feed broilers without any adverse effect on the performance of birds (Akhtar *et al.*, 1984). *Ocimum gratissimum* and *Ocimum canum* as NGPs can be used as an alternative to common artificial growth promoters like antibiotics both to improve growth performance, carcass characteristics and eating quality. These aromatic leaves has been reported to retain their flavor and other qualities even after drying (Mandal *et al.*, 2010). The study was undertaken therefore to evaluate the essential oil of *Ocimum gratissimum* and *Ocimum canum* leaves as additives on the carcass and organoleptic assessment of broiler chickens meat.

MATERIALS AND METHODS

Experimental site

The experiment was conducted at the Poultry Unit of the Department of Animal Science Teaching and Research farm, Ahmadu Bello University, Zaria, Kaduna State. Zaria is in the Northern Guinea Savannah zone, on longitude 11° 09' 01.78" N and 7° 39' 14.79" E 671m above sea level with a mean annual rainfall of 700-1400mm (IARMS, 2019).

Experimental design and management of birds

Three hundred and ninety six day old Cobb 500 broiler chicks were allotted to six dietary treatments with 3 replicates of 22 birds each in a completely randomized design (CRD). The birds were housed in deep litter pens and managed with all necessary routine management practices. Feed and water were provided *ad libitum* throughout the experimental period. Six treatment diets were formulated to meet the requirements of the birds for the starter and finisher phases respectively containing 0g, 400g and 800g of *Ocimum gratissimum* and 400g and 800g of *Ocimum canum* as additives and oxytetracycline as recommended by manufacturer as positive control.

Carcass analysis

At the end of the finisher phase, 3 chickens were randomly selected from each treatment, representing the average weight of the group for carcass evaluation. The selected birds were starved of feed, bled by severing the jugular vein and then scalded in hot water to remove the feathers. Live weight for

each chicken, dressed weight, prime cuts and weight of organs were measured. Dressing percentage was calculated. The organs and cut parts were expressed as a percentage of live weight and dressed weight respectively.

Sensory evaluation

The meat was assessed for flavour, tenderness, juiciness, texture, colour and overall acceptability with a structured questionnaire on a 5-point Hedonic scale (5-like very much, 4-like, 3-neither like nor dislike, 2-dislike, 1-dislike very much) using 30 semi-trained panelists in the Faculty of Agriculture, Ahmadu Bello University, Zaria. All needed accessories were provided; clean water, tooth-picks, detergent, biscuit and serviette were provided for the entire panelist before the evaluation. Each sample was blind coded by the researcher to reduce bias. The samples were processed by grilling at the animal product and processing laboratory of the Department of Animal Science, Ahmadu Bello University, Zaria.

Statistical Analysis

All data obtained from the experiment were statistically analysed using the General Linear Model Procedure of Statistical Analysis Systems software package while significant difference between treatments means were separated using Tukey Procedure (SAS, 2002).

RESULTS AND DISCUSSION

Carcass characteristics of broiler chickens fed diets containing *Ocimum gratissimum* and *Ocimum canum*

The carcass characteristics of broiler chickens fed diets containing *Ocimum gratissimum* and *Ocimum canum* is presented in Table 1. There were significant differences ($p < 0.05$) in all parameters measured except for thigh, back, gizzard and lungs percentages. The results obtained showed that birds fed dietary supplements of *Ocimum canum* at 800g/100kg diet and AGPs had higher ($p < 0.05$) dressed weight and dressing percentage than those fed diets containing *Ocimum gratissimum* and the control. Result of the cut parts showed that birds on 400g of *Ocimum gratissimum*, 800g of *Ocimum canum* and AGPs had higher ($p < 0.05$) drumstick and breast cut percentages. Organ weights were significantly higher ($p < 0.05$) for birds fed diets containing *Ocimum gratissimum* and *Ocimum canum* at 800g/100kg diets. The enlargement of these organs may be due to their involvement in detoxification of the materials. Studies have reported that the use of antibiotics as a growth promoter has ability to improve weight gain as well as carcass yield of birds (Al-Kassie, 2010). The result is in agreement with Khaksar *et al.* (2012) who reported significant improvements in some carcass traits due to inclusion of thyme essential oils. However, Schulze *et al.* (2008) did not observe a significant effect in the broiler carcass yield due to the dietary inclusion of essential oil blend based on thyme and cinnamon. Abdominal fat were lower for birds fed diets containing *Ocimum gratissimum* and *Ocimum canum* at 800g/100kg diets. Percent abdominal fats reduces as the inclusion levels of the experimental materials increases. The findings of this study agrees with that of Myandoab and HosseiniMansoub (2012) who reported that licorice extract lowered abdominal fat level.

