International Journal of Pharmaceutical and Bio-Medical Science

ISSN(print): 2767-827X, ISSN(online): 2767-830X

Volume 03 Issue 05 May 2023

Page No: 185-190

DOI: https://doi.org/10.47191/ijpbms/v3-i5-03, Impact Factor: 6.858

A Trial of Antiparasitic Activity of *Carica Papaya Seeds Extract* on Gastrointestinal Parasites in Aulacodes (Thryonomys Swinderianus)

Lanan Wassy SOROMOU[1], Germaine Millimono, Maxime Lamah[2], Pé 2 GOUMOU, Mamadou Fodé CAMARA[3], Alpha Ibrahima DIALLO[4]

[1]Department of Applied Biology, University of Labé, 210 Labé, Republic of Guinea

[2]Institute of Science and Veterinary Medicine, 09 Dalaba, Republic of Guinea

[3]Centre for Research and Extension of Aulacodiculture of Tanènè (Guinea)

ABSTRACT

Medicinal plants are nowadays sought after for their benefits. The main objective of this study was to test the efficacy of papaya (*Carica papaya*) seeds against parasites of the digestive tract of aulacodes in order to contribute to the improvement of the sanitary conditions of the animals in the farms. To achieve this objective, a cross-sectional survey was conducted.

No data on previous studies on the antiparasitic effects of *Caricapapaya* seeds on aulacods in the study area were found in the archives of the veterinary services.The survey of animal keepers showed that some farmers use *Caricapapaya* seeds as an antiparasitic in different doses, although their therapeutic effect has not been scientifically proven. The clinical examination revealed a suspicion of diseases based on the observed clinical signs. Mac Master's quantitative method showed that the farms are infested with coccidia, trichuriasis and strongyles. In aulacods, the aqueous extract of *Caricapapaya* seeds resulted in a reduction of more than 75% of the detected parasites.

KEYWORDS: *caricapapaya,* gastrointestinal parasites, aulacodes

ARTICLE DETAILS

Published On:
08 May 2023

Available on:
https://ijpbms.com/

INTRODUCTION

The breeding of aulacodes is a means of conserving biodiversity and is one of the solutions to the problem of protein malnutrition faced by our populations.

This increasingly important activity is likely to be affected by various parameters, among which are the parasitic diseases that cause a serious problem and a huge economic loss to the animal industry in Africa [1]. Globally, it is estimated that approximately $3 million is lost each year due to the infection of 500 million animals [2].

In Guinea, the majority of preventive and curative veterinary products are imported and are less accessible due to their high cost, which leads aulacod farmers to resort to other alternatives, such as the use of medicinal plant-based products. All these practices are carried out without the support of specialised services.

Thus, medicinal plants in general and caricapapaya *seeds* in particular are sought after for their benefits. The papaya tree, *Caricapapaya*, is a medicinal plant. Its latex containing papain is known for its anthelmintic and healing properties. The seeds of its fruits have been used to treat amoebiasis, human verminosis and avian ascariasis [3].

Research has shown that various preparations of papaya seeds (*Carica papaya*) can effectively kill helminths. In chickens, an aqueous decoction of papaya seeds resulted in a 40-65% reduction in *Eimeria sp.* [4]. These results led us, in view of health problems, to investigate the effectiveness of papaya seed on gastrointestinal parasites of farmed aulacods at the Centre for Research and Vulgarization of Aulacodiculture of Tanènè (Guinea).

The objective of this study is to investigate the efficacy of Caricapapayac pawpaw seeds *against* parasites of the digestive tract of aulacodes in order to contribute to the improvement of sanitary conditions on the farms.

2- MATERIALS AND METHODS

2-1-Materials

2-1-1-Study area

This study took place in the Centre for Research and Vulgarization of Aulacodiculture of Tanènè (Guinea). The study area is located in the prefecture of Dubréka with its sub-Guinean climate characterized by the alternation of two (2) distinct seasons with a regular regime, a dry season from November to April and a rainy season from May to October. The highest rainfall in 2011 was recorded in December (1613.3mm in 29 days) and the lowest in August (6.5mm in 1 day). The highest relative humidity was 86% in december and the lowest was 59% in august 2011. The annual average recorded was 72.5%. The flora is largely mangrove. The herbaceous vegetation contains some forage species: *Panicum maximum* (Jacques), *Pennisetum purpureum* (Shum), *Rottboelia exaltata, Imperata cylindrica*, etc.

2-1-2-Animal Material

The study included 30 aulacodes reared at the research centre without exclusion of species, sex or age. The foodstuffs consumed by the animals in both the fresh and dry state were plants and seeds of wild grasses, herbaceous and seed legumes, roots, tubers and vegetable wastes.

