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Anthelmintic Effects of Processed Mature Betel Nut as Dewormer to Native Chicken and Small Ruminants (Sheep And Goats)

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Abstract - This study was conducted from September 1, 2006 to December 10, 2006 covering a period of 3 months at the College of Agriculture, WMSU-Dumingag Campus. It aimed to determine the anthelmentic effects of processed matured betel nut (Areca catechu) and commercial dewormer to native chicken, sheep and goats. The study consisted of four treatments: for chicken; treatment I, administered with 1g powdered betel nut per 1 kg body weight; treatment II, administered with 2 grams powdered betel nut per 1 kg body weight; treatment III, administered with 3 grams powdered betel nut per 1 kg body weight; and treatment IV, administered with commercial dewormer, mebendazole niclosamide. Results reveal that after thorough laboratory examination of feces, round worms, tapeworms and parasite eggs were expelled by the processed matured betel nut. Among the treatments used, treatment I, is the most effective. However, those administered with 2 and 3 grams of powdered betel nut is also effective but the chickens

showed unhealthy condition. Among goats and sheeps; treatment I, administered with 20g/20kg.BW; treatment II, administered with 30g/20kgLW; treatment III, administered with 40g/20kgLW; and treatment IV, administered with 1 ml/10 kgBW using albendazole, a commercial dewormer. Results revealed that processed native betel nut can expel eggs and adult parasites like roundworms and tapeworms, while commercial dewormer can expel only roundworms. Among levels of powdered betel nut used, treatment II, 30g/20kgBW showed better result.

Keywords - Anthelmintic effects, betel nut, dewormer, native chicken, goat, sheep

INTRODUCTION

Betel nut (supari) is a fruit of a tall, graceful asiatic betel palm, Areca catechu, chewed with lime and PAN (betel leaf). The tree is slender, erect up to 30 meters tall with a smooth trunk and a crown of large pinnate leaves 1-2 cm long, orange coloured when ripe, with hard fibrous endocarp and a single seed, commonly called a nut.

The Philippines and the Nicobar Island have been known as the centers of origin of betel nut. Various types have been described differing in size and shape of the fruits. The tree is very sensitive to drought and in areas with less than 1250 mm of rainfall per annum.

Handsome tree of the palm family with a single, slender stem, growing up to 25 meters or more. Male and female flowers appear on the same tree; male flowers are less numerous and located on the lower part of the flowering stalk. The fruits are conical, about 2 to 2.5 inches long with a flattened base, orange to red in color with a soft and fibrous outer covering over a hard seed which is mottled brown in color. The see is mostly known as a narcotic used by certain natives. It is cut into narrow pieces and rolled up inside a betel (piper betle) leaf, rubbed with lime and chewed.

New technology arises to resolve the problem of poultry and livestock raisers particularly infestation of internal parasites of their

chicken. Betel nut which is abundant in many communities can be a good substitute to commercial dewormers as experimented by many researchers. In this study, the researcher will try to find out whether the different methods of processing betel nut will be an effective dewormer to poultry and livestock.

FRAMEWORK

Encyclopedia Americana, (1988:626) revealed that betel nut, the seed of the betel palm (areca catechu), which is chewed as a stimulant throughout southern Asia. The betel nut is about 2 inches (5cm) long and is mottled brown and gray in color. The ripened seeds are gathered between August and November, boiled in water, cut into slices, and dried in the sun, giving them a dark brown or reddish color. Each dried nut is then wrapped, together with a piece of shell lime, in a leaf of the betel pepper and chewed.

Betel nuts contain the alkaloid arecoline a mild stimulant that produces a feeling of well being. They are not habit forming, but habitual chewing of betel nuts eventually blackens the teeth and may cause them to decay. In some parts of the Orient, betel nuts are used to destroy intestinal worms. Elsewhere, they are used as dewormer in veterinary medicine.

In an internet, Tripod.com/betelnut.htm, it is mentioned that betel nut has medicinal uses: astringent, stimulant laxative, diuretic, acid, bitter, mildly toxic; also relieves hunger and abdominal discomfort due to bloating and flautence due to constipation. It kills intestinal parasites (tapeworms, roundworms, pinworms, body flukes). Both the extract of the seed and decoction show 100% cure for pork tapeworm and a 94.1% cure in 120 cases of cestodiasis. In case of faslolopsis buski, a single dose was effective for 54.7%, while 3 successive doses cured 98.4%.

