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## EFFICACY OF CRUDE EXTRACTS OF *Ocimum gratissimum* (SCENT LEAF) AGAINST INTESTINAL PARASITES OF EXOTIC CHICKENS (AGRIC FOWLS).

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### ABSTRACT

*Ocimum gratissimum* plant materials and extracts were examined for utilization in the control of the gastro-intestinal parasites especially, notable nematodes and *Eimeria* species of the domestic fowl (*Gallus gallus domesticus*: Galliformes) for a sustainable profitable poultry production. *O. gratissimum* was chosen based on the already available information on its medicinal and other useful uses in human and veterinary medicine, and most especially its traditional applications. The adverse effects of the presence and activities of some parasitic organisms that inhabit the gastro-intestinal tracts of the domestic fowl (*Gallus gallus domesticus*: Galliformes) were considered. Two hundred and forty birds (domestic fowls) infected with gastrointestinal parasites were tested with *O. gratissimum* to ascertain the safety on the birds through acute toxicity test. It was found to be safe for the birds even at relatively very high doses/concentrations of 50mls (of 1000g of the plant-materials in 1000l) per bird. Eighty eight chickens (36.6%) were solely infected with helminth parasites. Number with protozoan parasites (coccidial oocysts) were ninety nine (41.25%), 27.25% had both infections at the same time. The presence of the G.I.T-parasites was established by examination of their faecal matter by direct faecal smear and egg concentration methods. These birds were subjected to *in vitro* and *in vivo* tests using various concentrations of *O. gratissimum* extracts in water and feed. There were adverse effects of *Ocimum gratissimum* on the various G.I.T-parasites so identified especially, when given in feed.

**Key words:** GIT parasites, *Ocimum gratissimum*, poultry production, plant extracts.

## Introduction

Special hybrid of chicken called 'Agric fowl' is raised especially for commercial purpose. Compare to the traditional chickens which often are allowed to roam about to fend for themselves or provided with a small shelter which they return to at night, Agric fowls are well catered for in terms of shelter, feeding and medication (Obioha *et al*, 1983). They are therefore raised commercially for the purpose of providing the farmer with eggs and meat with the expectations of huge financial return (Elenwo and Okafor-Elenwo, 2014). To the humans, the world over, chickens are of high economic, nutritional and social importance. However, the associated diseases especially parasitic infections have become a major challenge to full realization of the financial and health benefits of the domestic chicken, *Gallus gallus domesticus* (Hansenk and Perry, 1994; Soetan *et al* 2011; Permin *et al.*, 1997; Elenwo and Okafor-Elenwo, 2014). When the losses are enormous, most farmers become discouraged from the business. Efforts at eliminating these gastro-intestinal parasites using some chemical/synthetic compounds and (even) vaccines have not yielded the much desired results (Oyeka, 1989).

There is an increasing need to use non chemical means to control most of these parasitic agents of domestic chickens (Soetan *et al.*, 2006). The awareness of the effectiveness of plants and/or their extracts in promoting health is increasing (Lale *et al* 2000; Khalid *et al*, 2002; Tarus *et al* 2004; Saula, 2005; Kubmarawa *et al*, 2008; Okrikata and Auaso, 2008; Masola *et al*, 2009; Erkan *et al*, 2010; Bora *et al* 2011; Casanova *et al*, 2014). Such medicinal plants if confirmed could serve as alternative and effectively cheaper approach to the control of different nematode worms. The present paper takes advantage of the new interest in the use of plants and/or their extracts in addressing the problem of parasitosis in domestic fowls.

## Materials and methods

### Acute toxicity test

The test-birds (240 infected birds) were screened for the presence of the study-parasites. Some of the infected birds were used as controls.

The plant was subjected to the 'Lethal Dose-50 (LD-50 test). The method adopted was similar to that used by Nweze and Ezech, (2009).

### Examination of the chicken faeces for GIT parasites

This was carried out in two methods:

#### Direct Smear Method

A gram of faeces was taken from each bird using a spatula. This, with a drop of water was placed on a microscope slide. The preparation was mixed evenly with the edge of another microscope-slide and covered with a cover-slip. Under the x40 magnification of light microscope the slide was examined to ascertain the presence or otherwise, of the ova of parasites being investigated.