2-2-Methods

2-2-1-Preparation of plant material

The plant material studied included seeds of the species *Carica papaya*. The plant was authenticated using the key "African medicinal herbs" by Pousset J.L 1988 [5]. After harvesting the plant material, the *Carica papaya* seeds were collected in their fresh mucilage and dried in the shade for 2 months. They were pulverised and sieved to a powder (500g). Then 100mg were taken and decocted in a mixture of 1 litre of water at room temperature and protected from light until a precipitate was formed. The mixture is then filtered on a filter paper, this operation is repeated 3 times to remove impurities, then submitted to an organoleptic examination (tasting and sensory analysis). The aqueous extract is used immediately in drinking water.

2-2-2- Constitution of the groups

A total of 30 aulacodes were divided into batches (T0=6, T1=8, T2=8 and T3=8) that were sufficiently homogeneous with regard to parasite species and infestation levels in terms of eggs per gram of faeces.

2-2-3-Clinical examination of subjects

The clinical parameter focused on assessing the general condition of the animals through close observation. The aim was to direct the aetiological diagnosis and to detect evocative anomalies from the clinical symptoms observed. It focused particularly on observation of the general condition, examination of the natural orifices and palpation. Thus, each animal has a specific individual health card on which the information for the species concerned is recorded.

2-2-4-Laboratory examination

After macroscopic examination, samples were taken and faeces were collected daily. Thus, early in the morning, all cages were cleaned in order to remove faeces from the previous day according to the technique of Amany (1978) [6]. The freshly deposited droppings of the aulacods are collected by hand from several places in the cage and put into numbered boxes according to the holdings. Each sample is given an identification number before being placed in the cooler for transport to the laboratory.

Animals exposed to natural infestation and administered the product of interest were pre- and post-treatment coprologically analysed by enrichment, flotation and the McMaster method. The number of eggs per gram of faeces (EPG) was determined using the McMaster technique with a NaCl solution of density 1.

2-2-5-Processing of batches

The control lot T0 received only distilled water (0.2 ml) and lots T1 and T2 were treated for three days successively with 100mg/kg and 200mg/kg PV respectively; the last lot (T3) was treated with Levalap 100mg/kg PV.

2-2-6-Analysis of the data

The effectiveness of the treatment was evaluated according to the parasite load and the average egg reduction rate per gram of faeces (OPG).

2-2-6-1- Determination of the parasitic content

It is the number of positive samples during the period under review, expressed as a percentage of the number of samples tested.

$$CP = \frac{Xp}{Xt} \times 100$$

Where:
CP= Parasite load
XP= Number of positive samples ;
XT= Number of analysed samples.

2-2-6-2-Determination of the number of Eggs per gram of faeces (OPG)

o obtain the equivalent number of eggs in one (1) gram of faeces, we multiplied the number of eggs in one cell by 200 or the sum of the eggs in both cells by 100.

OPG = (n1+n2)/2 x 100

Where: n1 = number of eggs counted in cell 1
n2= number of eggs counted in cell 2.

2-2-6-3-Analysis of reduction rates and efficiency rates

The treatment efficacy was assessed in terms of reduction in the number of parasite eggs present per gram (epg) of faeces calculated for each batch (T0, T1, T2 and T3) and in terms of the rate of efficacy of T2 compared to T0 using the formula :

$$\text{Reduction rate} = \frac{\text{epg pretreatment} - \text{epg post treatment}}{\text{epg pretreatment}} \times 100$$

$$\text{Effectiveness rate} = (1 - \frac{\text{T2 post treatment} - \text{TO pretreatment}}{\text{epg pretreatment}}) \times 100$$

3-RESULTS

3-1- Results of the experimental scheme

In order to reduce the water content of the plant, after harvesting, a drying process was carried out and the results are shown in Table 1.

Table 1. Results of the lost water content

Designation	Weight (g)	Lost moisture rate
Fresh weight	2213	
		77,4%
Dry weight	500	

3-2- Results of the clinical examination

The results of the clinical examination are shown in Table 2.

Table 2. Results of the clinical examination

Species	Number of animals examined	Number of animals suspected	Rate of suspicion (%)	Observed symptoms	Suspected diseases
Thryonomys swinderianus	30	07	23,33	Wilted hair, emaciation, prostration, paleness of the mucous membranes, moderate diarrhea	Coccidiosis Strongylosis Ascaridiosis

3-3-Results of macroscopic examination (Table 3)

Table 3. Results of general characteristics of dung observed with the naked eye.

