Comparative Evaluation of Graded levels of *Jatropha curcas* oil and *Eucalyptus globulus* oil in the Treatment of Mange in Goat

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Abstract

The study evaluates the efficacy of *Jatropha curcas* oil and *Eucalyptusglobulos* oil in the treatment of Nine mange infected West African dwarf goat. The animals were randomized against the Treatments (A, B, C and D) in a Completely Randomized experiment for a 56 day period. Treatment A was the Control (without oil treatment), B was Ivomectin treated animals, C was 50% Jatropha oil + 50% Eucalyptus oil, D was 75% Jatropha oil + 25 % Eucalyptus oil. The goats were fed standard formulated diet and watered *ad-libitum*. Data collected include feed intake, weight gain and blood parameters. The results revealed significance differences among the feed intake. The highest feed intake was reported for Treatment C followed by B and the least was A. However, Treatment D was similar to B and C. The highest weight gain of animals on Treatments C and D (oil treatment) compared favourably with the (Ivomectin) drug treated animals (Treatment B) but significantly heavier than the Control Treatment (without oil). Animals on the Control Treatment (A) had poor Red blood cell while the highest Packed Cell volume, Red blood cell heamoglobin and neutrophils showed that animals on Treatments B and C (oil treated) responded well to the biological treatment. It could be concluded that the application of a combination of Jatropha oil and Eucalyptus oil holds a good promise in the treatment of mange in goat.

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Key words: Jatropha oil, Eucalyptus oil, mange, goat , feed intake , weight gain, blood indices.

Introduction

Mange is one of the common external parasites of small ruminant animals across sub- Saharan region (Hungerford, 1975). The prevalence of *S. scabiei*, *P.communis* and *Demodectic folliculorus* in goat in Nigeria was estimated at between 24% and 23%, 22% and 11% respectively. Humid condition, poor nutrition and inter-current

infection increase the susceptibility of animal to mange mites.

The disease was noted as one of the notorious ectoparasite causing great economic losses due to damage done to the skin, wool and physical condition of the animals. It also decreased milk and meat production as well as reduced the growth rates of animals. (Fthenakis *et al.,* 2000). The infection of mite on animals exposed the animals to other bacterial and viral infections (Blood *et al*., 1983; Scott , 1988 and Dorny *et al* ., 1994)

Mange disease can only be spread to other animals through direct contact (Schmidt, 1949). When animals are infected, the mange would be found on the head, inner part of the ears as well as the corners of the thighs. Symptoms show by infected animals include loss of blood and the animal become anaemic , dull , weak , weight loss and if left untreated death may occur due to secondary invasion (Radostits *et al* ., 1994).

Despite the economic importance of the infection ,mange has not been given due attention and effort is on the application of chemical drug (Ivomectin) which is costly and not readily available. In Nigeria , the biological control method is still at the infancy stage. This study therefore, evaluates the efficacy of Jatropha oil and Eucalyptus oil (which are noted to have antibacterial and antifungal properties) in the treatment of mange in West African dwarf goat.

Materials and Methods

Study Area: The study was conducted at the Animal Pavilion of the Department of Animal Production, University of Ilorin, Nigeria.

Collection, Preparation and Extraction of Oil

Eucalyptus globules

Eucalyptus leaves were collected around the University of Ilorin, main campus, Nigeria. The leaves were air dried for 24 hours and later milled. While the oil was extracted from the milled leaves using cold extraction method (with petroleum ether). The mixture of petroleum ether and the extracted oil was decanted while the petroleum ether was recovered using soxhlet extraction method.

Jatropha curcas

Jatropha seed was collected around the University of Ilorin main campus , Nigeria. The seed was dehauled to obtain the kernel which was later milled and mechanically pressed to obtain the oil.

Parasitological Procedure

A total of twelve West African dwarf goat were examined for the presence of mange symptoms (like lesions on the face, neck, head, , breast, brisket and tail). Laboratory examination was done by scrapping the infected part into black plastic containers and the method of Fthenakis *et al*. (2000) was used.

Animal and Management

The experimental animals were raised intensively in pens that were washed and dis-infected using morigard prior to the

arrival of the animals. The animals were fed a complete diet containing 91g crude protein and a Metabolizable energy of 2.05M.Cal and watered *ad libitum*. The experimental animals were divided and randomized against the Treatments (A, B, C and D) with each Treatment replicated thrice. The Treatments arrangement is shown below:

Treatment A (Control)	No treatment
Treatment B	vomectin treated animals
Treatment C	75% Jatropha oil + 25% ucalyptus oil
Treatment D	50% Jatropha oil + 50% Eucalyptus oil

Blood collection and Analysis

Blood was collected from all the animals through the jugular vein into clean test tube. Half of the blood was collected into test tube containing 1% EDTA for the examination of different haematological indices while the remaining half was used for serum evaluation following the method of Benjamin (1978).

Statistical Analysis

The experiment lasted for a 56 day period while all data collected were analysed in a completely Randomized design model while treatment means were separated using Duncan (1955) multiple rang test.

