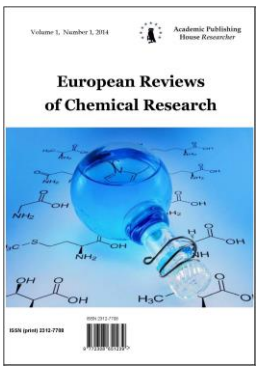

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Articles and Statements

Competence of *Hyptis Suaveolens* Leaf Extract on Treatment of Ecto-Parasites (Fleas) on Farm Animals (Goat)

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Abstract

Studies were carried out to examine the effectiveness of Hyptis suaveolens leaf extract and DO force against ectoparasites (fleas) on goats. Effect of Hyptis suaveolens leaf extract and DO force on certain parameters weight, packed cell volume (PCV) and repellence were studied on goats. A total number of 18 goats were examined for the presence of fleas by physical examination and were divided into three equal groups viz: Group A (infested control group) group B (treated with Hyptis suaveolens extract) group E (treated with the DO force). On day 14 of post treatment it was discovered that the PCV level and body weight of treated groups (B and C) increased significantly and relative infestation decreased, all the goats after dipping in DO force diluted water and Hyptis suaveolens spray remained healthy, no adverse effect on goats was observed. On the other hand the PCV and body weight of control group decreased on day 14 and the number of fleas per surface area of the body increased.

Keywords: packed cell volume, ecto parastes, infestation, ethylene diamine tetraacetic acid, hyptis suaveolens, repellence.

1. Introduction

Hyptis suaveolens is a native of tropical America and west tropical African region and Found to grow in Australia since the mid-19th century. A major weed in northern queen land, Hyptis suaveolens is commonly found along side roads and water sources and overgrazed pasture. The plants are not eaten by stock. Hyptis suaveolens is a weed in many tropical areas around the world (Bieski et al., 2015).

Hyptis suaveolens which is popularly known as mint weed, bush tea, Gros baume, Vilayati tulsi, Jungi tulsi, Ganga tulasi, Gandha thulasi, Konda thuslasi, Adavi tulasi, Bhustrence, American mint, chan plant belongs to the family Lamiaceae describe as erect annual herb grow up to 3m high with a woody base. The stem is hairy and hollow. The plant is covered with glandular and non-glandular hair. Leaves are hairy ovate 2 – 10 cm long. The leaf stalk ranges between 0.5-4cm long.

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The fruit is a lobed capsule nutlets dark brown shield shaped 3.5-4cm long and 2.5-3mm wide. Flowers and seeds head in clusters of 1-5, 6-7mm long on stalks 0-2cm long, sepals joined to form a 5-lobed Calyx that is ribbed, green at first drying brown and bluish purple flowers and hairy lobed capsules 4-6mm long in flower late summer to winter (Srivastava et al , 2012).

Hyptis suaveolens distinguished by opposites leaves strong mint aroma when crushed, 5-bristled calyx 8-14mm long fruit petals bluish purple, joined and with the lower lip punched and bent down ward, stamens 4 bent down wards, flower and fruit not in comb-like group, fruit dividing into 2 seeds-like nutlets. Dispersal methods of fruit is spread by water and mud attached to animals (Edeoga, Gomina, 2000).

Hyptis suaveolens is popularly used in the treatment of respiratory and gastrointestinal infection, in digestion, cold, pain, fever, cramps and skin diseases (Bieski et al., 2015). The leaves are used as an anti-cancer and anti-fertility agent. While their aqueous extract has shown on antinociceptive effects and acutetoxicity, antimicrobial activity of plant extract towards drug resistant or clinically significant microbes are reported and it was observed that active constituent material seep out in organic solvent to display biological activity (Srivastava et al , 2012; Bieski et al., 2015).

Fleas belongs to the kingdom: *anlmalia,* phylum; *arthropoda,* class: *insect,* sub class: *pterygoto,* infra class: *neoptero,* super order: *endopterygota,* order: *siphonoptera*. They are wingless, with mouth part adopted, piercing skin and sucking blood. Fleas are external parasites, living by hemotophagy off the blood of mammals and birds. Some fleas species include; *spi/opsythus cunichli* (rabbit fleas), *Ctemocephalides [eiis* (cat fleas), *Csterocephalide canis* (dog fleas), *Pulex irritans* (Human fleas), *Dasypsyllus gallinulae* (moorhen flea), *Nosopsyllus fasetatus* (jnorthern rat flea), *Xenopsylla cheapis* (ureiental rat flea). Over 2,000 species have been described worlds wide (Peattie , 2013).