It has medical action and uses, the leaves are stimulant antiseptic and sialogogue; the oil is an active local stimulant used in the treatment of respiratory catarrhas as a local application or gargle, also as an stimulant in diphtheria. In India the leaves are used as mamary glands absesses. The juice of 4 leaves is equivalent in power to one drop of oil.

Betarmos (2002:8) in his undergraduate thesis stated that betel nut could be suitable to native chicken using 2 grams per kilogram body

weight. Betel nut is also a good alternative dewormer for tapeworm only.

He further revealed that commercial and herbal medicine are very effective by using 2 grams betel nut and one caplet of piperazine plus niclosamide in deworming native chicken but using betel nut is more economical.

Calma and Parami (2003:07) revealed that the betel nut is commonly cultivated throughout the country. The nut is emmenagogue, purgative, the young ones make very effective laxative, mature seeds are vermifuge, good for urinary disorder, and is reported to have aphrodisiac properties. It is used in Tincture forms as an astringent gargle for mouth sores. Fresh areca nut is sometimes intoxicating to some persons. Powdered nuts are used as anthelmintic, antiseptic, alkaloids abundant in the kernel and leaves, traces of amygdaline in leaves.

PCCARD as cited by Ramon V. Valmayor, stateed that besides roundworm (Ascaris and Heterakis), tapeworm is a common parasite of poultry. Tapeworm infection could be a serious problem specially if the birds are allowed free on the range as normally practiced in small animal production systems. However, it has been observed, although not properly documented among fighting cock owners, that the betel nut (Areca catechu L.) can expel tapeworms. Saraspe, E.B et al. (UPV, Mangao, Iloilo), stated that in preparing the natural parasiticide into powder formulation, the researchers used green fruits of bunga and the vines of makabuhay. The plant materials were chopped into small pieces, dried, and then ground using a hammer mill. Dextrose powder was added to the ground plant materials to improved the taste and act as a preservative.

The powder formulation of bunga was brownish red and it had 5.28 pH and moisture content of 7.2. Makabuhay had pH of 5.36, moisture content of 5.8, and was greenish brown. Both powder formulations had pleasant smell. Researchers states further that these natural dewormers are relatively cheaper than commercial anthelmintics. The computed cost of formulated bunga parasiticide was P155.49/kg. On the other hand, the price of commercial dewormer (triclabendazole) is very prohibitive (P6,600.00/liter, 2003 price) while tetramizole is P26.00 per 500mg tablet. At the dose of 30g/20 kg BW, the cost involved was only

P4.66. This amount is about one-third the amount if triclabendazone is used at a dose of 2 ml/20 kg BW (P13.20), or less than one-fifth the cost of tetramisole (P26.00 per 500 mg tablet). The cost can still be reduced if plant materials are obtained in the locality and the farmers are the ones who prepare the formulations themselves.

Estimates show that more than 300 million cattle, buffaloes, sheep, goats, pigs, and horses worldwide are infected with liver fluke causing significant economic losses of $ 3 billion yearly. Locally, it was reported in 2001 that liver flukes were responsible for 361 deaths and 12,008 cases in carabaos, 215 deaths and 8,994 cases in cattle, and 267 deaths and 5,252 in goats and sheep. According to Seraste et al, as a dewormer against liver fluke in goats, bunga was effective when given at a dose of 30g/20 kg body weight (BW). The researcher noted that at these doses, bunga and makabuhay had comparable effects with those of commercial anthelmintics in reducing the liver fluke egg per gram counts. As such , the researchers concluded that bunga and makabuhay are practical, good substitutes for expensive commercial dewormers.

OBJECTIVES OF THE STUDY

This study endeavored to determine the effects of processed mature betel nut as dewormer to livestock and poultry. Specifically, the study aimed to describe the efficacy of processed mature betel nut to small ruminants and chicken, as well as to identify what specific parasites will be expelled.

MATERIALS AND METHODS

Materials

The following materials were used in this study:

1. 16 heads of native chickens, 12 heads goat and 12 heads sheep
2. Matured betel nut processed into powder
3. Grinder
4. Cellophane
5. Mortar and pestle
6. Record book
7. Camera
13. Microscope
14. Cover slides
15. Glass slides
16. Plastic tape
17. Tissue paper

8. Drinking glass
9. Plastic container
10. Alcohol
11. Vials
12. Saline solution
18. Puller/picker
19. Face mask
20. Ice chest

Methods

Gathering and Collection of Betel nut. Fresh native mature betel nut was gathered from different places in the Municipality of Dumingag, Zamboanga del Sur. The same variety of betel nut was used in this study.