Table 1: Carcass and organs characteristics of broiler chickens fed diet containing *Ocimum gratissimum* and *Ocimum canum*

Parameters	Inclusion levels of experimental materials (g/100kg diet)						SEM
	0	<i>Ocimum</i>		<i>Ocimum</i>		Oxytet	
		<i>gratissimum</i>		<i>Canum</i>			
		400	800	400	800		
Live wt. (g/bird)	2350.00 ^c	2400.00 ^{bc}	2533.33 ^a	2416.67 ^{bc}	2466.67 ^{ab}	2516.67 ^a	50.46
Dressed weight (g/bird)	1702.33 ^c	1722.00 ^c	1828.00 ^{ab}	1775.67 ^{bc}	1860.00 ^a	1868.00 ^a	45.33
Dressing percent (%)	72.43 ^b	71.77 ^b	72.14 ^b	73.49 ^{ab}	75.44 ^a	74.20 ^a	1.14
Cut parts expressed as percentage of dressed weight (%)							
Thigh	12.33	11.67	12.23	12.36	12.17	12.69	0.29
Drum stick	9.59 ^b	10.20 ^a	9.48 ^b	9.65 ^b	10.33 ^a	9.78 ^{ab}	0.30
Breast	24.57 ^a	23.98 ^{ab}	24.92 ^a	22.50 ^b	24.77 ^a	25.53 ^a	0.75
Back	11.58	12.02	12.10	12.16	11.70	11.35	0.34
Organ weights expressed as percentage of live weight (%)							
Liver	2.27 ^b	2.28 ^b	2.87 ^a	2.34 ^b	2.50 ^{ab}	2.17 ^b	0.25
Lungs	0.61	0.69	0.76	0.70	0.70	0.70	0.14
Kidney	0.67 ^b	0.71 ^{ab}	0.78 ^a	0.73 ^{ab}	0.74 ^a	0.64 ^b	0.05
Gizzard	2.24	2.32	2.41	2.29	2.43	2.23	0.10
Heart	0.45 ^c	0.55 ^{ab}	0.51 ^{bc}	0.51 ^{bc}	0.64 ^a	0.50 ^{bc}	0.05
Abdominal fat	1.29 ^c	0.95 ^b	0.63 ^a	1.01 ^b	0.76 ^a	1.01 ^b	0.13

^{abc}Means with the same superscripts along the rows are not significantly different ($p > 0.05$), SEM: standard error of means, Oxytet: Oxytetracycline.

Sensory attributes of meat from broiler chickens fed diets containing *Ocimum gratissimum* and *Ocimum canum*

The organoleptic evaluation of food products to any food processing technology is very important in determining the consumer acceptability. The result of sensory analysis for the meat of broiler chickens fed dietary supplement of *Ocimum gratissimum* and *Ocimum canum* is presented in Table 2. The results obtained shows that there were significant differences ($P < 0.05$) for all the sensory parameters evaluated. Meat of the broiler chickens in the treatment groups supplemented with *Ocimum gratissimum* and *Ocimum canum* had higher eating and sensory attributes. Sensory parameters had higher organoleptic attributes for the birds in the treatment groups fed diets supplemented with *Ocimum gratissimum* and *Ocimum canum* than the control and AGP groups. This implies that addition of these phytochemical feed materials improved the eating quality of broiler chicken meat which may be due to higher aromatic fluids and essential oil in these botanical which makes them to maintain desirable culinary properties. Okubanjo *et al.* (2010) in their study also reported higher culinary properties for spent layers chicken meat tenderized with an additive.

Table 2: Sensory evaluation of broiler chicken meat fed diet containing *Ocimum gratissimum* and *Ocimum canum*

Parameters	Inclusion levels of experimental materials (g/100kg diet)						SEM
		<i>Ocimum gratissimum</i>		<i>Ocimum canum</i>		Oxytet	
	0	400	800	400	800		
Colour	4.13 ^{bc}	4.68 ^{ab}	4.87 ^a	4.61 ^{ab}	4.84 ^a	3.87 ^c	0.34
Texture	3.97 ^{bc}	4.65 ^{ab}	4.87 ^a	4.55 ^{ab}	4.77 ^a	3.84 ^c	0.35
Flavour	3.45 ^c	4.85 ^a	4.87 ^a	4.58 ^{ab}	4.81 ^a	3.77 ^{bc}	0.42
Tenderness	3.74 ^c	4.42 ^b	4.87 ^a	4.74 ^{ab}	4.65 ^{ab}	3.97 ^c	0.34
Juiciness	3.32 ^c	4.55 ^a	4.88 ^a	4.61 ^a	4.84 ^a	4.03 ^b	0.37
Acceptability	3.45 ^b	4.77 ^a	4.94 ^a	4.84 ^a	4.94 ^a	3.48 ^b	0.37

^{abc}Means with the same superscripts along the rows are not significantly different ($p>0.05$), SEM: standard error of means, Oxytet-Oxytetracycline.

CONCLUSION

Addition of *Ocimum gratissimum* and *Ocimum canum* in broiler chickens diets at 800g/100kg diet significantly improved carcass characteristics and organoleptic properties of broiler chicken meat.

RECOMMENDATIONS

Ocimum gratissimum and *Ocimum canum* at 800g/100kg diets as an alternative to synthetic antibiotic growth promoters for improved carcass traits and better eating quality of broiler meat.

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