COMPARATIVE ASSESSMENT OF ETHANOLIC EXTRACT OF JATROPHA CURCAS ON Haemonchus contortus IN YANKASA SHEEP

Habiba, L. M.,[1] Sa'aci, Z. A.[1] and Mohammed, A. A.[2]

mohammedsaaciz@gmail.com 09133016602

1. Department of Agricultural Technology, The Federal Polytechnic, Bida, Nigeria.

2. Department of Animal health and Production Technology, College of Agriculture, Mokwa, Nigeria

ABSTRACT

The study was aimed to investigate larvicidal activity of Jatropha curcas on haemonchosis in yankasa sheep. Sixteen sheep of about 5 to 6 months old with average body weight 9 kg per animal were randomly distributed into four treatments consisting four animals per treatment as: T1 (infected-treated with Albendazole) represent positive control, T2 (infected- treated with EEJL), T3 (infected-treated with EEJL) and T4 (infected-untreated) that serve as negative control. The experimental infections were orally administered at 10, 20, 30 and 40 mg/ml ethanolic extract of Jatropha curcas. The sheep were raised on semi-intensive system and fed balanced concentrate ration at 1% live weight with cowpea and groundnut hay. Data generated were analysed using SPSS (version 16.0). Result demonstrated CP, CF, EE and ash composition of Jatropha leave and stem were within the requirement recommended for sheep and 30 mg/ml of Jatropha leaf ethanolic extract had higher ($P<0.05$) larvicidal effect on *H. conturtus* than Jatropha stem ethanolic extract. There were large difference between Albendazole and the two plant extracts. It was observed that Albendazole highest larvicidal activity was recorded at 40 mg/ml with 43.6 %. Based on these results, Jatropha curcas showed significant anthelmentic activity against *H contortus* at 30 mg/ml/ BW by reduction worms load in faecal egg count and can improve health condition of infected sheep.

Key words: Jatropha curcas ethanolic extract, *haemonchus contortus* and Yankasa sheep

INTRODUCTION

Jatropha curcas originated in Central America and has become naturalized in many tropical and subtropical areas including India, Africa and North America. It is a valuable hedge plant, with the mature small trees bearing separate male and female flowers and do not grow very tall belong to the family *Euphorbiaceae* (FACT, 2007). The plant grows in several agro-climatic conditions with morphological differences, particularly with regard to the shape and size of the seeds and their protein and lipid content. Alshaibani *et al*. (2009).

Jatropha curcas is a perennial plant which can produces well for 30 to 40 years after establishment. Due to its economic, nutritional and agricultural importance, J. *curcas* has recently attracted attention of various research organizations, governments, public and international developmental agencies as well as industries in the tropics and subtropics because of its biological value in living system (FACT, 2007). Furthermore, the area of research on the nutritional value of *Jatropha curcas* is still at infancy consideration which might be due to its toxic characteristics. *Haemonchus contortus* is among gastro-intestinal parasitic nematode of small ruminant which is highly pathogenic (Brik *et al*., 2019). Animal infected with *H. contortus* usually have the following symptoms: anaemia, loss of weight and low productivity. *H contortus* specie has the ability to suck blood and lysis the blood cells at both adult and larvae stage resulting in haemorrhage (Mannan *et al*., 2017). This research is therefore embarked upon to evaluate the proximate compositions of *Jatropha curcas* leave and stem, and anthelmintic effect of their ethanolic extract on *Haemonchus contortus* larvae.

MATERIALS AND METHODS

Experimental site

The study was carried out at the department of Agricultural Technology, School of Agricultural Technology, The federal polytechnic, Bida, Niger State, Nigeria.

Source of experimental materials and sample preparation

Fresh Jatropha leave and stem were collected from agricultural and bio environmental engineering farm of the federal polytechnic, Bida, in November 2019. The leave and stem were weighed and oven-dried for 16 hours at 70°C until constant weight was achieved in the Laboratory of the Department of agricultural and bio environmental engineering. The dried jatropha leave and stem were ground into fine powder using mortar and pestle. The obtained products were stored in glass container with tight lid until use.