Removing the Fresh Betel Nut. The fresh betel nut fruit was cut into halves and the meat of the nut was separated from the shell by using knife or teaspoon and was placed in a clean container.

Oven-drying the Meat of the Betel Nut. The fresh nut was oven-dried using an electric drier by setting the temperature at 100oC for thirty minutes or until the nut was fully dried ready for milling or grinding.

Grinding the Dried Meat of the Betel Nut. As soon as the meat of the nut was fully dried, it was milled or ground into powder using a manual grinder until it turned into powder.

Source of the Stock. Native Chicken freely ranged in the backyard was used in this study. Experimental Goats and sheep from the small ruminants project of the school were also used. They were examined if they are positive of internal parasites through fecal analysis using floatation method. Animals that were found positive of parasites were placed in the cage three days before the administration of processed betel nut.

Weighing the Animals. The experimental animals were weighed individually to determine the amount of powdered nut given.

Administration of Processed Betel Nut to the Animals. Experimental animals were orally administered with processed mature betel nut buy drenching in goat and sheep while chicken were administered by wrapping the powdered nut with tissue paper.

Collection of Feces. Animals were properly observed after the administration of dewormer. Feces excreted were immediately collected and examined. Adult parasites were placed in the labeled vials for proper identification.

Determination of Anthelmintic Effects. Anthelmintic effects were determined through fecal examination. The parasites expelled were counted to determine which treatment is more effective in deworming.

Classification of Parasites. Collected parasites were identified as gastro-intestinal parasites further classified as Nematodes (roundworms), Cestodes (tapeworms), and Trematodes.

Data Gathered. The data gathered are as follows:

For Goat and Sheep:

1. Frequency counts of parasites' eggs before the administration of the powdered nut
2. Frequency counts of internal parasites' eggs 3 days after the administration of powdered nut
3. Efficacy of different processed mature betel nut
4. Frequency counts of adult parasites expelled per lot after administration
5. Costs and return analysis

For chicken:

Frequency counts of adult parasites expelled per lot

2. Frequency counts of parasites' eggs expelled before and after administration of different processed mature betel nut

Time and Place of the Study

This study was conducted from October 1, 2006 to December 10, 2006 at the College of Agriculture, WMSU-Dumingag Campus, Dumingag, Zamboanga del Sur.

RESULTS AND DISCUSSION

Table 1 shows the frequency counts of internal parasites before administering the processed powdered betel nuts. The examination showed that all experimental animals were severely affected with internal parasites like roundworms, tapeworms and flukes due to the number of eggs present.

Occurrence of roundworm parasites got the highest total of 329 eggs, which was followed by the fluke parasites with a total of 130

and the last was the occurrence of tapeworm eggs with a total of 68 in goats while sheep got a total of 583 roundworms and 680 flukes. The table shows that occurrence of internal parasite eggs were many just because the experimental animals did not undergo deworming.

Table 1. Frequency counts of internal parasites' eggs before the administration of the powdered betel nut

Treatments	Roundworms		Tapeworms		Flukes	
	Sheep	Goat	Sheep	Goat	Sheep	Goat
T1-20g/20kgbw	100	90	0	30	232	3
T2-30g/20kgbw	234	72	1	37	100	29
T3-40g/20kgbw	12	75	0	0	68	19
T4-1ml/10kgbw	237	92	0	1	193	79
Total	583	329	1	68	680	130

After deworming, the feces of the animals were collected and examine by floatation technique to determine the parasite's eggs expelled.

Table shows the frequency counts of internal parasite eggs after three days of administration of processed betel nut in goats. Eggs of the fluke parasites obtained the highest total of 843 eggs, followed by the roundworms eggs with a total of 212 tapeworms eggs. While in sheep, many of roundworm eggs expelled compared to flukes and tapeworm parasites with a total of 343, 221 and 13 eggs respectively. All experimental animals were severely positive of internal parasites as shown in the result of the examination. The result of the reducing number of eggs expelled is due to the administration of processed powdered betel. Adult parasites were expelled and production of parasite eggs was stop.