#### Test Tube Flootation Technique/Method

4g of the fecal sample were separately taken, from each tier of the cages. This was put in a plastic container labeled (1). 50mls of saturated salt (NaCl) solution was added to dissolve the faeces and mixed thoroughly by stirring with a glass-rod. Immediately after stirring, the faecal suspension was poured through a tea strainer (2-3mm aperture) into another plastic container and labelled (2). The debris retained in the strainer was discarded. The filtrate was

poured into a test tube, placed in a vertical position in a test tube rack and topped up with the faecal suspension, so that it had a convex meniscus at the top. A cover slip was placed on top of the test tube and left to stand for 20 minutes.

Helminth eggs and coccidial oocysts floated and thus accumulated just beneath the cover slip. The cover-slip was then lifted off vertically from the tube together with the adhering flotation fluid. Some of the accumulated helminth eggs were now within the adhering fluid. The cover slip was then transferred very carefully and placed on a microscope-slide and mounted on a light microscope for examined under x40 and x60 magnification power. Then increased to (x 60 magnification). Also the sediment was examined for presence of GIT parasites.

#### **Preparation of the plant materials for administration to the birds:**

Aqueous extracts of *Ocimum gratissimum* leaves were prepared by mashing 1kg and soaking same in 1litre of distilled water (ratio 1:1). The mixture was secured in a plastic bucket for 12hours. It was thereafter sieved with a plastic sieve of 2-3mm aperture. A deep “Army-green” coloured liquid was obtained (plate 1). The liquid was administered to the test animals and the controls. The next test was extracting the juice *Ocimum gratissimum* directly from the leaves and administering same to the chickens. Also in another test, the leaves of *Ocimum gratissimum* were mashed and mixed in different measures with chicken feed before administering to the test birds.

#### **Results**

*Ocimum gratissimum* leave extracts were safe for use on the birds in this research. The birds to which the plant-extracts have been administered were observed over a period of twenty-four (24) hours, of which none of the birds died. There also were no observable abnormalities that could be associated with or attributable to the extracts.

Domestic fowls already infected with gastrointestinal parasites were used for the study. 138 (57.5%) were infected with helminth parasites notably, cestodes and nematodes. 150 birds were found to be infected with protozoan (*Eimeria sp.*) parasites and released the oocysts and 213, representing 88.8% were infected with both parasite types in the same bird figure 1.

#### **Effects of only the extracts *O. gratissimum* on the excretion of eggs and oocysts.**

The test plant induced the excretion of a large number of eggs of the helminth parasites notably nematodes as well as coccidial oocysts. As the weight in gram of the extract increased from 50gm to 100g and above the, number of eggs and oocytes voided. Comparatively, the quantity of oocyst released by the *Eimeria* parasites according of the size of the plant extracts outweighed the eggs excreted by the helminth parasites when the same quantity of the extract was administered, figures 2a and 2b. The control birds, given ordinary water excreted less amount of eggs and oocyst

#### **Effects of *O. gratissimum* extract administered through water**

Helminth and coccidial infective stages voided per gram of faeces continued to increase as the extracts increased in intensity.

The eggs and oocysts excreted were found to have become distorted, lost their covering consistency, denatured and appearing destroyed. This suggested that the plant-materials/extracts were destructive to the eggs and oocysts of the G.I.T-parasites in this study. Increase in the number of the oocysts and eggs voided by the treated birds continued for the

first few days of such administration. This was followed subsequently by a gradual fall on the number, until the seventh-day when the oocysts were no longer voided (figures 3 and 4). The control birds continued to shed coccidial-oocysts in their faeces relatively in lower numbers which increased gradually but never stopped throughout the period of administering the plant-extracts and beyond.

#### **Administration of *O. gratissimum* extracts mixed with poultry-feed.**

Chicken feed mixed with the test plant extract, without any other anthelmntic and no other anti-coccidial compound or additive incorporated was given *ad libitum* of various weights (between 1kg/25kg and 25kg/25kg of feed respectively).The results of administering the plant-extracts to the test-birds were shown in figures 5 and 6.

The number of ova and oocyst voided progressively increased continuously as the weight of the plant material given to the birds increased. It was however observed that the feeding of test birds with macerated *O. gratissimum* leaves mixed with chicken feed caused the expulsion of more parasites' eggs than when given in water. Also, the quantity of coccidial oocyst voided by the infected domestic fowls were comparatively more than the helminth eggs voided. Continuous feeding of the test birds *with* the plant materials for extended number of days caused a downward-turn from the 4<sup>th</sup>-day. They started showing a complete absence of parasites' ova as from 6<sup>th</sup>-day by the 12<sup>th</sup> hour of the day. By 7<sup>th</sup>-day none of the birds fed with the plant extract shed any further gastro-intestinal parasite ova. On the other hand, the control-group, given the ordinary compounded poultry-feed, also voided some ova of the parasites, but in comparatively lower numbers than test-plants' groups.