The proximate composition of *Jatropha curcas* was determined in line with the method described by Association of Official Analytical Chemists (AOAC, 2000).

Preparation of ethanol extracts.

Twenty gram of powdered plants material was soaked in 150 ml of ethanol in conical flask covered with aluminum foil. It was place on reciprocating bioshaker at 150 rpm for 24 hours in continuous agitation for thorough mixing. The solution was filtered using what man filter paper and the filtrate was transferred to rotary vacuum evaporator RE52 with water bath temperature of 50 ºC. Finally, the sediment particles were collected and use for l*arvicidal* activity using the procedure described by (Ezatullah *et al*., 2019).

Source of haemonchus larvae

Haemonchus contortus adult female parasite were detected and collected from the abomasi of the sheep slaughter at abattoir in Bida, Nigeria. The collected worms were cultured in line with procedure described by (Ezatullah *et al*., 2019). The needed eggs were harvested from crushed sheep faeces and the culture was kept at room temperature for 7 days. L3 parasite was obtained from the culture using protocol of (Soulsby, 1982). Motile larvae were identified and counted based on the guidelines of ministry of Agriculture (UK, 1979).

a lamb free from internal parasite was inoculated with orally dose of 10,000 $L_{3\ in}$ 10 ml saline solution as recommended by Hassan (2014) and as donor animal. It was used as source of L3 for infection of the experimental animals.

Experimental design, feed and management

A total of sixteen yankasa sheep 4-5 months old of 9 kg body weight were sourced from Wuya Market in Niger state of Nigeria. The sheep were acclimatized for 21 days in close door pen. During this period, the animals were offered fresh clean drinking water ad-libitum and fed concentrate balanced ration at 1 % live weight, cowpea, groundnut hay and soilage (Fresh forage). They were administered oral dose of anticoccidia drug (sulpadimidine 33 % Pharma: China), a dose of multivitamins (univet., Nigeria) and prophylactic antibiotic injection (oxytetracyclin 20 %, Avico) 1 ml/10 kg BW. Each treatment was orally administered a dose of ethanolic extract of Jatropha curcas leave (EEJL) and stem (EEJS) at 10, 20, 30 and 40 ml/BW to evaluate faecal *Haemonchus contortus* larva percentage counts. As T1 (infected-treated with Albendazole) represent positive control, T2 (infected-treated with EEJL), T3 (infected-treated with EEJS) and T4 (infected-untreated) that serve as negative control.

Faecal sample collection and eggs count

The faeces were collected with clean glove worn and a little amount of water was applied to index and middle fingers. The fingers were inserted into the rectum of each animal to spread the rectum in order to allow air into the rectum. The air duplicates fullness in the rectum and a wave of muscular contraction push faeces out into the finger. About 4 grams of faecal matter was removed in adult pellet of 1 gram and each was labeled respectively. The *haemonchus contortus* eggs count percentage from each treatment was determined in accordance with the illustration of Soulsby (1982).

Data Analysis

Data generated are presented as mean ± SE. Variation between means from different groups were tested for significance different using one-way analysis of variance (ANOVA) using SPSS (version 16) and Duncan's multiple range test to was used to detect significant between the treatment means.

Results and discussion

Table 1 present the result of proximate composition of Jatropha leaf and stem. It was observed that *Jatropha curcas* leave and stem contains reasonable amount of crude protein, crude fibre, ether extract and ash. The CP levels of Jatropha leaf and stem 16.97 % and 8.34 % are within the requirement range for sheep which is 9 % - 14 % Devendra *et. al.* (2011). In addition, Table 2 show the *in vivo* assessment of ethanolic extract of Jatropha leaf and stem on *H. contortus* in yankasa sheep. The result demonstrated 30 mg/ml of Jatropha leaf ethanolic extract had higher ($P<0.05$) larvicidal effect on *H. conturtus* than Jatropha stem ethanolic extract. There was difference between Albendazole and the two plant extracts. It was observed that Albendazole had higher larvicidal activity at 40 mg/ml with 43.6 % and lowest at 20 mg/ml with 33.5 % ethanolic extract of Jatropha. The present results are in line with the report of Hassan (2014) who indicated that medicinal plant extract have anthelmintic activity on haemonchosis in sheep. This might be attributed to larvicidal property of *Jatropha curcas* extract on the larvae and adult worms in GIT of small ruminants.