Table 2. Frequency counts of internal parasites' eggs 3 days after administration of processed powered betel nut

Treatments	Roundworms		Tapeworms		Flukes	
	Sheep	Goat	Sheep	Goat	Sheep	Goat
T1-20g/20kgbw	93	39	0	6	105	179
T2-30g/20kgbw	44	32	4	0	0	20
T3-40g/20kgbw	153	129	9	94	59	351
T4-1ml/10kgbw	53	12	0	0	57	106
Total	343	212	13	100	221	843

Table 3. Efficacy of processed mature betel nut

Treatments	Roundworms		Tapeworms		Total	
	Sheep	Goat	Sheep	Goat	Sheep	Goat
T1-20g/20kgbw	**3**	13	**0**	5	**3**	18
T2-30g/20kgbw	**2**	22	**2**	8	**4**	30
T3-40g/20kgbw	**2**	1	**1**	7	**3**	8
T4-1ml/10kgbw	**31**	77	**3**	0	**34**	77
Total	**38**	**113**	**6**	**20**	**44**	**133**

This table shows the efficacy of the different processed mature betel nut. Commercial dewormer obtained the highest number of parasites expelled with a total of 34 parasites followed by T2, 30g/20 kgBW with a total of 4 parasites, then T1, 20g/kgBW and T3, 40g/kgBW with only 3 parasites. Commercial dewormer, albendazole is more effective than betel nut. While in goat commercial dewormer got the highest number of parasites expelled followed by T2, T1 and T3 with a total number of 77, 30 and 18 parasites respectively. Nevertheless, the dosage of 30g/20kgBW ranks second to the commercial dewormer.

Table 4a. Frequency counts of adult parasites expelled per lot after administration in sheep

Classification of Parasites	LOTS					Total
	20g/20kg bw	30g/20kg bw	40g/20kg bw	Valbazine 1m/10kgbw	Fresh Betel nut	
Roundwors	0	0	0	0	0	0
Pinworms	3	2	2	31	0	38
Tapeworms	0	2	1	3	0	6
Flukes	0	0	0	0	0	0
Total	3	4	3	34	0	44

Table IVa shows the frequency counts of adult parasites expelled per lot after administration. Treatment V, administered with fresh betel nut, had no parasites expelled. Treatment IV, administered with commercial dewormer Valbazine got the highest number of pinworms with 31 and 3 tapeworms. Treatment I, administered with 20g/20kgbw, expelled only 3 pinworms. Treatments II and III had only 2 pinworms expelled.

Table 4b. Frequency count of adult parasites expelled per lot after administration (Goat)

Classification of Parasites	LOTS				Total
	20g/20kgbw	30g/20kgbw	40g/20kgbw	CD 1m/10kgbw	
Roundworms	11	17	0	0	28
Pinworms	2	5	1	77	85
Tapeworms	5	8	7	0	20
Flukes	0	0	0	0	0
Total	18	30	8	77	133

Table 4b shows the frequency count of adult parasites expelled per lot after administration of processed powdered betel nut. After the examination of the individual feces, Lot II, 30g/20kgBW, got the highest count of adult parasites expelled with a total of 30 parasites, followed by Lot I, 18 parasites and the last is Lot III, had 8 parasites

expelled. These three lots expelled adult tapeworms, roundworms, and pinworms.

The control shows the highest total number of 77 parasites compared to three different lots due to the effectiveness of the commercial dewormer, but only pin worms were expelled. It goes to show that albendazole a commercial dewormer is only effective to pinworms.

Chicken

Table 1. Frequency counts of internal parasites' eggs before the administration of powered betel nut

Classification of Parasites	TREATMENTS				
	I 1G	II 2G	III 3G	IV CD	Total
Ascaridia galli	17	68	17	82	184
Amaeboaenia shenoids	0	1	0	0	1
Capillaria annulata	24	1	5	91	121
Davainea prolottina	0	17	15	0	32
Heterakis Galliae	72	61	8	39	180
Prosthogonimus Sp	42	0	1	0	43
Raillietina tetragona	0	11	0	0	11
Suburula brumpti	0	3	0	0	3
TOTAL	155	162	46	212	575

The feces of the experimental birds were examined before the dewormer was administered to ascertain that the birds used are really infested with internal parasites. During the fecal examination only eggs were seen and the frequency counts are reflected in Table 1.

As reflected in this table, all of the sample feces from each of the treatments were infested with internal parasites hence, the birds used in this study are recommendable for deworming.