Plate 1. Macerated leaves and juice from *Ocimum gratissimum* leaves

**Macerated leaves and juice from *Ocimum gratissimum* leaves**

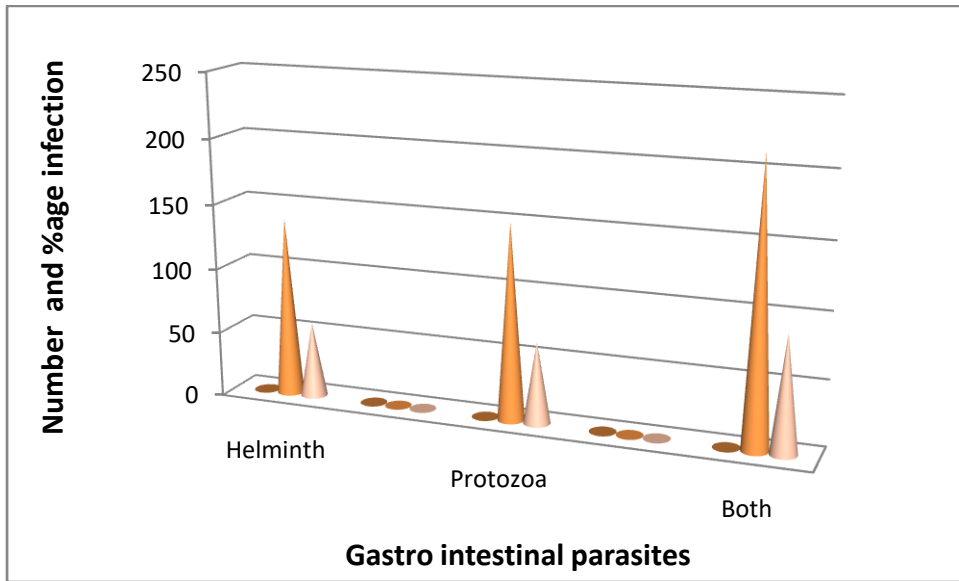


Figure 1. Prevalence of GIT parasites from the infected birds

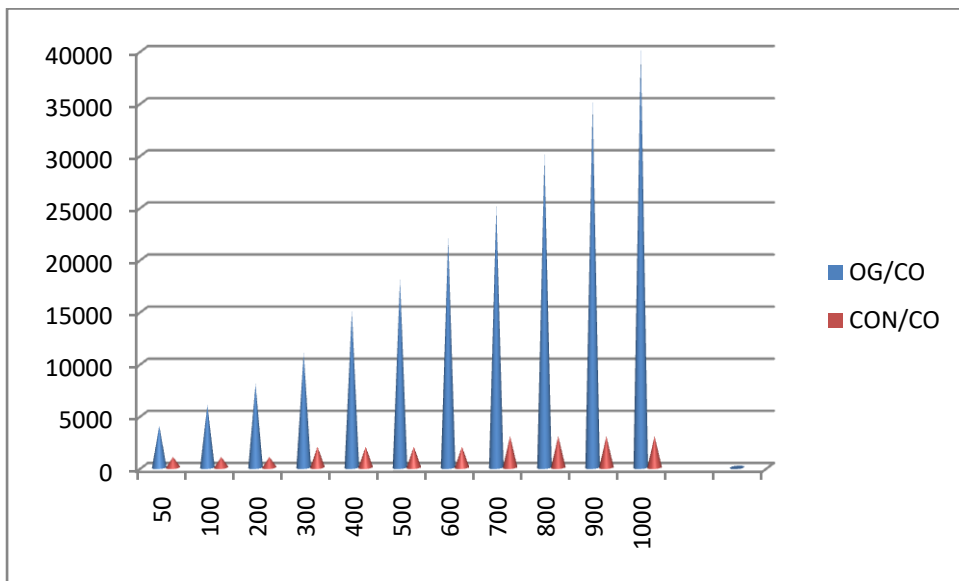


Figure 2a. Comparison of the effects of *O. gratissimum* extract and ordinary water in the excretion GIT parasites

