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EFFICACY OF IPIL-IPIL (*Leucaena leucocephala*), BETEL NUT (*Areca catechu*) AND PAPAYA (*Carica papaya*) SEEDS AGAINST ROUNDWORMS OF DARAG NATIVE CHICKEN

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ABSTRACT

The study aimed to evaluate the efficacy of ipil-ipil (*Leucaena leucocephala*, Lam. de Wit), betel nut (*Areca catechu* L.), and papaya (*Carica papaya* Linn.) seeds as anthelmintic in Darag native chicken. The study utilized 165 Darag native chickens subjected to a 3 x 3 factorial experiment in Randomized Complete Block Design with three replications. Two factors were considered: (A) the kind of ethnobotanical dewormer (Ipil ipil, Betel nut or Papaya) and (B) the dosages (2 g, 4 g, or 6 g/ kg BW). T- test was used to compare the efficacy with the commercial dewormer. Data on the efficacy of the ethnobotanicals were obtained by getting the percent reduction of egg per gram (EPG) count before the administration of experimental treatments and on the 7th, 14th, 21st, and 28th day post treatment. F-test and Duncan Multiple Range Test interpreted at 5% and 1% levels of significance were used for statistical analysis. Results showed that the ethnobotanical dewormers under study can significantly reduce the EPG count of roundworms of Darag native chickens. A dosage of 6 g/kg BW of the three ethnobotanicals is effective in controlling gastrointestinal helminths. The efficacy of the kind of ethnobotanical is dependent to the dosage on the 21st and 28th day post treatment. The higher the dosage, the more effective is the ethnobotanical. The ipil-ipil, betel nut and papaya seed powder were found to have a comparable percent reduction of EPG count with the commercial dewormer.

Key words: *Areca catechu*, *Carica papaya*, chickens, phytotherapy, round worms

INTRODUCTION

Throughout the tropics and elsewhere, helminths are recognized as a major constraint to livestock production. Among the different types of helminths, nematodes are the most prevalent and most harmful (FAO, 2002). They cause retarded growth, lowered productivity, mortality and high economic losses. Very high prevalence of nematodes in different species of animals has been reported (FAO, 2002). Most of the parasitic control programs (FAO, 2002) are based upon a combination of chemotherapeutic control, grazing management, dietary management, biological control, vaccination and ethno-veterinary medicine treatment.

Ethnobotanical studies reveal that the indigenous knowledge of a community is a key player in the identification of medicinal plants which have been tested by generations of indigenous people. This indigenous knowledge is passed on verbally from one generation to the next and, occasionally within a family, constitutes the basis for traditional bio-prospecting which often leads to new herbal product development. Ethno-pharmacological surveys provide the rationale for selection and scientific investigation of medicinal plants, since some of these indigenous remedies are already used by significant numbers of people over extended periods of time (Lans, 2001). Many botanical

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anthelmintics have been proven to contain natural elements and have been considered cheap sources of anthelmintics to complement the commercially manufactured anti-parasitic drug against internal parasitism (Ozaraga, *et al.*, 2004).

Ipil-ipil (*Leucaena leucocephala*, Lam. de Wit) is a deep-rooted tree with bipinnate leaves, lanceolate leaflets and yellow white flowers in long stalk heads. It is a perennial summer growing plant. The constituents of the seeds and leaves are the following: fat (8.68%), crude fiber (22.59%), nitrogen-free material other than fiber (9.78%), nitrogen (6.42%), water (14.8%), ash (4.2%) and alkaloid (1%), tannin (1-2%), saponin in stem (1%), glucosides in stem (1%). Sixty g per 10 kg BW of ipil-ipil leaves was the most effective dosage in reducing the roundworm EPG of sheep (Ozaraga *et al.*, 1991) and 30 g of powdered ipil-ipil seeds per 50 kg body weight of swine (IIRR, 1994).

The betel nut (*Areca catechu* L.) commonly known as "bunga" has an erect trunk, solitary up to 25 m high and mark with annular scars. Powdered nuts are used as anthelmintic (De Padua *et al.*, 1999). The nuts contain arecoline which is veterinary anthelmintic. Arecoline is an alkaloid and has been shown to have indirect effects on catecholamine levels, while arecaidine and guvacine inhibit gamma-aminobutyric acid (GABA) receptor uptake in micromolar concentrations. The Areca nut comprises approximately 0.2% to 1.7% by weight alkaloid compounds. Of that amount, approximately 40-85% is arecoline, 10 to 40% is arecaidine, and guvacine is 2 to 30%. Other alkaloids present include guvacoline and areaolidine (Meyer Jones *et al.*, 1977). Farmers in the Philippines used 8 –10 mature nuts against liver fluke in cattle (IIRR, 1994). A pinch of powdered *Areca catechu* nuts in the mouth of each matured chicken is given once a day for a week (IIRR, 1994).