Table 2: Proximate composition of Jatropha leave and stem

Jatropha	Crude Protein %	Crude fibre %	Ether extract %	Ash %
Leaf	16.96 ± 0.7	19.7 ± 0.2	2.46 ± 0.1	15.8 ± 0.6
Stem	8.34 ± 0.03	48.34 ± 0.3	0.96 ± 0.01	6.86 ± 0.01

Table 4.3. *Invivo* assessment of ethanolic extract of Jatropha leaf and stem on *H. contortus* in yankasa sheep
*****significant at P<0.05, means attached with different superscript are significantly difference

Concentration (mg/ml)	Mortality rate of *Haemonchus contortus* larva (%)				
	Albendazole (positive control)	Jatropha leaf	Jatropha stem	SEM	LS
10	35.6±5.0	21.3±4.0^{d}	27.3±4.0^{ab}	1.03	*
20	33.5±3.0	20.3±3.0^{d}	29.6±5.0^{a}	0.11	*
30	42.0±8.1	31.3±6.2^{a}	25.3±6.0^{c}	1.01	*
40	43.6±6.0	23.1±2.0^{c}	28.0±5.0^{a}	0.19	*
50	38.3±6.0	28.0±2.0^{b}	25.0±7.1^{c}	0.07	*

CONCLUSION AND RECOMMENDATIONS

The study revealed that *Jatropha curcas* extract showed significant anthelmentic activity against *H contortus* at 30 mg/ml/BW by reduction worms load in faecal egg count and can improve health condition of infected Yankasa sheep. Livestock farmers are encouraged to administer *Jatropha curcas* extract at 30 mg/ml/BW for the prevention of faecal egg counts worm load.

REFERENCES

Al-Shaibani, I. R. M., Phulan, M. S. and Sheikh, M. (2009). Anthelmintic activity of *Fumarta parviflora* against gastrointestinal nematodes of sheep. International Journal of Agricultural biology, 11: 431 – 436.

AOAC. (2000). *Association of Official Analytical Chemist*. Official Method of Analysis (17th Edition), Maryland USA.

Brik, K., Hassouni, T., Elkharrim, K., Belghyti, D. (2019). A survey of *Haemonchus contortus* parasite of sheep from Gharb plain, Morocco. Parasitic Epidermiology Control Feb. 4: e00094 Published online Feb. 12 DOI: https/doi.org/10.1016/j.parepi.2019.

Devendra, B. N., Srinivas, N., Talluri, P.S.S.L.P. & Latha, P. S. (2011). Antimicrobial Activity of *Moringa oleifera* Lam., Leaf Extract, against Selected Bacterial and Fungal Strains. *International Journal of Pharma and Bio Sciences*, 2, 13-18.

Ezatullah, J., Amira, H. M., Noha M. F. H., Khaled, M. A., Soad, M. N., Hala, A. A. and Abou, Z. (2019). Evaluation of the curative effect of Balanites aegyptiaca fruits ethanolic extract on Haemonchosis experimentally induced in Egyptian Baladi Goat: Phytoanalytical, parasitological and haemotological studies. *Springer Journal of Parasite* dis, 43 (4): 638 – 650.

FACT. (2007). Prevention of parasitic nematodes in sheep: 12th April, 2007, Bulletin, UK.

Hassan, N. (2014). Evaluation of efficacy of some medicinal plant extract on treatment of sheep haemonchosis. PhD. Thesis, Faculty of Veterinary Medicine, El Sadat University.

Mannan, M. A., Masuduzzaman, M. Rakib, T. M. (2017). Histopathological and haemotological changes in haemonchosis caused by Haemonchus contortus in small ruminants of Bangladesh. *Bangladesh Journal of Veterinary Animal Science* 5 (2): 17 - 23.

Soulsby, E. J. L. (1982). Helminthes, arthropods and protozoa of domesticated animals, 17th edn. Baille Tindall, London.