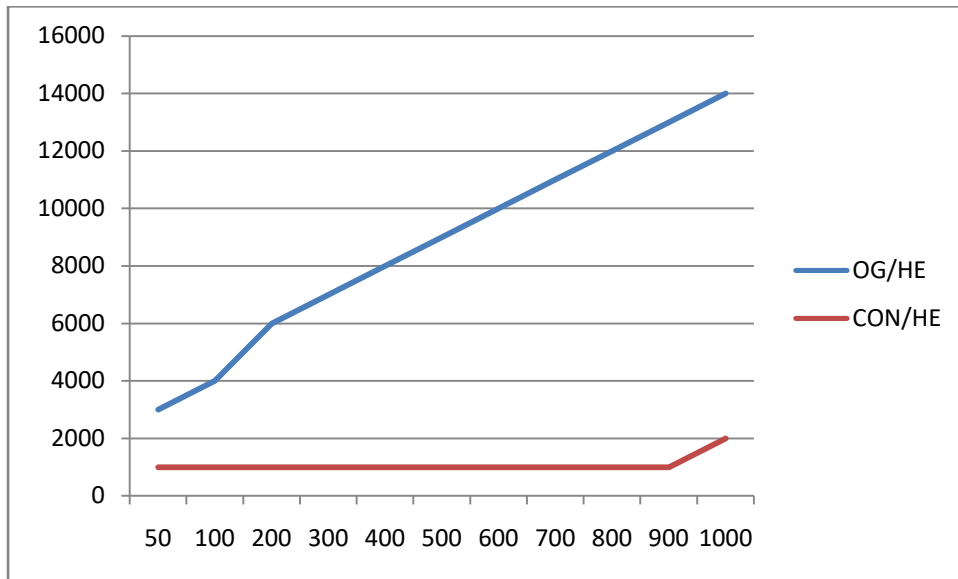


Figure 2b. Comparison of the effects of *O. gratissimum* extract and ordinary water in the excretion GIT parasites

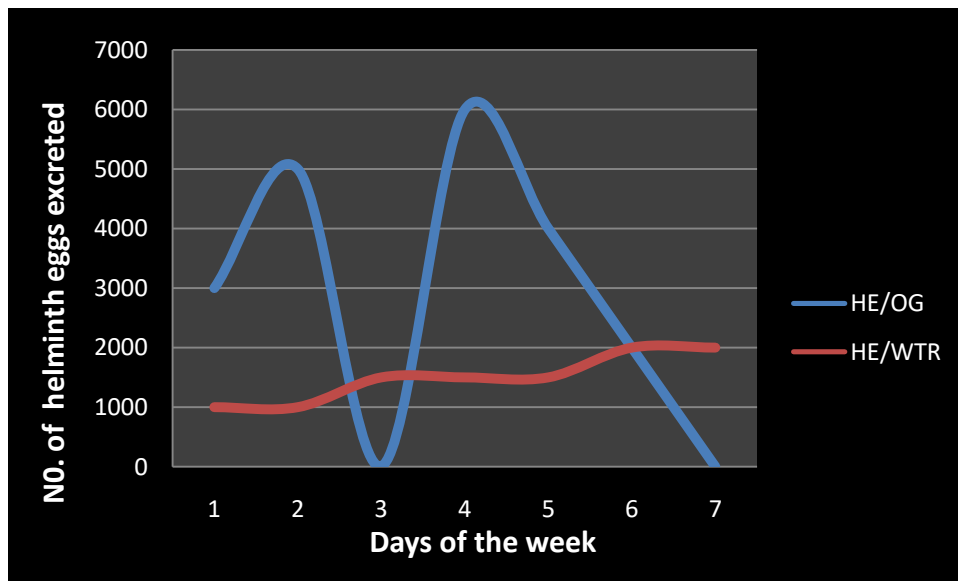


Figure 3. Effects of the test-plants on the excretion of helminth ova per gram of faeces per day for 7days of treatment