Formulated bunga can significantly reduce the liver fluke in goats with 30 g/20 kg BW as the most effective dosage (Ozaraga *et al.*, 2004) and 15 mg of powdered bunga nuts per 50 kg body weight of swine (IIRR, 1994).

Carica papaya Linn. locally known as papaya, is found throughout the Philippines. This plant is used in treating birds with helminth infestation. Papain is the substance that is found in papaya which can reduce helminth infestation in poultry. Anthelmintic property can be obtained for a chicken by feeding 50 papaya seeds. An infusion of dried or fresh leaves can be given as drench to livestock as an anthelmintics (De Padua *et al.*, 1999).

Hence, information on ethnobotanical agents against internal parasite can fill the gap on enhancing the production and utilization of native chickens aside from information on improved management systems, feeding and occurrence of parasites and diseases. The use of ethnobotanicals is vital input to the health programs that aim to control and/ or reduce parasitic diseases affecting free range native chickens.

The general objective of the study was to evaluate the efficacy of ethnobotanicals such as ipil-ipil (*Leucaena leucocephala*) seeds, betel nut (*Areca catechu*) and papaya (*Carica papaya*) seeds as anthelmintics of Darag native chickens. Specifically it aimed to determine the efficacy of the three ethnobotanicals in terms of percent reduction of roundworm EPG count of feces; determine which of the dosages of the three ethnobotanicals is the most effective; determine whether there is an interaction between the kind of ethnobotanical and the dosage in terms of percent reduction of EPG count; compare the efficacy of the use of ethnobotanicals and the commercial dewormer.

METHODOLOGY

One hundred sixty five (165) mature Darag native chickens of both sexes with ages

ranging from 5 to 8 months were used as experimental animals in the study. These birds were equally divided into 11 treatments replicated 3 times having 5 birds per replicate. The 11 treatments include the betel nut at a dosage of 2, 4 or 6 g/kg BW; ipil ipil at a dosage of 2, 4 or 6 g/kg BW; papaya at a dosage of 2, 4 or 6 g/kg BW; un-dewormed native chickens as negative control and commercial dewormer (piperazine) as a positive control. These animals were initially screened for internal parasite so that only those found to be naturally infested with parasites were used in the study. These include the *Ascaridia galli, Capillaria spp* and *Heterakis gallinae*. The average EPG count was determined three days before the administration of the ethnobotanicals at a range of 200 to 600 EPG count. Each fecal sample was examined three times to get the average EPG. Birds were completely confined in assigned pens, each with an area of 1 sq.m. per replicate. The initial weights of the birds were recorded before the administration of ethnobotanicals.

Mature brown ipil-ipil seeds, mature green betel nut and ripe papaya seeds were collected and sun-dried until 14% moisture content. These materials were ground using hammer mill, formulated and packed ready for administration.

A single dose of the ethnobotanical dewormer was mixed with the feeds based on the different treatment combinations. The birds were made to skip one meal in the morning to ensure that all of the given dewormers were consumed. The dosages were based and computed according to the different treatments in grams per kilogram body weight of native chickens.

Data were gathered through fecalysis using the formula:

percent reduction = [(A – B)/ A] X 100

Average pretreatment EPG count was determined three days before the administration and on the 7th, 14th, 21st, and 28th day post treatment. Fecal samples were examined thrice to get the average EPG count per fecal sample.

A 3 x 3 factorial experiment in Randomized Complete Block Design (RCBD) was used in the study having a total of 165 naturally infested experimental birds randomly distributed to eleven treatments, each replicated three times. Randomization was done using the draw-lots scheme.

Efficacy of the best ethnobotanical compared to the commercial dewormer was determined using T-test.

RESULTS AND DISCUSSION

The average percent reduction of roundworms EPG count in Darag native chicken was significantly different among the different treatment combinations. Birds treated with Ipil-ipil seeds at 6g/kg bw gained the highest percent reduction (m= 66.43) which is comparable with the commercial dewormer (m= 60.58) and is also found comparable with betel nut and papaya seeds at a dosage of 6 g/kg bw. (m=60.77, m=60.18), respectively. The mimosine glycoside content of the ipil-ipil may have arrested the dividing cells therefore gradually killing the parasite. The betel nut, which contains the arecoline, inhibited the gamma amino benzoic acid receptors thus causing paralysis of the parasite. The papain content of the papaya seeds removes the cuticle of the gastrointestinal tract of the nematodes which becomes crucial for its survival.

