

# The Anthelmintic Efficacy of *Artemisia Capillaris* in Free-Range Chickens Naturally Infected with *Ascaridia Galli*, *Capillaria Spp* and *Strongyloides Spp*

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**Abstract:** Free-range chickens naturally infected with helminths, were randomly divided into three groups. Groups A and B were given 1000 and 500 mg of dried powdered *Artemisia capillaris* leaves, respectively. Group D was given 100 mg / 10 mg Niclosamide + Levamisole (positive control), while Group C was given nothing (negative control). Chickens included in Group C were randomly selected from the flock not detected for the presence of helminths. Using flotation technique, the number of eggs per gram of feces (EPG) was determined. Statistical analysis after treatment the EPG's of group A, B and D were significantly reduced compared to group C. Fecal egg reduction test was used to estimate the efficacy of powdered *Artemisia capillaris* as an anthelmintic. The percent efficacies of group A, 76.56% (*A. galli*), 69.72 % (*Capillaria spp.*), 7.5 (*Strongyloides spp.*) and for Group B, 81.48% (*Ascaridia galli*), 22.5% (*Capillaria spp.*), -62.5 %, -10% (*Strongyloides spp.*). Based from the given statistics the anthelmintic efficacy of *A. capillaris* was responsible for the varying helminth egg per gram at fecal analysis following treatment. Successful reduction in worm burden can be witnessed with proper dosage and extended experimental period.

**Keywords:** Anthelmintic, *Artemisia capillaris*, *Ascaridia galli*, *Capillaria spp.*, *Strongyloides spp.*, free-range chickens.

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## I. INTRODUCTION

Gastrointestinal helminth infections are a cause of economic losses in modern poultry farming. Among the parasites next to coccidium, cohorts of helminth infections in chicken namely, *Ascaridia galli*, *Capillaria spp.* and *Strongyloides spp.* is considered to be of great importance as these can cause extensive economic losses in different ways such as loss of weight, meat production, egg production and mortality of birds (Mukaratirwa & Khumalo, 2010). Control of gastrointestinal helminth infections is mainly based on regular anthelmintic treatment with deworming agents such as albendazole, piperazine hydrate and levamisole (Tucker, 2007). Because of the high cost of anthelmintic agents, small scale poultry farmers cannot afford to procure the deworming agents. In this context, investigations on indigenous medicinal plants might contribute to develop effective and low cost herbal anthelmintics.

Indigenous and locally available herbals like *Artemisia capillaris* have been reported to have anthelmintic properties (Wilcox, 2009; Amidon *et al.*, 2014). The present study was conducted to evaluate the anthelmintic efficacy of the powdered dried leaves of *A. capillaris* on free - range chickens naturally infected with gastrointestinal helminths.

## II. MATERIALS AND METHOD

### A. Plant Material:

The plant *A. capillaris* were collected from Look 1st, Lugam, City of Malolos, Bulacan. The plant was submitted as a herbarium specimen for authentication to the Botany Division of the National Museum of the Philippines. The collected leaves were washed thoroughly with filtered water for several times followed by distilled water. The plant leaves were dried under shade at a well ventilated place. The dried leaves were processed for oven drying and grinding at the

Department of Science and Technology - Chemicals and Energy Division (DOST-CED). The grinded material is then encapsulated using empty capsules (size 0).

### **B. Experimental Animal:**

Fifty-two (52) free-range chicken's ages 3-8 months of varying sex were caged individually to ensure that there will be no confusion in the fecal collection. An initial fecalysis was conducted to determine which chickens are naturally infected with parasitic worms. Out of the fifty-two chickens only seventeen (17) were tested positive for the worm burden of *Ascaridia galli*, *Capillaria* spp. and *Strongyloides* spp. which yielded average egg per gram counts of 542.857, 314.285 and 380.00, respectively. The chickens are then divided into four (4) groups, namely: Group A or the experimental group I, Group B or the experimental group II, Group C or the untreated group and Group D or the positive control group. Group A received 2 capsules or 500 mg of *A. capillaris* per chicken given twice a day and Group B received 1 capsule or 500 mg of *A. capillaris* per chicken given once a day. Group C or the untreated groups are chickens that were randomly selected from the 35 birds tested negative for the helminths. Group D or the control group was treated with 1 tablet of Niclosamide / Levamisole HCl per chicken given only once in the course of the experiment.

During the experimental period, birds were given balanced commercial feed ration and water ad-libitum. Egg counts per gram (EPGs) were determined in excreta samples taken from each groups at days 3, 6, 12 and 18 to evaluate the degree of fecal egg reduction using flotation technique (Permin & Hansen, 1999).

### **C. Statistical Analysis:**

The data generated were subjected to statistical analysis by employing one-way ANOVA for meaningful and accurate comparison and interpretation between control and treatment groups.

## **III. RESULTS AND DISCUSSIONS**

On Day 3, treatment Group B proved to be the most effective treatment against *A. galli*, Group A against *Capillaria* spp. and Group D against *Strongyloides* spp. with Fecal Egg Count Reduction (FECR) rates of 96.3%, 30% and 71.43% respectively. Group A also showed efficacy against *A. galli* and *Strongyloides* spp. with FECR rate of 68.75% and 60%, Correspondingly Groups B and D also showed efficacy against *Strongyloides* spp. and *A. galli* with FECR rates of 50% and 92.86%, respectively (see Table 1).

