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# Potency of Pawpaw (Carica Papaya) Latex as an Anthelmintic in Poultry Production

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**Abstract:** The rationale behind this project was to employ the knowledge of adaptive research in animal health care by conducting field experiments as to the efficacy of a botanical species-*Carica papaya* in eradicating/ checking worm burden in poultry due to the identified limitations against the use of conventional anthelmintics. The research work was carried out with an experimental flock of One hundred and twenty cockerels divided into three treatments A, B, C of 4 replicates with 10 birds per replicate. Oven dried ground latex of pawpaw was the medicament used in treating the birds at 16 weeks following artificial helminth infestation. A week after treatment, faecal analysis/egg count showed 26.9% and 77.8% reduction in Egg per gram (Epg) in Treatment A (treated with 300mg/dose) and Treatment B, (treated with 400mg/dose) respectively while in Treatment C (the Control) the reduction percentage in Epg was-8.33%. From the results obtained, it was confirmed that the anthelmintic potential in *Carica papaya* latex used in the experimental flock was responsible for the varying helminth egg per gram at faecal analysis following medication. Successful reduction in worm-burden was witnessed at dosage of 1200mg i.e. 400mg dose/day.

**Key words:** Anthelmintic · *Carica papaya* · Egg per gram · Latex · Poultry

## INTRODUCTION

Historical background of poultry is an integral part of livestock farming which entails rearing of different classes of birds. Chicken (*Gallus spp.*), duck (*Anas platyrnchos)* muscovies (*Cairina moshata)* guinea fowls (*Numida melearis)* pigeons (*Coluba livia)*, quails (*Coturnixv coturnix)* and turkeys (*Meleagris gallopavo)* epitomize the concept of micro-livestock. The poultry industry has been growing persistently over the years around the globe and that is why, it has witnessed more remarkable developments in the last fifty years more than any other classes of livestock particularly in the areas of nutrition, genetic improvement, disease control, management and organization through dietary requirements in precise terms of energy, amino acids, minerals and vitamins [1] selection and cross-breeding techniques; large scale poultry production and vertical integration respectively [2]. According to the world livestock population statistics of 1987, the population of chicken was estimated as 9.445 billion. The chickens are the most globally recognized of all classed of poultry birds and the FAO source [3] claimed that more than 90% of the world flock consist of chicken. It is unequivocal to say that the poultry enterprises contribute considerably to the livestock industry vis-à-vis agriculture, which hitherto serves as the bedrock of the world economy. The poultry species help meet the protein needs of the poorest people in the world. The meat is widely consumed, in constant demands and an excellent source of protein, minerals as well as the B-complex vitamins with much lower cholesterol and saturated fats. The poultry eggs are also important sources of nutrient.

In spite of the multidimensional benefits derivable from the poultry industry, the importance of diseases in the economics of a poultry farm needs no justification. Disease does indeed affect the profitability of a poultry-breeding enterprise either directly or indirectly [4]. Poultry diseases are caused either by the development of pathogenic agents: virus, bacteria, protozoa, fungi and parasites or by the effects of intrinsic factors: malnutrition, poisoning, climatic or intrinsic stress, body malnutrition and genetic abnormalities [5]. Generally, parasites causing diseases in livestock can be grouped into two broad categories; the external parasites which include ticks, lice mites and fleas and

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the internal parasites which are of three classes-the nematodes (round worms), the cestodes (tapeworms) and the trematodes (the flatworms).

For the purpose of this study, emphasis was laid on the intestinal nematodes of poultry particularly *Ascaridia galli, Heterakis gallinanum, capillaria* spp. and *Ascaridia galli* [6]. Scientific studies have proven that a number of plants used in human athnomedical practice have pharmacological activities and may also be useful as ethno-veterinary remedies [7-10]. Thirteen plant species were used as anthelmintics and nine to combat worm infestation in livestock [11] include *Carica papaya*, *allium satirum, Areca catecha, Ananas comosus, Nicotiana tabacum, Cucurbita moschata* [12]. Among these botanical specie, *Carica papaya,* (pawpaw) may be preferred to others as an ethno-veterinary remedy in this part of the tropics because of its adaptability, agro-ecological considerations and availability. It is against this background that the idea of anthelminth efficacy of *Carica papaya* latex in poultry was advanced.

