BUSITEMA UNIVERSITY.

FACULTY OF AGRICULTURE AND ANIMAL SCIENCES.

DEPARTMENT OF ANIMAL PRODUCTION AND MANAGEMENT.

FINAL YEAR PROJECT DISSERTATION

THE EFFICACY OF PAWPAW (*Carica Papaya*) LEAVES AS A DEWORMER IN THE TREATMENT OF GASTROINTESTINAL TRACT (GIT) NEMATODES IN GOATS AT ARAPAI VILLAGE

By

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TO BE SUBMITTED TO THE FACULTY OF AGRICULTURE AND ANIMAL SCIENCES IN PARTIAL FULFILLMENT OF REQUIREMENTS FOR AWARD OF DEGREE IN ANIMAL PRODUCTION AND MANAGEMENT OF BUSITEMA UNIVERSITY

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BU/UP/2019/2451

ACADEMIC SUPERVISOR;

MR. MUYINDA ROBERT

ABSTRACT

The comparative study on the anthelmintic potency of pawpaw leaf was investigated in naturally infected local indigenous goats of age group between 5-12 months which was in accordance with the study conducted by Nsereko in central Uganda that the worm burden where highest between 3-5 and 8-9 months old. The selected eight (08) samples of goats of the weight range of 10-20kg body weight were screened by picking their fecal sample for nematodes egg count under microscope for examination of natural helminthes before exposure to extract and control which is Albendazole. The purpose of the study was to determine the efficacy of pawpaw (C*arica papaya*) leaves in thetreatment of gastrointestinal nematodes in goats. The sample size of eight goats(08) were divided randomly into four treatment that was A which was exposed to 2.5% pawpaw leaves extract, B which was 10% pawpaw leaf extract, C which was 2.5% Albendazole and D which was 10% Albendazole. Treatments A and B were extracted by 98% ethanol solvent using soxhlet apparatus. The results were as follows: In all the eight (8) goats' baseline counting, there was no significant difference in the nematodes (p value=1.0). However, there was reduction in the number of nematodes in the first drug exposure but there was no significant different in all the four study treatment and in Comparison of efficacy of pawpaw leaf extracts and Albendazole on GIT nematodes there was no significant difference between the 2.5% extract concentration and 2.5% Albendazole concentration in the reduction of nematodes in the second drug exposure. However, there was significant difference between the 10% extract and 10% Albendazole in the second drug exposure In the view of the above result, the reduction in the number of nematodes were the same in both pawpaw leaf extract and control hence there are no significant difference in the concentration in both first and second treatment hence both Albendazole and extract reduced the egg production therefore, the study allows us to affirm the use of pawpaw leaf plant extract as an alternative anthelmintic for goats and that in a farming environment, the leaves seem to be effective and are able to replace synthetic molecules to avoid the cost and the resistance observed during the repeated use of these molecules.

DECLARATION

I hereby declare that this work is truly my original work and it has never been submitted to any institution for any academic award.

Student

AWEKONIMUNGU FOSKA

Signature…….

Date…….

Supervisor

Mr. MUYINDA ROBERT

Signature……

DEDICATION

I would like to dedicate this report to my beloved mother Ocidah Mary, my son Shaddai M Cyrus, my sister Charity, Gloria all my brothers such as Godswill, Patrick, Yasin, Centis Frank, Jackson, and all my friends.

Special thanks should go to my academic supervisor Mr. Muyinda Robert, and all the lecturers in animal production and management department.

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I also acknowledge the contribution of the following people my mother Mary, my sister charity, my son Cyrus and to all my brothers for supporting me both spiritually and financially.

LIST OF ABBREVIATIONS

Dr:	Doctor
BUAC:	Busitema University Arapai Campus
Mr:	Mister
E.P.G:	Eggs per Gram
ETC:	And so on
GIT:	Gastrointestinal tract
GIN :	Gastrointestinal Nematodes

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CHAPTER ONE: INTRODUCTION

1:0 Background

Goats are kept for various reasons such as income generation, household consumption religious purposes, and as security against crop failure while to the economy of Uganda, it contributes to employment, study purposes, and foreign exchange. (Maikasuwa and Jabo 2014). According to the Agricultural ministry and Uganda Bureau of Statistics currently there are sixteen million goats in Uganda. Despite of the fact that small ruminant farming has huge potential, there are challenges of diseases, parasites, and lack of adequate nutrition affecting goat production (Chah *et al*., 2013). In Africa gastrointestinal parasites has caused serious anaemia and even death to goats (Adedeji *et al*., 2013). There are conventional anthelmintic drugs such as Albendazole, Levamizoles against gastrointestinal nematodes of small ruminants, and the efficiency of conventional medicaments against nematodes diseases have been reported with variable success. (Hariono et al., 2021). However, due to the fact that the synthetic drugs which are not readily available as well as the high cost of drugs paved way for herbal remedies as reasonable alternatives (Solikhah et al., 2020b). Herbal therapies such as cassava leaves, neem trees, pawpaw seeds, garlic and many others have been used as natural products which are environmentally friendly and cheap and have been used and showed efficacy to different nematodes. The pawpaw bears a fruit and it is cultivated in tropical and subtropical regions and is well known for its nutritional benefits and medicinal applications (Hariono et al., 2021). It is rich in the powerful antioxidants which are vitamin C, vitamin A, and vitamin E; minerals, magnesium, and, potassium; the B vitamin pantothenic acid, folate and fiber (Ameen et al., 2018) In humans, pawpaw leaves are used in the prevention of diabetes, and heart disease since they not only provide a good source of fiber but also lower high cholesterol levels (Zingare et al., 2018). However, pawpaw leaves have not been exploited for the treatment of gastrointestinal parasites in goats in Uganda hence there was need for research about the efficacy of pawpaw leaves in the treatment of GIT in goats.

