ORGANOLEPTIC ATTRIBUTES OF BROILER CHICKEN MEAT FED GRADED LEVELS OF OREGANO POWDER (*Origanum vulgare*)

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ABSTRACT
This research was conducted to evaluate the organoleptic attributes of broiler chicken meat fed graded levels of Oregano powder (OP) (*Origanum vulgare*). A completely randomized design (CRD) was employed to randomly allot two hundred broiler chicks into four (4) dietary treatment groups. The dried oregano leaves were ground into a fine form, milled and incorporated into the ration over the top (above 100%). Each treatment consisted of varying levels of OP as 0, 15, 20 and 25g/100kg representing treatments T1, T2, T3 and T4, respectively. The experimental feed was fed to the birds for a period of 49 days, at the end of which 5 birds per replicate were sacrificed and meat samples were collected from their carcasses for organoleptic attributes evaluation. The results of this study showed that the organoleptic attributes (aftertaste, flavour, juiciness, and tenderness) of broiler chicken meat were not significantly affected (P>0.05) by the inclusion levels of OP. Therefore, it was concluded that Oregano powder inclusion in the diets of broiler chicken as phytobiotics did not have any effects on eating and cooking quality of the meat as none of the sensory constructs evaluated were affected.
Keywords: Oregano, Aftertaste, Flavor, Juiciness, Tenderness

Introduction

Over the years, in the past few decades, the rapid growth of broiler chickens and their short generation interval have been attributed to the use of antibiotics as growth promoters in poultry diet (Puvača *et al*., 2013). Although chicken reared with the addition of antibiotics in their diets have shown a remarkable performance, , their potential side effects has become a measure public health concern worldwide (Puvača *et al*., 2013). Thus, the use of antibiotics in poultry diets has been banned in many countries due to the fear of antibiotic growth promoter (AGP) residues in the meat that may directly affect human health (Hashemi and Davoodi, 2010). In recent years, natural strategies such as the use of natural medicinal products derived from herbs and spices are being studied for use in poultry diet as feed additives (Guo, 2003).

Oregano (*Origanum vulgare* L.) is an aromatic herb containing abundant active chemical compounds which has been used to replace chemical antibiotics in poultry and livestock and its effect as a feed additive has been investigated in many previous studies (Ertas *et al*., 2005). However, more focus was given to application of Oregano oil as phytobiotic alternative to antibiotics rather than Oregano powder by the previous literature. Similarly, there is a gap in information on the inclusion level of Oregano powder and effect of Oregano powder on organoleptic attributes of broiler chicken as feed additives. Thus, the present study investigated the effect of feeding graded levels of Oregano powder (OP) (*Origanum vulgare*) on organoleptic attributes of broiler chicken meat.

Materials and methods

This study was carried out at the Poultry Production Unit of the Teaching and Research Farm of the Department of Animal Science, Faculty of Agriculture, Usmanu Danfodiyo University, Sokoto, Nigeria. Sokoto is located between latitudes $11^0\ 30^1$ and $13^0\ 50^1$ N and longitudes $4^0\ 0^1$ and $6^0\ 40^1$ E in the northern part of Nigeria and lies on altitude of 350 m above sea level (Mamman *et al*., 2000). Sokoto is located in the semi-arid region of Nigeria. It has rainfall of about 760mm per annum and high temperature range of 35-40°C characterized by scanty vegetation, made up of few trees and abundant shrubs and grasses.

Experimental design and Experimental diets

The study employed the use of Completely Randomized Design (CRD), using a total of 200 broiler chickens comprising four (4) treatments (50 birds per treatment). Treatment 1 (T1) contained 0g/100Kg of Oregano Powder (OP), treatment 2 (T2), treatment 3 (T3) and treatment 4 (T4) contained 15g/100Kg, 20g/100Kg, and 25g OP, respectively, and replicated 5 times (10 birds/ replicate).

Four (4) Iso-caloric and Iso-nitrogenous diets were formulated both at the starter and the finisher phases and were fed to the experimental broiler chickens for seven (7) weeks. (Table 1). However, Oregano powder was added over

the top as additive (above 100%) at 15g/100Kg OP, 20g/100Kg OP, 25g/100Kg in treatments 2, 3 and 4, respectively while treatment 1 served as the control diet with no (0%) OP.