Species	Physical assessment		
	Colour	Consistency	General characteristics
Thryonomys swinderianus	Dark and greenish	Soft, pasty, medium, hard	Presence of blood, mucus and food debris

3-4-Results of the laboratory examination (Tables 4 and 5 and Figures 2 and 3)

Table 4. Overall results of pre-treatment analyses of experimental aulacodes (qualitative coprology)

Number of samples analyzed	Number of positive samples	Rate of positivity (%)	Observation
30	14	46,66	Coccidia oocysts Trichurus eggs Strongle eggs

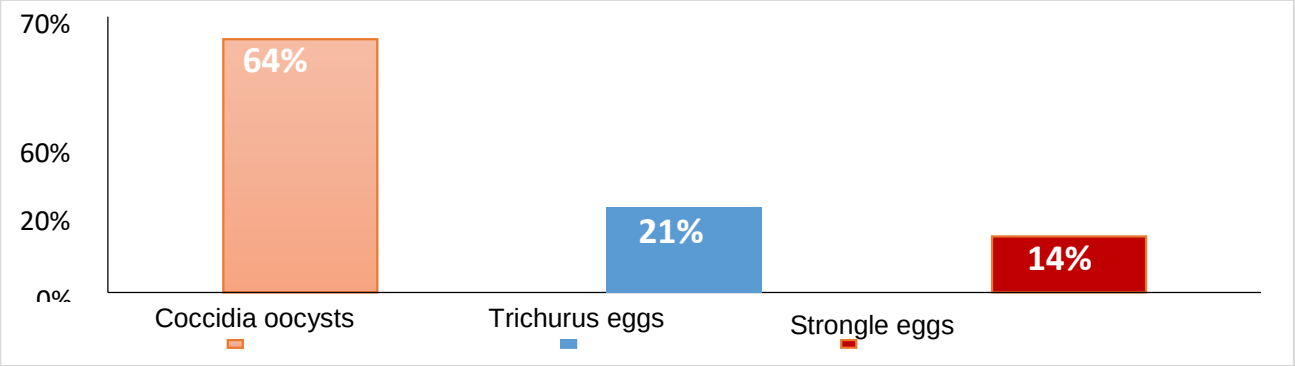

Figure 2: Observation frequency of parasitic components

Table 5. The results of pre-treatment analysis (quantitative coprology using the Mac Master method)

Lots	Number of samples analyzed	Number of samples positive	OPG by pest species		
			Eimeria sp	Trichuris sp	Strongylus sp
T0	06	03	4000	300	200
T1	08	04	3500	400	250
T2	08	04	3500	200	100
T3	08	03	2000	300	150
TOTAL	30	14	12000	1200	700

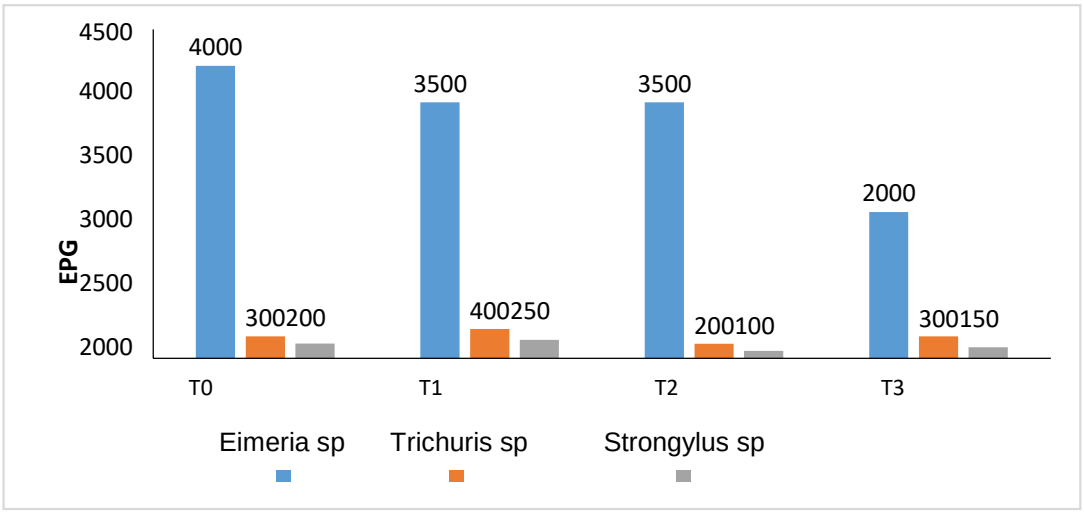

Figure 3. Number of eggs and oocysts per batch before treatment

3-5-Processing results

The subjects were treated with different doses. The results are shown in Table 6.