1.2. Problem Statement

Gastrointestinal nematodes are a major challenge in goat farming globally and they have caused economic loss in terms of decreased growth rate, productivity, and mortality in small ruminants. This has caused income loss estimated up to US dollar two million in sub-Saharan Africa to the

A., Oliveira, M. C. S., Sousa, I. M. O., Magalhães, P. M., & Barioni, W. (2014). Anthelmintic activity of Artemisia annua L. extracts in vitro and the effect of an aqueous extract and artemisinin in sheep naturally infected with gastrointestinal nematodes. *Parasitology Research*, *113*(6), 2345–2353. https://doi.org/10.1007/s00436-014-3891-z

Charpentiera, M. (2019). *Version of Record: https://www.sciencedirect.com/science/article/pii/S0003347219300144*. 0–38.

Githiori, J. B., Höglund, J., Waller, P. J., & Baker, R. L. (2004). Evaluation of anthelmintic properties of some plants used as livestock dewormers against Haemonchus contortus infections in sheep. *Parasitology*, *129*(2), 245–253. https://doi.org/10.1017/S0031182004005566

I Airaodion, A. (2019). Antidiabetic Effect of Ethanolic Extract of Carica papaya Leaves in Alloxan-Induced Diabetic Rats. *American Journal of Biomedical Science & Research*, *5*(3), 227–234. https://doi.org/10.34297/ajbsr.2019.05.000917

Imran, M., Sajid, M. S., Sindhu, Z., Khan, M. K., Mahmood, M. S., Alvi, M. A., Naseer, M. U., Malik, M. A., Kauser, S., & Asad, M. (2022). *Animal Health Perspectives SELECTION OF PARASITES RESISTANT BREEDS OF SMALL RUMINANTS : A*. *I*, 39–46.

Nsereko, G., Emudong, P., Magona, J. W., & Odoch, T. (2013). Anthelmintic efficacy of Albendazole, Levamisole and Ivermectin against gastrointestinal nematode (GIN) infections in goats on natural pastures in Gomba District, Uganda. *Uganda Journal of Agricultural Sciences*, *14*(1), 75–85.

Osman, I. A. M. (2010). *Anthelmintic Activity of Extracts from Three Putative Medicinal Plants Against Caprine Haemonchosis*.

Ameen, S. A., Azeez, O. M., Baba, Y. A., Raji, L. O., Basiru, A., Biobaku, K. T., Akorede, G. J., Ahmed, A. O., Olatunde, A. O., & Odetokun, I. A. (2018). Anthelmintic Potency of *Carica papaya* seeds against Gastrointestinal Helminths in Red Sokoto goat. *Ceylon Journal of Science*, *47*(2), 137. https://doi.org/10.4038/cjs.v47i2.7509

Aravind, G., Bhowmik, D., Duraivel, S., & Harish, G. (2013). Traditional and Medicinal Uses of Carica papaya. *Journal of Medicinal Plants Studies*, *1*(1), 7–15.

Bhat, F. A., & Tak, H. (2012). *A Survey of Gastrointestinal Helminth Parasites of Slaughtered Sheep and Goats in Ganderbal, Kashmir A Survey of Gastrointestinal Helminth Parasites of Slaughtered Sheep and Goats in Ganderbal, Kashmir*. *January*.

Byaruhanga, C., Egayu, G., & Olinga, S. (2013). *Efficacy of two anthelmintics against gastrointestinal nematodes in naturally infected goats in a pastoral Karamoja region, Uganda*. *14*(2), 27–36.