Table 2. Frequency counts of internal parasites' eggs 3 days after the administration of powdered betel nut

Classification of parasites	Frequency Counts				
	I 1g/kgbw	II 2g/kgbw	III 3g/kgbw	IV CD	Total
Ascaridia galli	5	16	6	2	29
Amaeboaenia shenoids	0	0	0	0	0
Capillaria annulata	0	0	1	0	1
Davainea Prolottina	0	1	1	0	2
Heterakis Galliae	1	8	3	3	15
Prosthogonimus Sp	3	0	0	0	3
Raillietina Tetragona	0	3	0	0	3
Suburula brumpti	0	0	0	0	0
TOTAL	9	28	11	5	53

Three days after the administration of the powdered betel nut and commercial dewormer, the feces were again examined. The eggs were counted separately from the adult. The frequency counts of the eggs are shown in Table 2.

The data show that the eggs expelled after the deworming is fewer than when it was not yet dewormed. So far the grand total number of eggs counted only reached to 53. This result indicates that one effect of dewormer is melting the eggs of the parasites because they were no longer visible during the fecal examination after the administration of dewormer.

Table 3. Frequency counts of adult parasites expelled as influenced by different levels of processed mature betel nut to chicken

Treatment (Processed betel nut)	Number of Parasites Expelled		Total
	Roundworms	Tapeworms	
Treatment I - 1 gram/kgbw	11	62	73
Treatment II - 2 grams/kgbw	9	26	25
Treatment III - 3 grams/kgbw	7	23	20
Treatment IV – Commercial Dewormer	2	0	2
Total	29	111	140
Mean	7.25	27.75	35

Table 3 shows the frequency counts of the different adult parasites expelled after deworming with processed betel nut administered at different levels. As examined only roundworm and tapeworm were expelled. As shown in this table, Treatment 1 expelled 62 tapeworms and 11 roundworms. This was followed by Treatment 2 with 26 tapeworm and 9 roundworms, then Treatment 3 with 23 tapeworm and 7 roundworm. The commercial dewormer only expelled 2 roundworms.

This table shows that betel nut is more efficient in expelling tapeworm than roundworm, more effective than commercial dewormer. These findings parallel the result of Betarmos' study using fresh betel nut. This result indicates that betel nut whether fresh or processed is a good dewormer for chicken.

Table 4. Frequency count of adult parasites expelled per lot after administration of processed betel nut

Classification of Parasites	TREATMENTS				Total
	I 1g/kgbw	II 2g/kgbw	III 3g/kgbw	IV Commercial Dewormer	
Roundworms	11	9	7	2	29
Tapeworms	62	26	23	0	111
Total	73	35	30	2	140
Mean	36.5	17.5	15	1	70

Table IV shows the frequent occurrence of adult parasites being expelled by the different treatments. Treatment I administered with 1g/kgbw powdered betel nut expelled the highest number of adult parasites followed by Treatment II, III and IV respectively.

This figure shows that among the different dosages used, T1- using 1g/kgbw is the most effective and showed no salivation to chicken compared to higher dosage.

The results of this study would help improve the economic status of the farmers due to the following reasons:

Improve the quality and quantity of animal production through the use of betel nut, since parasitism is one of the major problems in backyard animal raising especially small ruminants and poultry.

Minimize the cost of commercial dewormer because betel nut is locally available and consider as cost free dewormer.

Increase animal production.

It is very easy to process and administer.

CONCLUSIONS

From the findings and result of the study, it is concluded that processed mature betel nut possessed anthelmintic effects to chicken and the dosage of 1 gram per kilogram body weight is effective in expelling roundworm and tapeworm.

In goat and sheep, the use of 30g/kilogram body weight is effective in expelling eggs and adults of roundworms while commercial dewormer albendazole expelled only adult roundworms. Based on the findings of the study, it is concluded that processed matured betel nut is effective in expelling parasite eggs while valbazen, a commercial dewormer, is effective in expelling adult parasites.

RECOMMENDATIONS

Based on the results of the study, the following are hereby recommended.

1. Processed mature betel nut as herbal medicine is very effective alternative to commercial dewormer to chicken.

2. A dose of 30g/20kgBW processed betel nut is safe and effective dewormer to goats and sheep.

3. Similar study may be conducted to large animals using the same dosage and other poultry species.

4. Another study may be conducted placing the powdered betel nut in a capsule or making it in a pellet form for easy administration.

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