

Effects of scent leaf (*Ocimum gratissimum*) on intestinal helminths affecting local free range chickens

¹Olorunsola, R. A. and ^{*2}Bagbe, A. S

¹Department of Animal production and Health, School of Agriculture, Food and Natural Resources, Olusegun Agagu University of Science and Technology, Okitipupa. Ondo State.

²Department of Biological Sciences, School of Science, Olusegun Agagu University of Science and Technology, Okitipupa. Ondo State.

*Correspondence Author

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Abstract: Scent leaf or *Ocimum gratissimum* is introduced to test its effectiveness as herbal purgatives in the treatment/eradication of gastrointestinal parasites in native chickens. Therefore, considering the side effects and the extracts and biologically protozoan builds against drugs, more attention should be given to the extracts and biologically active compounds which are isolated from plant species commonly used in herbal medicine. Hence, there is need for the study of potentials use of scent leaf (*Ocimum gratissimum*) in the control of gastro-intestinal parasites of local free range chicken.

A total of 18 local free range chickens were used for the study. The birds were sourced from the local community market at 17 weeks of age. The local birds were weighed to determine their initial body weight. Six (6) local chickens were allocated to three (3) treatment.

The results reveals that all the free range chicken that were given scent leaf extract and commercial dewormer shows great reduction in number of eggs in their faeces. This indicates that scent leaf extract are equally effective as commercial dewormer (mebendazole).

From the studies, *Ocimum gratissimum* is a good antioxidant and also has some medicinal and nutritive values. This method of gastrointestinal helminthes control/eradication is cheap and easy to practice and could be adopted to replace conventional use of anti-helminthic drugs because of recent development of resistance of the helminthes to these drugs. The formulation of the plant extract regimen could be carried out without much technical know-how and the use of highly sophisticated equipment. Consequently, rural dwellers could access this nascent method of eradication of gastrointestinal helminthes in local free range chickens with little training/orientation.

From the results of this study it is recommended that *Ocimum gratissimum* extract and commercial dewormer (Mebendazole) be incorporated into the treatment of local free range chickens without any detrimental effect.

Keywords: Scent Leaf Extract, Local Free Range Chicken, Purgatives

I. Introduction

One of the fastest growing segments of the animal industry is the poultry industry. Chicken, turkeys, ducks, geese and other birds make up a large portion of the meat diet of people in most countries. Poultry meat is generally accepted by most cultures as a wholesome meat for human consumption. Local free range chickens are birds that have been domesticated from its wild ancestor. They are medium in size, good layer and their carcasses are well suited for the table. They possessed brown-shelled egg; the skin and shank are either yellow or blank in color. The egg yolk color is darker than purebred, which make it more attractive and palatable to the consumer. The face, comb, wattle and earlobes are red in color. They are usually presented in brown, white, black or combination of color.

The range type of production practice by the farmers/backyard raisers in raising free range chickens, make them more exposed and easily infect with gastrointestinal parasites, cause to lower their resistance (Taiwo, 2005; Bagbe, 2017). The gastrointestinal parasites could affect the performance of the birds, in terms of growth and egg production. In addition to this, parasites serve as stress factor on the normal physiological processes of the birds making them less resistant to other types of infection. Animals that are infected with parasites consumed more feed per gram of gain. Parasites are feeding either directly or indirectly on the feed supplied by the producers. The most common parasites that infect poultry are the large roundworms or *Ascaridia galli*, small roundworms or *Capillaria spp.*, cecal worms or *Heterakis gallinarum* and the tapeworms or *Syngamus tracheae*. All the internal parasites of the digestive system “eat” or absorb through the body wall the digested food of the animal host. Only large number of

parasites will cause the birds to become gradually thinner, weaker, paler, and less productive. It lowered also the resistance of the birds thus they become susceptible to diseases which may easily be fatal (Makkar and Becker 1997; Gidamis *et al.*, 2003).

In order to solve this problem on gastrointestinal parasites that usually attacks birds, especially those on free range system of production and in support to the project regarding the organic production of animals. Scent leaf or *Ocimum gratissimum* is introduced to test its effectiveness as herbal purgatives in the treatment/eradication of gastrointestinal parasites in native chickens. Scent leaf is a vegetable grown throughout the Nigeria. It is cultivated although wild forms can be found, grows in the remote areas of the country.

Therefore, considering the side effects and the extracts and biologically protozoan builds against drugs, more attention should be given to the extracts and biologically active compounds which are isolated from plant species commonly used in herbal medicine. Hence, there is need for the study of potentials use of scent leaf (*Ocimum gratissimum*) in the control of gastro-intestinal parasites of local free range chicken.

II. Materials and Methods

Location of the Study

The study was carried out at the poultry unit of the Olusegun Agagu University of Science and Technology, Okitipupa, with an altitude of 430m above sea level. The climate is a typical humid tropical setting with a relative humidity range of 56.01- 103.83%. Average diurnal minimum temperature ranges from 75°F (24°C).

Duration of the Study

The experimental animals were allowed two weeks stabilization period and feeding trials lasted for 5 weeks.