Fleas are wingless insects (1/10 to 1/8inch) (1.5 to 3.3mm long) that are agile usually dark coloured (for example, the reddish brown of the cat fleas) with tube like mouth parts adapted to feeding on the blood of their hosts. Their legs are long. The hind are well pair adapted for jumping. A flea can jump vertically up to 7 inches (18cm) and horizontally up to 13 inches (33cm) making the flea to be one of the best jumpers of all known animals (relatively to body size). Their bodies are laterally compressed permitting easy movement through the hair or feathers on the host's body (or in the case of human under clothing). The flea's body is hard, polished and covered with many hairs and short spire directed backward, which also assist its movement on the host (Peattie, 2013).

Fleas are holomelabolous insects, going through the four life cycle stages of egg, larva, pupa and imago (adult) (Mueller et al., 2015). Adult fleas must feed on blood before they can become capable of reproduction. The flea life cycles begins when the female lay eggs after feeding. Eggs are laid in batches of up to 20 or 50, usually on the host itself, which means that the eggs can easily rot on the ground (Van Emden, 2013). Because of these, area where the host rest and sleeps becomes a habitat of the eggs and developing fleas. The eggs take around two days to two weeks to hatch (Burgess, Cowan, 2012; Boase et al., 2014).

Expenditure on control measures, fleas related diseases account for over 50 % darmatological cases reported to the veterinary clinics (Laflamme, 2014). Regular applications of paraseticide to prevent or treat fleas infestation is a common strategies in veterinary practice which have more toxic affect to the host itself (Jacobs et al., 2015). The cost of chemicals is also high which make it inaccessible to peasant to farmers.

A lot of different parasite control plants are naturally available everywhere and easier to extract and make use of it, many of them exhibiting almost one hundred percent efficacy to treat vector parasite, many of them when used are very effective and toxic to parasites and virtually not harmful to the host so they are safer to use and at affordable price (Bradley et al., 2015).

Objectives of the research is therefore to study the efficacy of *Hyptis suaveolens* leaf extract on the repellence of fleas; to investigate the effect of *Hyptis suaveolens* on weight gain of goat; and also to examine the effect of *Hyptis suaveolens* leaf extracts on blood count or packed cell volume (PCV) of the animals.

2. Materials and methods

Experimental Site

The study was conducted at the small ruminant animal farm of the College of Agriculture Bauchi, Nigeria (10°17' N, 9° 47' E and 609m above sea level) to investigate the efficacy of *Hyptis*

suaveolens leave extract on treatment of ectoparasite (fleas) on farm animals (goat). The experiment consisted of three treatments (control, conventional drug and *Hyptis suaveolens* leave extract). The treatment were randomized and applied in a complete randomize design with six replications.

Method of Extraction

The fresh and tender leaves of *Hyptis suaveolens* were collected from the College premises which were thoroughly washed with clean water and chopped to pieces with a knife and are exposed to sunlight for five days till they drained completely. The dried leaves were mechanically grinded and sieved to fine soft powder, 500g of the powder was mixed with one liter of free chlorine water and boiled to 100°c. The solution was filtered using filter paper, the filtrate was then diluted with 500ml clean water. The solution so obtained was sprayed onto the experimented animals using sprayers.

Procedures of Data Collection.

Animal weight

The animal weight was determined by the use of weighing scales, at the beginning of the experiment the weight of assistance was taken as an initial weight and then the weight of assistance plus that of animals considered as the final weight. So the actual weight of the animal was obtained by subtracting the initial weight from the final weight. The obtained value was recorded as animal weight per unit kilogram (kg).

Total Blood count or packed cell volume (PCV)

Blood samples were collected from jugular veins of each animal and transferred to blood sample bottles that contain the material that prevent blood from clotting (EDTA), 1ml of blood were transferred into capillary tubes and placed in a haematocrit centrifuge spinning at 3000 revolutions per minute for 5 minutes, the result was read using microhaematocryt reader in percentage (%). Relative infestations were determined by physical examination of the body surface area of animals by counting the number of ecto-parasites in the selected area of individual goat.

Repellence method of application

Eighteen goats were grouped into A, Band C, each group has six infected goats. Group A was negative control (infested untreated). Group B infested treated with *Hyptis suaveolens* leaves extract solution applied by spraying and the last group C was infested treated conventional drug (acaricide D.O. force) applied by dipping method with the dilution rate of 1ml per 1 liter of distil water.