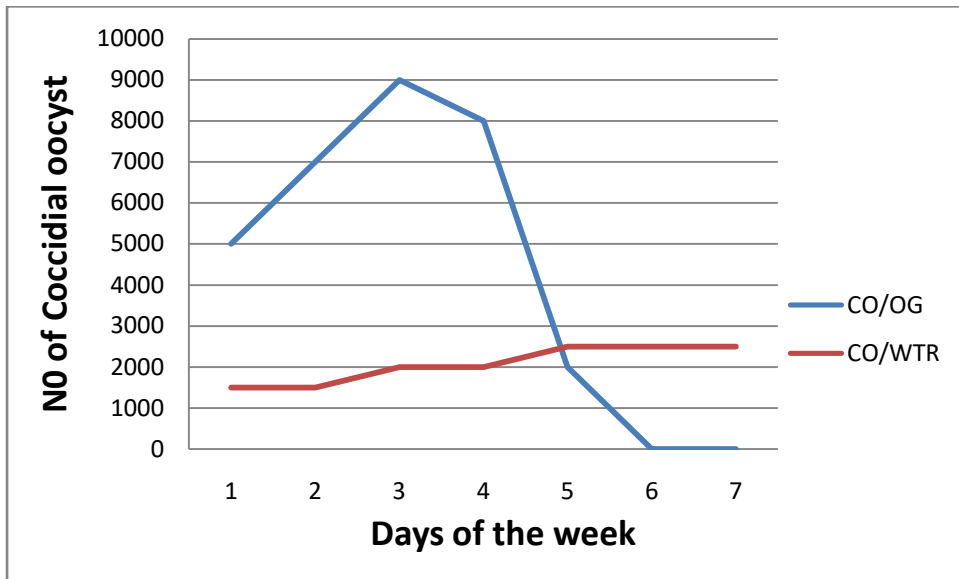


Figure 4. Effects of the test-plants on the excretion of coccidial-oocysts per gram of faeces per day for 7days of treatment

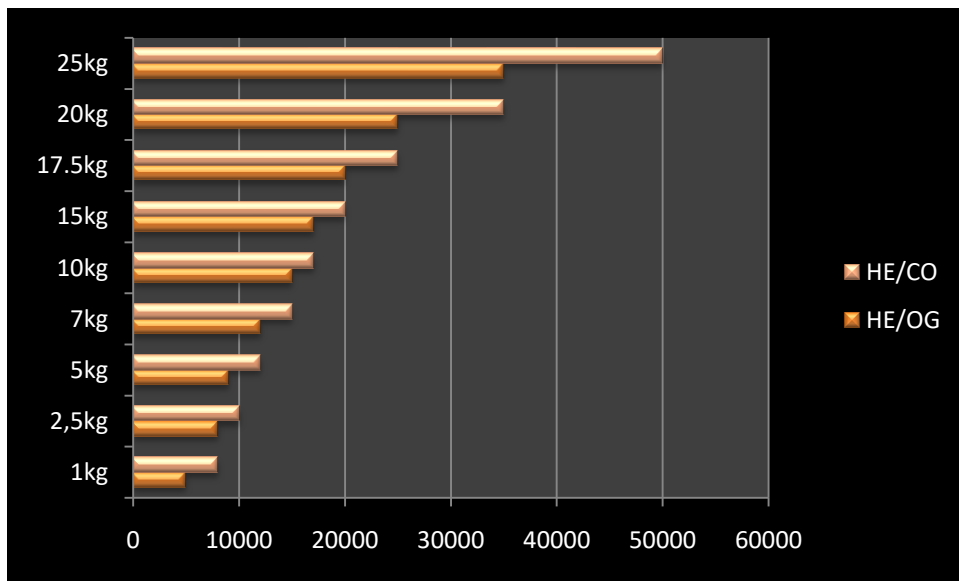
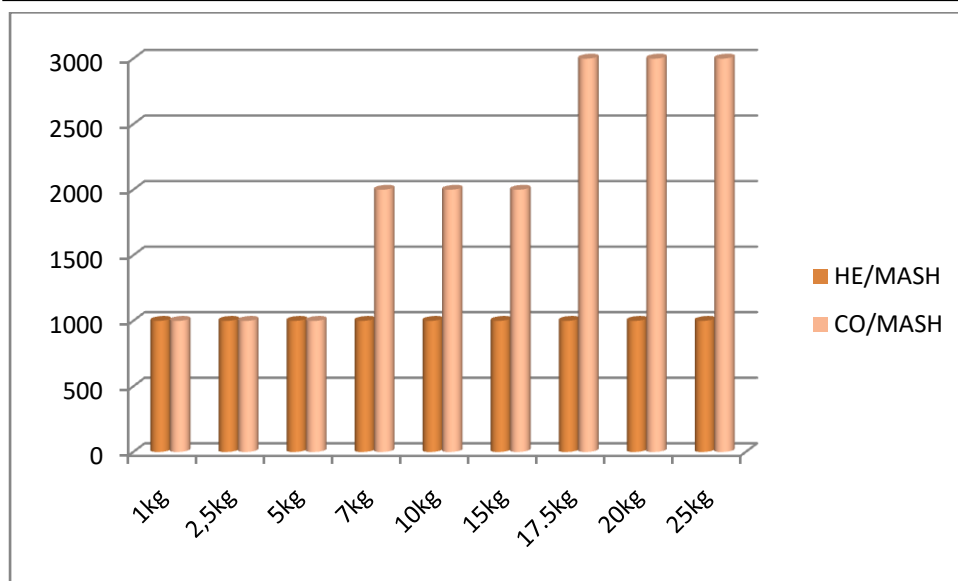