Experimental diets

The starter and finisher mash (Top feed) used for this study. Feed and water inclusion of the leaf extracts was given *ad libitum*. Other routine management practices were carried out.

Experimental Animal Procurement and Management

A total of 18 local free range chickens were used for the study. The birds were sourced from the local community market at 17 weeks of age. The local birds were weighed to determine their initial body weight. Six (6) local chickens were allocated to three (3) treatment. The floor of the pens was cleaned daily, feed and water troughs were also washed daily, Feed and water were provided *ad libitum*.

Ocimum gratissimum leaves were bought from the Okitipupa community market in Okitipupa Local Government Area, and were air dried under shade for 10 days. Thereafter, the leaves were threshed carefully to separate leaves from twigs before grinding. The dried leaves were grounded to powder form with a hammer mill to make a leaf meal. Twenty percent (20%) of *O. gratissimum* leaf meals were added to the supplemented diet. These formed the experimental treatments. The leaf meal solutions were stored in a plastic bottle during the entire period of the study.

Experimental Design

Completely Randomized Design (CRD) was used in this study having six (6) treatments replicated three (3) times. Descriptive analysis was used to interpret the result of the experiment. Collection of fecal materials for fecal analysis was done prior to the start of the study to determine positive birds of gastro-intestinal parasites. Positive birds were again subjected for fecal analysis a week prior to the start of the study as basis for evaluation on the effect of treatment given. Then the succeeding collections were done every week after the administration of treatment (Scent leaves). Only fresh or newly voided droppings were collected, placed separately in a clean universal bottle (UB) and labeled for identification. These samples were taken to the Laboratory for fecal analysis of the parasite egg.

Fecal examination was done using the Mc Master Method. Two grams of each fecal sample was placed in strainer then 30 cc of water with saturated salt solution was poured slowly to the sample, while pouring the solution a stirring gun was used to stir the fecal sample. A container was placed below the strainer to collect the solution. The collected solution was the one used for examination. A sieved pipette was used to get a sample from the collected solution, placed it in the slides and examined under an electric compound microscope for the presence of parasite's egg. The number of eggs counted, multiplied by 200 represents the egg per gram.

Preparation of Scent Leaf Extract:

Scent leaves were collected fresh, washed and dried under room temperature while retaining the greenish coloration (25% Dry matter). They were grounded separately to leaf meals using hammer mill (2.0 mm screen size). The leaf extracts were prepared by soaking 200g of the ground *O. gratissimum* in warm water. One Litre of water was used to soak the leaf meal for 12h. This preparation was carried out subsequently to obtain the leaf extract that was used throughout the period of the experiments.

Scent Leaf Extract

The treatment was given orally to experimental chicken assigned in treatment T1, T2 and T3. Each chicken was given two ml of scent leaf extract per administration with the use of a disposable syringe. Administration was done once before feeding the experimental chicken.

Mebendazole:

The commercial dewormer (Mebendazole) was purchased from a reputable veterinary pharmacy. This is one of the common dewormer used by the poultry raisers in deworming their chicken. It is in tablet form with the dose of 0.20 gms per kilogram body weight, and was repeated after two weeks of administration. The amount of commercial dewormer was diluted first in water before it was administered orally to the chicken with the used of disposable syringe. The ratio of commercial dewormer and water is 0.16 mg: 1 ml.

Scale:

The given scale was used to interpret the presence of egg parasites in the feces from week 0 to week 4: (-) = No Infection; (+) = 100 -700 Light Infection; (++) = 800 – 1100 Moderate Infection; (+++) = 1200 – above Heavy Infection.

Statistical analysis:

Data obtained from the prevalence study were analyzed using descriptive statistics and the results summarized as percentages. Students’ T test was used to analyse the difference between the prevalence of cestodes and nematodes. One way analysis of variance (ANOVA) was used to analyse the data generated from worm counts and variant mean separated by the Duncan’s multiple range test. Probabilities (P) of 0.05 or less were considered significant.

III. Results

Presence of Egg Parasites of Roundworm (*Ascaridia galli*) in the faeces of the

Chickens examined

Table 1 reveals the result of all the experimental free range chicken after the administration of scent leaf extract and mebendazole as a dewormer. The result shows that scent leaf extract and commercial dewormer (Mebendazole) used in the study, indicates positive result in the treatment and control of *Ascaridia galli*.

Presence of Egg Parasites of *Capillaria spp* in the Faeces of the Chickens examined

The result shows that scent leaf extract and commercial dewormer (Mebendazole) used in the study, shows positive result in the treatment and control of *Capillaria spp*.

Presence of Egg Parasites of Tapeworm in the Feces of chickens examined

The result reveals that administration of scent leaf extract and commercial dewormer shows decrease in the number of tapeworm eggs as the week’s increases among the examined free range chicken (Table 3).

Presence of Egg Parasites of *Hetarakis spp.* in the Feces of the Chickens examined

Scent leaf extract shows comparable effect to commercial control (Mebendazole) in treating and controlling gastro-intestinal parasites of free range chickens (Table 4).