Results and Discussion

Table 1 shows the average body weight and average daily feed intake of the experimental animals. The average feed intake showed significant differences among the Treatments. The highest feed intake was recorded for animal on Treatment C followed by Treatment B, D and the least was Treatment A. The feed intake reported herein was similar to the value reported for goat elsewhere (http://www.gov.mb.ca/agriculture/livestock /goat/pdf). The highest feed intake of the biological treated goats showed the efficacy of these oils which confirmed the antibacterial and antifungal potency of the two oils (Jatropha oil and Eucalyptus oil). Conversely, the poor feed intake of animals on the Control (without treatment) supported the view that mange could contribute to poor feed intake of infected animals (Sinclair and Gibson, 1975).

The average weight gain of the animals was highest for Treatment B (Ivomectin treated) followed closely by Treatments C and D which are similar while poor weight gain was recorded for the Control (Treatment A). The poor weight gain could be due probably to the mange infestation. This finding supported the assertion of Sinclair and Gibson (1975) that animals infected with mange will show symptoms of becoming anaemic, dull, weak , loss of weight and poor health condition.

The haematological parameters (Table 2) showed significant variations between treated and untreated animals. The highest white blood cell (WBC), lymphocyte, eosinophil were recorded for animals on the Control (Treatment A). The highest WBC , lymphocyte and eosinophil noted are pointer to the fact that these blood parameter are fighting various foreign bodies (mange parasites) in the blood. The poor Red Blood

cell (RBC) of animal on the Control shows that the animals anaemic. This observation supported the work of Green (1982) who reported that mange may lead to anaemia at a severe stage. The highest packed cell volume (PCV) , RBC haemoglobin (Hb), neutrophil showed that animals on Treatments B and C(oil treated) responded well to the treatment. The positive response could be accounted for due to the antimicrobial (antibacterial and antifungal) activities of the two oils. The highest PCV and Hb reported for animals on Treatments B, C and D in this study corroborates the report of Hafeez *et al* . (2007). The poor PCV of animals on the Control (Tratment A) may be due to decreased cellular contents in blood after infestation of mange mites (Tung *et al*., 1975). Additionally, the infested animals showed eosinophilia and this could be due to allergic reaction caused by mite (Yousaf et al., 1978). The significant increase in the neutrophil, lymphocyte and monocyte of animals on Treatment B,C and D compared to Control (Treatment A) agreed with the work of Hassain 1989 who reported an increased in the level of monocyte, lymphocyte and neutrophils.

Conclusion

Due to high price of chemical drug and its residual effect it is pertinent to use biological treatment of mange in goat in development countries.

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Pictorial view of the experimental animals

Treatment A (CONTROL)

Before

After

Treatment B (IVERMECTIN)

Before

After

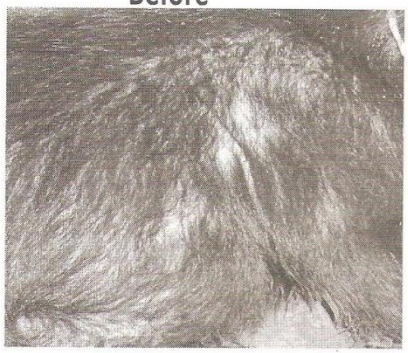
Treatment C (50:50 *E. globulos* and *J. curcas* oils)

Before

After

Treatment D (25:75 *E. globulos* and *J. curcas* oils)

Before



After

54

TABLE 1: Feed intake and Weight gain of the Experimental Animals

Parameters/Treatments	A	B	C	D	±SEM
Number of goats	12	12	12	12	
Initial weight	53.33	56.78	53.00	65.00	
Average daily gain (g)	13.33^{a}	47.16^{b}	30.66^{b}	35.7^{b}	5.89
Average Feed intake	91.00^{a}	117.00^{b}	130.00^{c}	104.00^{b}	8.5

Means having similar superscripts are not significantly different from each other ($p>0.05$)

Table 2: Haematological Parameters of the Experimental Animals

Parameters/ Treatments	A	B	C	D	±SEM
Pack Cell Volume (%)	16.00^{a}	29.50^{b}	34.00^{b}	31.00^{b}	3.42
Red Blood Cellx$10^{12/L}$	1.20^{a}	2.35^{b}	2.70^{b}	9.30^{c}	0.90
White Blood Cell x10^{9L}	10.00^{a}	9.75^{a}	2.45^{b}	9.35^{a}	1.89
Haemoglobin g/dL	2.50^{a}	5.05^{b}	5.95^{b}	5.10^{b}	1.23
Neutrophil(%)	25.00^{a}	29.00^{ab}	33.00^{b}	33.00^{b}	2.50
Lymphocyte (%)	50.00	69.00	66.00	66.50	4.98
Eosinophil (%)	1.50	2.00	0.00	0.50	0.01
Monocyte (%)	0.50	0.00	1.00	0.00	0.01

Means having the same superscripts are not significantly different ($p>0.05$)