Table 6. The results of treatments

Animal lots	Number of subjects subject to the treatment	Treatment regimen	Number of recovered animals	Level of negativity (%)
T0	06	-	00	00
T1	08	100mg/kg of the extract for 3 days	03	37,5
T2	08	200mg/kg for 3 days	06	75
T3	08	100mg/kg of Levalap for 3 days	05	62,5

3-6- The results of the laboratory examination after treatment

In order to confirm the anti-parasitic effect of the product on the subjects, a post treatment laboratory was carried out (see Table 7 and Figure 4).

Table 7. The results of the laboratory examination after treatment (Quantitative coprology using the MacMaster method)

Lots	Number of samples analyzed	Number of positive samples	EPG by parasite species		
			Eimeria sp	Trichuris sp	Strongylus sp
T0	06	03	6000	500	450
T1	08	04	800	100	50
T2	08	04	300	00	00
T3	08	03	400	50	00
TOTAL	30	14	7100	650	500

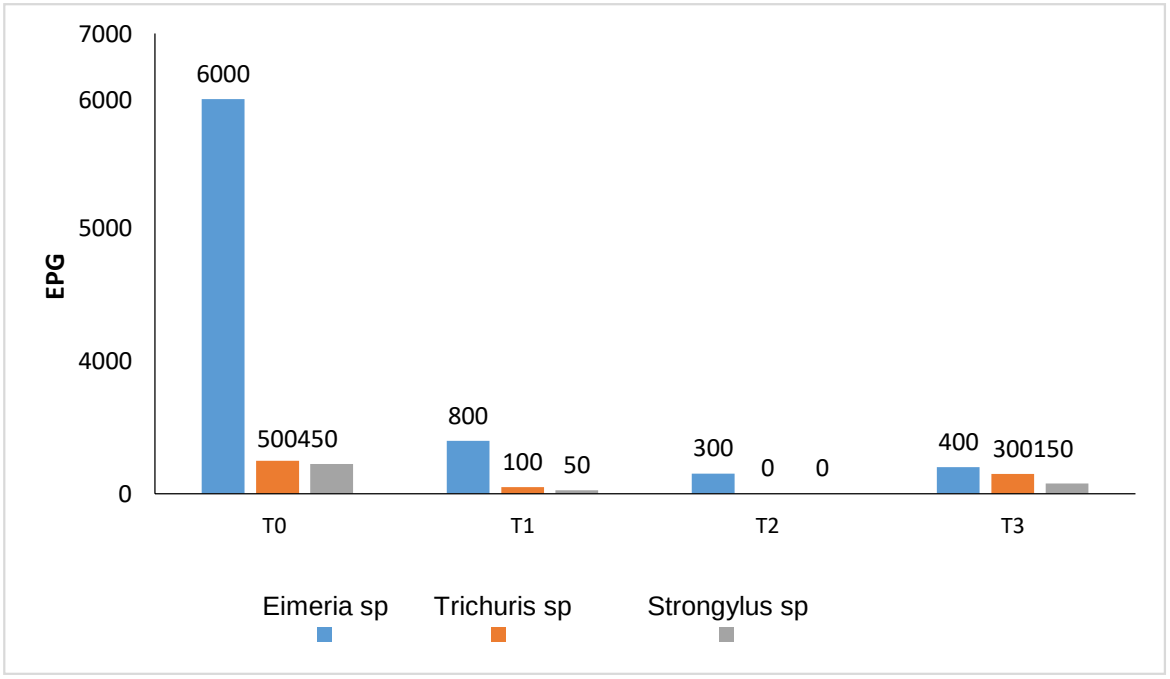

Figure 4. Number of eggs and oocysts per batch after treatment

3-7-Results of reduction rate and treatment efficiency

To assess the parasiticidal activity of the aqueous extract preparation of the *Carica papaya* seeds after treatment, we determined the rate of reduction of EPGs and the rate of treatment efficiency (Table 8 and 9).

Table 8. Determination of the egg reduction rate

Lots	Number of samples analyzed	Number of positive samples	Egg reduction rate byparasite species (%)		
			Eimeria sp	Trichuris sp	Strongylus sp
T1	08	04	77	75	80
T2	08	04	91,43	100	100
T3	08	03	80	83,33	100
Average rate of reduction (%)			79,33	86,11	93,33

Table 9. Determination of treatment efficiency

Designation	Quantities of OPGs per parasite species			Treatment efficiency rate (%) per pest species		
	Eimeria sp.	Trichuris	Strongylus	Eimeria	Trichuris	Strongylus

		sp.	sp.	sp	sp	sp
T2 post-processing	300	00	00			
T0 pre-treatment	4000	300	200	70	75	72
EPG pre-treatment	12000	1200	700			
Average efficiency rate (%)					72,33	