Table 1: Presence of Parasite Eggs of Roundworm (*Ascaridia galli*) in the faeces of the chickens examined from week 0 to week 3

TREATMENT	0 WEEK	1 WEEK	2 WEEK	3 WEEK
Chicken without any dewormer (T ₀)	+++	+++	++	+++
Chickens treated with Scent leaf extract (T ₁)	+++	++	+	-
Chicken treated with Mebendazole(T ₂)	+++	++	-	-

Table 2: Presence of Parasite Egg of *Capillaria spp* in the Feaces from week 0 to week 3

TREATMENT	0 WEEK	1 WEEK	2 WEEK	3 WEEK
T ₀ – Control	+++	++	++	++
T ₁ – Scent leaf	+++	+	+	-
T ₂ -Mebendazole	+++	+	-	-

Table 3: Presence of Parasite Egg of Tapeworm in the Feces from week 0 to week 3

TREATMENT	0 WEEK	1 WEEK	2 WEEK	3 WEEK
T ₀ – Control	+++	++	++	++
T ₁ – Scent leaf	+++	+	-	-
T ₂ – Mebendazole	+++	-	-	-

Table 4: Presence of Parasite Egg of *Heterakis spp.* in the Feces from week 0 to week 3

TREATMENT	0 WEEK	1 WEEK	2 WEEK	3 WEEK
T ₀ – Control	+++	+++	+++	+++
T ₁ – Scent leaf	+++	+++	-	-
T ₂ – Mebendazole	+++	+++	-	-

IV. Discussion

The results of this study showed that free range local chickens in Okitipupa area of Ondo state are commonly infected with a variety of gastro-intestinal helminth parasites. The high prevalence observed in this study among the local chickens in the first week before the administration of deworming drugs is believed to be associated with the free range nature of the local birds which roam from place to place in search of food by scavenging on superficial layer of the soil which contains various arthropods and earthworms that serve as the intermediate and paratenic hosts for most helminthes of poultry (Soulsby, 1982). The birds used in this study were mostly raised traditionally under extensive management with little or no supplementary feeding and without veterinary care. The occurrence of helminth infection among the chicken at such a high level is an indication of high availability of infective stages of the worms in the study area and conditions necessary for the survival of the pre-parasitic stages.

In many parts of the world, especially Africa and Asia, plant parts are used for the treatment of various ailments such as inflammation, fever, gout (Krawinkel). The leaves of *Ocimum gratissimum* is used for prevention and treatment of gout, catarrh, fever and malaria which has been found to be associated with free radical generation (Pamplona, 2004; Bagbe, 2019).

The results reveals that all the free range chicken that were given scent leaf extract and commercial dewormer shows great reduction in number of eggs in their feaces. This indicates that scent leaf extract are equally effective as commercial dewormer (mebendazole).

The antihelminthic activities of *Ocimum gratissimum* as shown by the results in this study were shown to be effective. The result also showed that the plant has antihelminthic properties and as the antihelminthic activity was dose-dependent. The plant extract also exhibited protection against lipid peroxidation induced by carbon tetrachloride and ferrous sulphate and this activity was also found to be dose- dependent compared with the standard used. It is evident that the *Ocimum gratissimum* has antihelminthic properties and this compliments our earlier studies on the antioxidant properties of this plant (Okonkwo and Njoku, 2011; Bagbe, 2019).

Given the wide spread availability of the medicinal plants and the reported resistance of the adult helminth to existing antihelminthic regimes, this alternative means of helminth control could be adopted to break the life cycle of the parasite and halt its progression into the adult helminth.

Since this study has established the anti-helminthic properties of these medicinal plants, while these plant parts could be introduced into the drinking water of livestock especially chicken, further work needs to be done to access the after math effect of the consumption of these plants and their extracts by these livestock. This method of parasite control is indeed cheap and easy to practice and could be adopted to complement the already in-use method of application of commercially available anti-helminths chemicals.

From the studies, *Ocimum gratissimum* is a good antioxidant and also has some medicinal and nutritive values. Further studies could be carried out with the plant aimed at isolating the plant active compound that is responsible for the anti-helminthic activity, as numerous studies have pointed out the effect in vitro.

This method of gastrointestinal helminthes control/eradication is cheap and easy to practice and could be adopted to replace conventional use of anti-helminthic drugs because of recent development of resistance of the helminthes to these drugs. The formulation of the plant extract regimen could be carried out without much technical know-how and the use of highly sophisticated equipments. Consequently, rural dwellers could access this nascent method of eradication of gastrointestinal helminthes in local free range chickens with little training/orientation.

From the results of this study it is recommended that *Ocimum gratissimum* extract and commercial dewormer (Mebendazole) be incorporated into the treatment of local free range chickens without any detrimental effect. It is also important that further studies are carried out to consolidate the anthihelminthic and nutritive value of the herbs in view of their potential use as treatments in a wider scale.

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Disclosure of conflict of interest

All authors who have contributed to this work and, the preparation of the manuscript have all agreed to every part of the work and therefore, there is no conflict of interest.

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