Dharmarathna, S. L. C. A., Wickramasinghe, S., Waduge, R. N., Rajapakse, R. P. V. J., & Kularatne, S. A. M. (2013). Does Carica papaya leaf extract increase the platelet count? An experimental study in a murine model. *Asian Pacific Journal of Tropical Biomedicine*, *3*(9), 720–724. https://doi.org/10.1016/S2221-1691(13)60145-8

Domke, A. V. M., & Chartier, C. (2012). *Prevalence of anthelmintic resistance in gastrointestinal nematodes of sheep and goats in Norway*. 185–193. https://doi.org/10.1007/s00436-012-2817-x

Domke, A. V. M., Chartier, C., Gjerde, B., Leine, N., Vatn, S., & Stuen, S. (2013). Prevalence of gastrointestinal helminths, lungworms, and liver fluke in sheep and goats in Norway. *Veterinary Parasitology*, *194*(1), 40–48. https://doi.org/10.1016/J.VETPAR.2012.12.023

Fissiha, W., & Kinde, M. Z. (2021). Anthelmintic Resistance and Its Mechanism: A Review . *Infection and Drug Resistance*, *14*, 5403–5410. https://doi.org/10.2147/IDR.S332378

Hariono, M., Julianus, J., Djunarko, I., Hidayat, I., Adelya, L., Indayani, F., Auw, Z., Namba, G., & Hariyono, P. (2021). The future of Carica papaya leaf extract as an herbal medicinal product. *Molecules*, *26*(22). https://doi.org/10.3390/molecules26226922

Idris, O. A., Wintola, O. A., & Afolayan, A. J. (2019). Helminthiases; prevalence, transmission, host-parasite interactions, resistance to common synthetic drugs, and treatment. *Heliyon*, *5*(1), e01161. https://doi.org/10.1016/J.HELIYON.2019.E01161

Islam, K. R., Farjana, T., Begum, N., & Mondal, M. M. H. (2008). *In vitro* efficacy of some indigenous plants on the inhibition of development of eggs of *Ascaridia galli* (Digenia: Nematoda). *Bangladesh Journal of Veterinary Medicine*, *6*(2), 159–167. https://doi.org/10.3329/BJVM.V6I2.2330

Jane, S., Preston, M., Sandeman, M., Gonzalez, J., & Piedrafita, D. (2014). *Current Status for Gastrointestinal Nematode Diagnosis in Small Ruminants : Where Are We and Where Are*

We Going ? Current Status for Gastrointestinal Nematode Diagnosis in Small Ruminants : Where Are We and Where Are We Going ? September. https://doi.org/10.1155/2014/210350

Karamon, J., Kochanowski, M., Cencek, T., Bartoszewicz, M., & Kusyk, P. (2014). Gastrointestinal helminths of raccoons (Procyon lotor) in western Poland (lubuskie province)-with particular regard to baylisascaris procyonis. *Bulletin of the Veterinary Institute in Pulawy*, *58*(4), 547–552. https://doi.org/10.2478/BVIP-2014-0084

Mahlehla MA, Molapo SM, Phoofolo MW, Matebesi PA, Phalatsi M, Johannes Moiloa M.Vet World. 2021 Sep;14(9):2554-2560. doi: 10.14202/vetworld.2021.2554-2560. Epub 2021 Sep 27. PMID: 34840477.

Map Soroti District showing the location of Arapai (shaded). | Download Scientific Diagram. (n.d.). Retrieved September 16, 2022, from https://www.researchgate.net/figure/Map-Soroti-District-showing-location-of-Arapai-shaded_fig2_281816595

Morganti, G., Das Singla, L., Dev, A., Chryssafidis, A. L., Kotb Elmahallawy, E., Gareh, A., Elhawary, N. M., Tahoun, A., Ramez, A. M., El-Shewehy, D. M. M., Elbaz, E., Khalifa, M. I., Alsharif, K. F., Khalifa, R. M. A., Dyab, A. K., Elsalahy, M., Monib, M., & Arafa, M. I. (2021). Epidemiological, Morphological, and Morphometric Study on Haemonchus spp. Recovered From Goats in Egypt. *Frontiers in Veterinary Science | Www.Frontiersin.Org*, *8*, 705619. https://doi.org/10.3389/fvets.2021.705619

Norahmad NA, Mohd Abd Razak MR, Mohmad Misnan N, Md Jelas NH, Sastu UR, Muhammad A, Ho TCD, Jusoh B, Zolkifli NA, Thayan R, Mat Ripen A, Zainol M, Syed Mohamed AF. Effect of freeze-dried Carica papaya leaf juice on inflammatory cytokines production during dengue virus infection in AG129 mice. BMC Complement Altern Med. 2019 Feb;19(1) 44. doi:10.1186/s12906-019-2438-3. PMID: 30744623; PMCID: PMC6371484.

Ratanapob N, Thuamsuwan N, Thongyuan S. Anthelmintic resistance status of goat gastrointestinal nematodes in Sing Buri Province, Thailand. Vet World. 2022 Jan;15(1):83-90. doi: 10.14202/vetworld.2022.83-90. Epub 2022 Jan 20. PMID: 35369591; PMCID: PMC8924396.

Liu T, Bruins RJF, Heberling MT. Factors Influencing Farmers' Adoption of Best Management Practices: A Review and Synthesis. Sustainability. 2018;10(2):432. doi: 10.3390/su10020432. PMID: 29682334; PMCID: PMC5907504.

APPENDIX 1 PHOTOS DURING DATA COLLECTION

Photo during fecal sample preparation

Photo during administration