The average percent reduction of roundworms EPG count in Darag native chicken

was significantly different among the different ethnobotanicals tested ($f = 13.88$; $p<0.05$). On the 28th day post treatment, birds treated with ipil-ipil seeds registered the highest percent reduction of 52.80% which has a comparable percent reduction in EPG count in birds treated with commercial dewormer (60.58%). This is followed by birds treated with betel nut (41.48%) which has comparable percent reduction to papaya seeds (40.30%).

Analysis of Variance revealed that the percent reduction in EPG count, was significantly affected by different dosages. The highest percent reduction in EPG count was observed among birds given a dosage of 6 g/kg bw (80.06%) on the 28th day post treatment. This was followed by those birds given a dosage of 4 g/kg bw (48.51%). Birds given 2 g/kg bw had the lowest percent reduction in EPG count (18.81%). This result implies that the efficacy of the different ethnobotanicals is dependent on the dosage given to birds. The higher the dosage, the more effective is the ethnobotanical as dewormer. A dosage of 6 g/kg bw is found to have the highest percent reduction.

There was no significant interaction noted between the kind of ethnobotanicals and dosage on the 7th and 14th day post treatment. This means that the effect of ethnobotanicals on the percent reduction in EPG count was independent on the effect of the dosage. However, there was a significant interaction between the kind of ethnobotanical and the dosage on the 21st and 28th day post treatment. This indicates that the efficacy of the kind of ethnobotanical is dependent to the dosage given to the birds.

Figure shows the percent reduction of EPG count of roundworms of Darag native chicken as affected by the different dosages of ethnobotanicals on a particular day. It shows that the higher the dosage, the higher is the percent reduction of EPG counts. In comparison with the commercial drug, it shows that ipil-ipil, betel nut, and papaya ground seeds were as effective as the commercial dewormer.

Based on the results of this study, it can be concluded that Betel nut, ipil-ipil and papaya seeds can significantly reduce the EPG count of roundworms of Darag native chickens. A dosage of 6 g/kg bw of the three ethnobotanicals is the most effective in controlling roundworms of Darag native chickens. The efficacy of the kind of ethnobotanical is dependent on the dosage. The higher the dosage, the more effective is the ethnobotanical. The betel nut, ipil-ipil and papaya seed powder were found to have a comparable percent reduction of EPG count with the commercial dewormer.

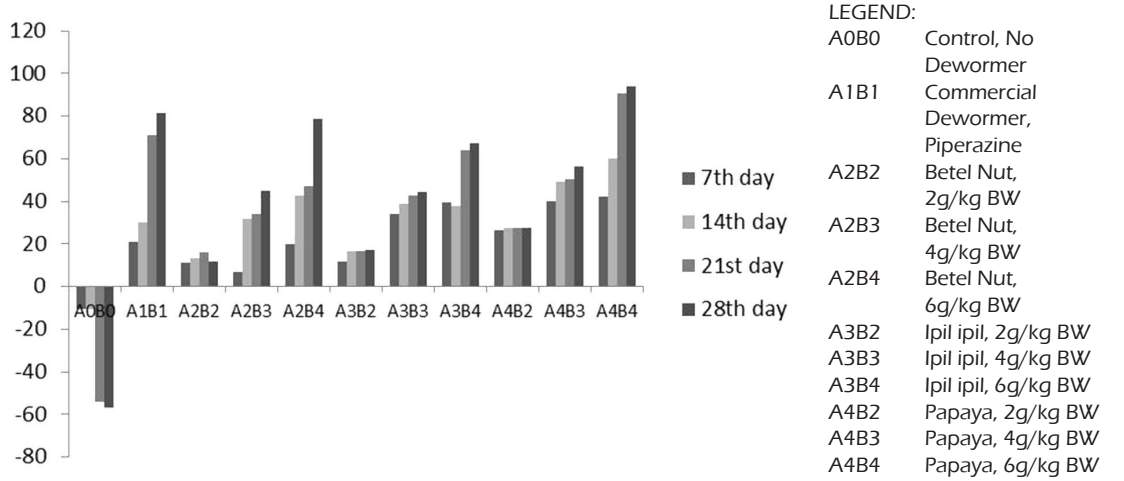

Fig. Average percent reduction of roundworms egg per gram count as affected by the different dosages of ethnobotanical dewormer.

It is recommended that the farmers and native chicken raisers should be encouraged to use ethnobotanicals such as ipil-ipil, betel nut and papaya seeds as dewormer to control internal parasitism and prevent anthelmintic resistance; and that ethnobotanicals should be administered every month to completely reduce the roundworms of Darag native chickens and avoid pasture contamination thus promote faster growth and performance.

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