Table 1: Gross and calculated chemical composition of starter and finisher diets

Ingredients (Kg)	Starter	Finisher
Maize	53.5	50.5
SBM	14.0	15.0
GNC	15.0	13.0
Fish meal	2.0	2.0
Wheat Offal	11.0	12.0
Limestone	2.0	5.4
Bone meal	1.5	3.0
Premix	0.25	0.25
Salt	0.25	0.25
Methionine	0.25	0.25
Lysine	0.25	0.3
Total	**100Kg**	**100Kg**
Crude protein	21 %	19 %
Energy (Kcal/Kg)	3000	2800
Methionine	0.5	0.5
Lysine	1.0	1.0
Calcium	1.3	2.8
Phosphorus (Av)	0.5	0.7
Fibre (%)	5.3	5.5

* T1 = Diet + 0g Oregano Powder; T2 = Diet + 15g Oregano Powder; T3 = Diet + 20g Oregano Powder; T4 = Diet + 25g Oregano Powder; SBM = Soya Bean Meal; GNC= Ground Nut Cake

Data collection

Qualitative analysis was carried out on the aqueous extracts of Oregano powder using standard procedures to identify the constituents as described by El-Olemy *et al*. (1994). Stratified sampling method was used to select five (5) birds per replicate, making 25 birds per treatment and a total of 100 birds from the four treatments. The sampled birds were slaughtered by severing the jugular vein closest to the head. The birds were de-feathered and eviscerated and then meat samples were cut from the primal parts for organoleptic attributes evaluation.

Sensory and statistical analysis

A descriptive test (QDA) was used to compare samples for tenderness, juiciness, flavour and after taste. A 12 member trained panel were used in the descriptive test (Stone and Sidel, 2004). The panelists were non-smokers and were drawn from the students' population of the Faculty of Agriculture, Usmanu Danfodiyo University, Sokoto. Samples were blind coded and randomized for the order of presentation. Water at room temperature was made available to panelists for cleansing palate between samples. The sensory data was analyzed using the General Linear Model procedure of Statistical Analysis System (SAS) package version 9.2 software (SAS, 2007) and statistical significance was set at $P<0.05$.

Results and discussion.

Phytochemical constituents of oregano (*Oreganum vulgare*)

Qualitative analysis of the test ingredients indicated moderate presence of tannins, glycosides, cardiac glycosides, steroids, saponin glycosides and balsam, higher content of flavonoids and saponins while alkanoids and volatile oils were found in trace quantity as shown in (Table 2). This is similar to the report of Veni and Neeru (2013) who indicated the presence of glycosides, steroids, tannings and flavonoids from Oregano and Prathyusha *et al*. (2009) who indicate the presence of the Alkaloids, Saponins, Glycosides, Flavonoids, Tannins and Steroids.

Table 2: Qualitative constituents of oregano powder

Qualitative phyto-chemical	Results
Flavonoids	+++
Tannings	++
Saponins	+++
Glycosides	++

Alkanoids	+
Cardiac glycosides	++
Steroids,	++
Saponin glycosides,	++
Balsams	++
Volatile oil	+
Anthraquinones	ND

Key: ND= Not detected; + = Trace; ++= Moderate; +++ = Concentrated

Sensory properties of the meat samples

The result of this study indicated that there was no significant difference (P>0.05) between the organoleptic construct of aftertaste, flavour, juiciness, and tenderness of broiler chicken meat fed graded levels of Oregano powder as shown in Table 3. This is in agreement with the findings of Puvača *et al.,* (2013) who reported that; plant phytobiotics did not have effects on eating quality of meat and can be regarded as safe for usage. Contrary results were obtained by Pavelková *et al.,* (2013) using Oregano essential oil in broiler diets, which resulted in improved sensory meat quality.

The result of this work showed that the meat harvested from all the treatments groups has similar (P>0.05) flavor and the same level of juiciness. Thus, this might be related to the juiciness and flavour perception which is a function of cooking loss and the water holding capacity, as there was no significant difference (P>0.05) between all the treatment means in terms of cooking loss and the water holding capacity. Furthermore, the non-significant difference in tenderness score obtained in this study might be as a result of non-significant differece in the pH of the meat samples. Bouton *et al.*, 1973 found a linear relationship between pH and meat tenderness. Aftertaste score obtained in this work followed a similar trend as obtained for flavor, juiciness and tenderness, no significant difference was observed between the treatment means in terms of aftertaste. Thus, this might be as a result of the non-significant difference in the flavor, juiciness and tenderness of the meat in all the treatments (Bouton).

Table 3 : Effect of graded levels of Oregano powder on sensory properties of broiler chicken meat

	OP Inclusion levels (g/100kg)				
Organoleptic Construct	0	15	20	25	SEM
Aftertaste	73.70	73.40	73.20	73.00	4.863
Flavour	90.50	90.30	90.60	90.20	5.435
Juiciness	69.40	69.60	69.80	70.10	5.248
Tenderness	70.00	70.00	69.70	69.50	4.781

Conclusions

Results of this study showed that none of the sensory constructs evaluated were affected by the inclusion of graded levels of Oregano powder (15g, 20g, and 25g per 100kg) and thus Oregano powder inclusion in the diets of broiler chicken as phytobiotics did not have any effects on eating and cooking quality of the meat.

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