## MATERIALS AND METHODS

Papain is the powder obtained from pawpaw latex which is the milky juice obtained from unripe pawpaw fruits by making 3-4 incisions (vertically) of about 2mm using a sharp pointed knife/object on each of the selected fruits still intact on the mother plants. On incision of the sharp object, the latex are collected with a crucible and immediately began to coagulate and it can be processed either by solar or oven drying at temperature of 40°C for 14 hrs with the aid of laboratory mortal and pestle, it was ground thus forming a greenish or grey powder known as papain. One hundred and twenty, 10 weeks old cockerels divided into three treatments A, B, C of four replicates of 10 birds per replicate under similar management conditions were used for the study. To ascertain the infestation of helminthes in the flock, an initial faecal sample analysis described by [13] was carried out revealing absence of worm infestation of this flock with intestinal nematodes of poultry by introducing into their feeds (after being made off-feed overnight) faecal materials collected from another laying flock with confirmed high worm infestation through separate faecal sample analysis and within 6 weeks of infestation the birds became heavily infested. By using the pawpaw extract i.e. papain, Treatment A were treated with powder mixed at 20% watery solution by drenching dosage rate of 900mg per birds for 3 days i.e. 300 mg/dose/day/bird. Treatment B birds were treated with higher dosage rate of 1200mg for 3 days and treatment C served as the control, there was no treatment at all. Faecal sample analysis using floatation method as described by [13] was used four times at different stages for the demonstration of helminth eggs and counting the helminth egg population to know the extent of infestation.

## RESULTS AND DISCUSSION

The initial faecal sample analysis indicated that the experimental flock was helminth free even though no previous de-worming. Six weeks following artificial infestation, faecal samples of the three treatments were analysed, eggs counted and identified, the result showed that treatments A, B, C had 1300, 1350 and 1200 egg per gram (Epg) respectively. Eggs of two helminth species were quite evident-*Ascaridia galli and Capillaria spp*. Apart from this, there were signs of diarrhea, depression, anorexia and loss of weight. A week after medication, faecal samples of these groups were collected, analysed and counted for helminth egg population, the outcome revealed the worm burden of A, B, C as 950, 300 and 1300 Epg respectively. It could therefore be deduced that treatment C (the control) still maintain heavy worm infestation, Treatment A, moderate infestation and Treatment B, light infestation. Following the last faecal sample analysis, the results obtained were employed in estimating the reduction percentage of eggs in the three replicates and were 26.9%, 77.7% and-8.33% respectively for treatments A, B and C (Table 1). The confirmed efficacy of the aqueous extract of the seeds of *Carica papaya* against *Oesophagostomum*, *Trichuris* and *Trichostrongylus* have been validated to be over 90% in efficacy [14] and this is related with the present study using Papain as efficacy against *Ascaridia galli and Cappilaria spp* and found to be 77.7% reduction in eggs per gram faeces and this is possible because papain is capable of digesting bacteria and parasitic cells hence its use as an anthelmintics and antibiotics as reviewed by [15]. By graphical representation, the Epg of Treatments A, B and C before medication showed negligible variations but distinct variations were observed in their Epg faeces after medication (Figure 1). From this experiment and the result obtained, it could be established that the latex of *Carica papaya* has certain chemical components that are of high anthelminthic attributes in poultry with satisfactory efficacy at the dosage of 1200mg per bird.

Table 1: Egg per gram (EPG) level of infestation before and after treatment with Papain

| | | | | | Level of worm | |
|---|---|---|---|---|---|---|
| Treatments | Before Treatment | After Treatment | Papain Used (mg) | Percentage Reduction | Before treatment | After treatment |
| A | 1300 | 950 | 900 | 26.9 | Heavy | Moderate |
| B | 1350 | 300 | 1200 | 77.7 | Heavy | Light |
| C | 1250 | 1300 | nil | -8.33 | Heavy | Heavy |
| Average EPG | 1283 | 850 | | | | |

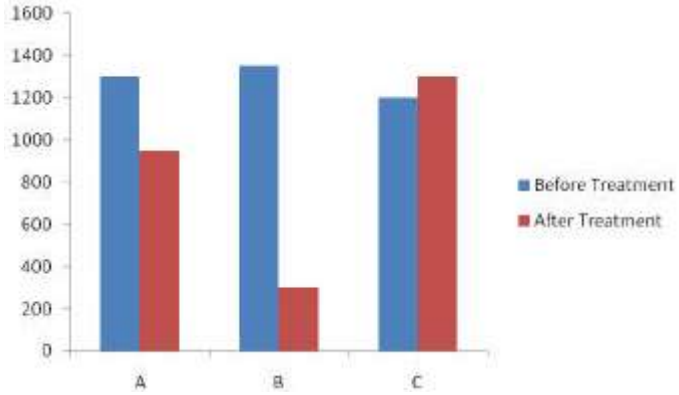


Fig. 1: Comparism of EPG before and after treating with Papain

## CONCLUSION

The trials concluded so far have proved that the latex of *Carica papaya* i.e. papain has reasonable pharmacotherapeutic properties against intestinal nematodes of poultry. It can therefore be recommended that further research be embarked on by the willing veterinary pharmaceutical industries to determine the toxicity level, in-depth study of mechanism of action, determination of therapeutic level and economic viability of the carica papaya latex as a de-worming agent in poultry before adoption for commercial production.

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