Figure 5. Comparison of the quantity of ova/oocyst excreted by administering the plant-extracts through the birds' feed



**Table 6. Comparison of the quantity of ova/oocyst excreted by administering only the birds' feed**

### Discussion

*O. gratissimum* plant extracts had adverse effects on the G.I.T-parasites of domestic chickens studied. The values of Scent leaves and some other medicinal plants in disease treatment and prevention, especially in man and few animals are well documented (Adebolu and Salau, 2005; Bora, *et al*, 2011; Boutoial, *et al* 2013; Casanova, *et al*, 2013 Boate *et al*, 2018; Okafor-Elenwo, *et al* 2021). It caused copious voiding and destruction of ova and oocysts of the helminth and protozoan parasites. From the first day of feeding the birds with *O. gratissimum* plant extract, there was significantly progressive reduction in the number of ova voided. It became more pronounced from the third (3<sup>rd</sup>) day for the same period of seven days. When the extract of *Ocimum gratissimum* was added to the bird's drinking water, it could be observed that the effects were not as strong on the birds compared to when it was mixed in the feed.

It could however, be suggested that this observation could be due to the duration of these plant-materials in the body/system of the birds. When administered in the feed, the active ingredients of the plants take longer time to be absorbed and act than when the materials are taken-in with water, as the feed would take a longer period to digest and be utilized in the digestive system than water. This, however, calls for a further research to be ascertained and more confidently explained scientifically.

Birds given ordinary poultry-feed or water without any of the plant-extracts and no other known anthelmintic nor anticoccidial agents, were also observed to be shedding some ova of the G.I.T-parasites. The number of such are comparatively insignificant and is known to be a normal occurrence as infected birds are known and reported to pass-out these parasites' ova during and even after the period such birds are infected with the parasites. As such, the ordinary poultry-feed or water cannot be said to have been responsible for the voiding of the said parasites' ova by the birds in the control-group.

The shedding of the ova by infected birds not treated/administered with drugs or other curative, prophylactic, apparent-test or controlling agents (including the plants in this study),



is usually comparatively lower in number and volume, as such are of little or no curative significance but rather constitute environmental (if not public-health) nuisance especially to other birds. Moreover, such passed-out ova from the 'untreated' infected-birds could remain infective to other susceptible birds during or in conducive/favourable environmental conditions. Such birds are also known to continue the shedding of these ova for considerably longer periods when compared with the treated birds

The observed effects of these plants-materials/extracts manifested early in the experiments and remain till the last stages of this work. The plant-extracts showed the presence of alkaloids, saponins, tannins, phlobatannins, anthroquinones, cardiac glucosides, polyuronides, Fatty-acid, essential-oil. These findings were in line with the studies of Akinmoladun *et al.*, (2007), Ajayi *et al.*, (2019).

## Conclusion

*Ocimum gratissimum* leaves have been identified to have adverse and destructive effects on the gastro-intestinal helminthes (especially nematodes) and protozoa (especially coccidian) of domestic-fowl. It therefore, can be considered for use in the destruction, avoidance, reduction or control of these very destructive parasites and their associated negative effects on poultry production. The plant could be included as part of the solution for the reversal of the G.I.T-parasites which ravage domestic fowls. The liquid extracts of *O. gratissimum* is effective against the worms when given in water but when compared to the mashed leaves mixed with chicken feed, the latter was observed to be more effective.

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