DISCUSSION

This study revealed that farmers use herbal medicine for the treatment of many diseases. They use papaya in several forms and in different doses combined or not with medicinal plants. This result is slightly higher than that obtained by Oliveira [7] in a study conducted in 2004, which indicated that a majority of farmers expressed confidence in phytotherapy. However, some farmers use veterinary specialities with specific doses when the prognosis of the disease is at risk. No clinical symptoms indicating massive parasitosis were observed in any of the animals. It is difficult to determine the disease from these clinical symptoms since in most cases the disease progresses in a chronic form. Laboratory examination prior to treatment gave positive rates for coccidial oocysts, trichuris and strongylus eggs.

The limited occurrence of coccidia and strongyle eggs could be explained by the abundant water sources during the rainy season. This is consistent with other research ideas from a study carried out in Ivory Coast [8]. The main eggs observed by coprology are mainly nematodes and protozoa. These classes include the following genera and species: Strongylus sp, Trichuris sp and Eimeria sp. This confirms other results already obtained, namely that the farmed aulacod is mainly a subject of polyparatism [9].

Papaya seeds showed antiparasitic efficacy at an optimal dose of 200mg/kg in aulacodes. The same results were observed by other researchers who showed that at high doses, the effect could be effective. At a dose of 200 mg/kg, it was possible to significantly reduce the excretion rate of eggs. At the doses of 100mg/kg PV and 200mg/kg PV of the aqueous extract of Caricapapaya seeds, there was a significant reduction in EPG ranging from 800 for coccidian oocysts, to 150 for trichuris. The use of the control product (Levalap) at 100mg/kg PV effectively eliminated some gastrointestinal parasites as confirmed by the coprological results obtained. Similarly, a study in Benin showed that disinfestation with papaya seed at a dose of 200 mg/kg PV effectively kills parasites at high levels [10]. The results found are considered satisfactory. However, we recommend further research in this area in order to optimise the utilisation of papaya seeds on livestock farms.

REFERENCES

I. Aizoum Z, Adetunji VE, Masade, S. Parasitoses transmitted by animal viscera: incidence in humans. Unpublished doctor of pharmacy thesis, Université Henri Poincare - Nancy I, France, 2018.
II. Dégbé M, Tété-Bénissan A., Maman H, Kulo A, Batawui B, Aklikokou K, Gbeassor M Epidemiology of toxoplasmosis in Togo: risk factors in the capital and its agglomerations International. Journal of Biological and Chemical Science, 2018;12 (1): 479-490.
III. Hounzangbé-Adoté MS, Mensah GA, Hounkpè B, Moutairou K.. Possibility of parasite circulation between aulacodes and small ruminants. In Acte de l'atelier scientifique 4 du 14 au 17/12/2004, AdjanohounA, Bankolé C, Agbo B, Igué K. (eds). INRAB, Programme Régional sud-centre du Bénin, Recherche Agricole pour le Développement, ISBN 99999-51-68-7, ISSN 99919-51-91-1, 2004; 279-284.
IV. Mpoame M,Essomba LI. Treatment trial against gastrointestinal parasitosis of chicken with aqueous decoctions of papaya seeds (Caricapapaya. Revue Élev. Med. vet. Countries, 2000, 53 (1): 23-25
V. Pousset, JL. Medicinal plants of Africa. How to recognize and use them? Edisud,Aix-en-Provence, France. France, 2004; 287 pp.1
VI. Amany KJ. The technique of collecting droppings as a method of estimating the biomass of the aulacodeThryonomysswinderianus TEMMINCK, 1827 (hystricomorph rodent). Ann. Université. Abidjan (Ivory Coast) Ser. E(XI)1978; 89.
VII. D'Oliveira A. Analyse du plan prophylactique adopté par les aulacodiculteurs dans les exploitations à poly-espèces animales comportant l'aulacode (Thryonomysswinderianus) d'élevage. End of cycle thesis, LAMS/Benin 2004; 76 p
VIII. Coulibaly PO: Internal parasites of aulacodes. Dissertation: BTS élevage: Abidjan (école d'élevage), 2006.
IX. Dossou KM. Comparative study of some pathologies encountered in aulacodes reared alone and/or with other animal species. End of cycle thesis: LAMS/Benin, 2002.
X. Sacramento TI. Study of the antiparasitic effect of pawpaw (Carica papaya) seeds on farmed aulacods: case of aulacodiculturists in southern Benin. DEA thesis, FSA/UAC, 2008; 63 pages