On Day 6, treatment Group D proved to be effective against *A. galli* and *Strongyloides* spp. with FECR rates of 100%. Accordingly, Group A showed efficacy against *A. galli* and *Strongyloides* spp. with FECR rates of 87.5% and 80% while Group B showed efficacy against *A. galli* and *Capillaria* spp. with FECR rate of 88.89% and 80% (see Table 1).

On Day 12, treatment groups A, B and D proved effective against *A. galli* with FECR rates of 93.75%, 92.59% and 86%, respectively. Group D also showed efficacy against *Capillaria* spp. and *Strongyloides* spp. with FECR rates of 50% and 85.71%. Group A showed 100% efficacy rate against *Capillaria* spp. (see Table 1).

On Day 18, Group B showed efficacy against *A. galli* and *Capillaria* spp. with rates of 48.15% and 40%. Correspondingly Group A and D showed efficacy against *A. galli* and *Strongyloides* spp. with FECR rates of 56.25% and 28.57%, respectively (see Table 1).

Treatment groups A and B treated with *A. vulgaris* showed the best efficacy against *A. galli* with their FECR averaging to 76.56% and 81.48% followed by Group D or the Niclosamide / Levamisole HCl treated group with an average FECR of 69.72% on the whole duration of the study.

Although *A. capillaris* groups showed efficacy against *Capillaria* spp. with FECR of 22.5% and 15%, the rates are observably low. Only the Niclosamide / Levamisole HCl treated group proved to be effective against *Strongyloides* spp. with an average FECR of 71.43%.

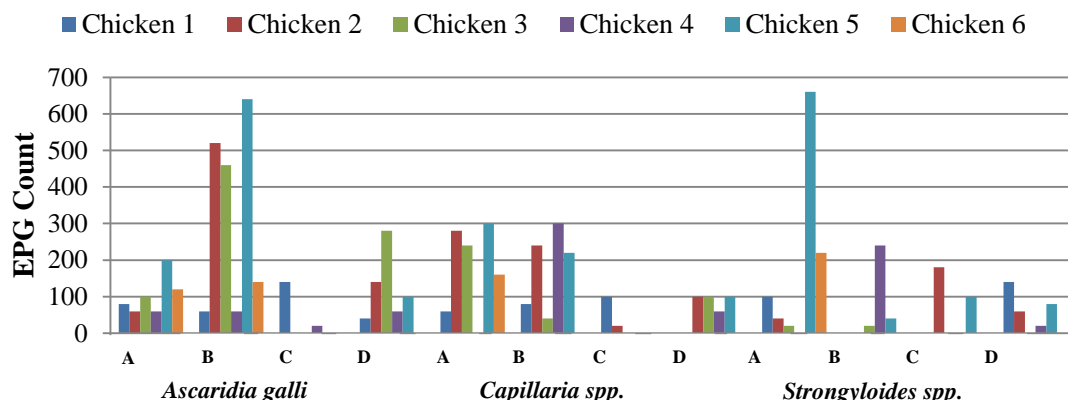
Group C was observed to monitor the susceptibility of the chickens to helminths. The group recorded an average of 40%, 90% and 10% increase in EPG with a total average EPG count of 32, 24 and 56 for *A. galli*, *Capillaria* spp. and *Strongyloides* spp., respectively from their initial worm burden of 0.

The results showed that the Species with the F-value of 1.5, F-criteria of 3.15 and P-value of 0.23 has no significant effect on the results obtained in the study. While the Groups showed significant effect on the results obtained with F-value of 3.92, F-criteria of 2.76 and P-value of 0.01. The result of Group and Species interaction also showed no significant effect

with F-value of 1.9; F-criteria of 2.23 and P-value of 0.08 (see Fig.1). Interpretation of the results obtained from the analysis suggests that the Species and Group and Species interaction does not influence the results obtained in the study. On the contrary the Groups or the Grouping used in the study influences the results obtained.

**TABLE I. Summary of FECR rates of Group A, Group B, Group C and Group D**

Groups	<i>Ascaridia galli</i>				<i>Capillaria</i> spp.				<i>Strongyloides</i> spp.			
	A	B	C	D	A	B	C	D	A	B	C	D
Day 3	68.75	96.30	-20	92.86	30	-30	0	-100	60	50	0	71.43
Day 6	87.5	88.89	0	100	-30	80	0	-300	80	0	0	100
Day 12	93.75	92.59	0	86	100	-30	-80	50	-100	-250	-40	85.71
Day 18	56.25	48.15	-40	0	-10	40	-280	-50	-70	-50	0	28.57
Average	76.56	81.48	-40	69.72	22.5	15	-90	-100	-7.5	-62.5	-10	71.43



**Fig.1. Comparison of the EPG counts of the group and species of helminths**

#### IV. CONCLUSIONS

The experimental trial concluded that the dried powdered leaves of *A. capillaris* has reasonable anthelmintic efficacy against intestinal nematodes of poultry. It can therefore be recommended that further research be embarked on the determination of appropriate dose by testing varied dosage of dried powdered leaves of *A. capillaris*, determine the toxicity level, increase the number of samples, examine the elimination of other helminth species, consider necropsy and histopathologic studies so as to arrive at a higher efficacy value and positive comparable results.

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