3. Results and Discussion

The effect of *Hyptis suaveolens* leaf extract and DO force on body weight of goat (Table 1) indicated that the average initial body weight of group A (control) on day 1 were 32.l kg decreased to 30.2kg on day 14 of post treatment respectively. On the other hand, the body weight was increased significantly in treated groups (Band C) from 30.8kg to 32.8kg in group B and in group C from 30.6kg to 32.8kg at days 1 and 14 respectively. This is in agreement with the findings of Sabate (1993) who reported that the means of initial body weight of group's treated with plant extract at (15 %) were 18kg at day 1 of post treatment, the body weight of calves increased significantly at group treated with plant extract.

Table 1. The effect of *Hyptis suaveolens* leaf extract and DO force on body weight (kg) of goat

Group	Treatment	Day 1	Day 14	Change
A	Control	26.3	24.3	-2.3
B	H. suaverolens	25.5	27.3	2.3
C	D.O force	26.2	29.3	3.1

The effect of *Hyptis suaveolens* leaf extract and DO force on PCV of goats (Table 2) indicated that the average PCV value of group A (control) decreased from 26.3 % on day 1 to 24.0 % on day 14 of post treatment. On the other hand the PCV value increased in all treated groups (B and C) from 25.5 %, 26.2 % to 27.8 %, and 29.3 % respectively. This is in agreement with the findings of Eguale (2007), who reported that the active ingredient does not penetrate the skin but dissolve into

the skin oil giving long time protection and increase in PCV observed due to the repellence of blood sucking parasites.

Table 2. The effect of *Hyptis suaveolens* leaf extract and DO force on PCV (%) of goat

Group	Treatment	Day 1	Day 14	Change
A	Control	55.6	62.2	0
B	H. Suaverolens	55.0	6.2	89
C	D.O force	55.5	5.5	91

The effect of *Hyptis suaveolens* leaf extract and DO force on repellence of fleas on goat (Table 3) indicated that the relative infestation increased in group A (control) from 55.6 % on day 1 to 62.2 % on day 14, on the other hand relative infestation decreased in treated groups (B and C) from 55.0 %, 55.5 % on day 1 to 6.2 %, 5.5 % on day 14 of post treatment, showing 89 % and 91 % efficacy against fleas. This is in agreement with the finding of Eguale et al., (2007) who reported that leaf extract or by controlling mint as an anti feedant with some repellence effect within days, it prevent feeding and repel midge from further feeding and egg lying. The parasite infection is dramatically reduced mainly due to the antifeedant effect of the plant extract.

Table 3. The effect of *Hyptis suaveolens* leaf extract and DO force on repellence of fleas (%)

Group	Treatment	Day 1	Day 14	Change
A	Control	32.1	30.2	-1.9
B	H. Suaverolens	30.8	32.8	2.0
C	D O force	30.6	32.1	1.5

3. Data Analysis

One way Analysis Variance (ANOVA). The P value is 0.0010, considered very significant variation among column means is significantly greater than expected by chance.

Turkey-Kermer Multiple Comparisons Test if the value of q is greater than 3.674 the P value is less than 0.05.

Assumption test: Are the standard deviations of the groups equal?

ANOVA assumes that the data are sample from population with identical SOs. This assumption is tested using the method of Barlett. Barlett statistic (corrected) 0.09896. The P value is 0.6097. Barlett's suggests that the difference among the SOs is not significant. Assumption test; Are the data sampled from Ga ussian distributions. ANOVA assumes that the data are sampled from population that follows Gaussian distributions. This assumption is tested using the method; Kolmogorov and Smirov if the P value greater than 0.10 passed normality test. The data were collected on day 1 and day 14 that is pre-treatment and post treatment.

4. Conclusion

From the foregoing it can be deduced that hyptis suaveolens leave extract has a notable efficacy against flea infestation on goats.

Hyptis suaveolens could therefore be used as an alternative to any other conventional drug against ectoparasites, it is naturally available and cheaper. However, prolong use of conventional drug in high dose might accompanied by toxic effect on the host life.

References

Anupam et al., 2012 – *Anupam, S., Patel, S. P., Mishra, R. K., Vashistha, R. K., Ajay, S., Puskar, A. K.* (2012). Ethnomedicinal importance of the plants of Amarkantak region, Madhya Pradesh, India. *International Journal of Medicinal and Aromatic Plants*, 2(1), 53-59.

Boase et al., 2014 – *Boase, C., Kocisova, A., Rettich, F.* (2014). 6 Fleas and Flea Management. *Urban Insect Pests: Sustainable Management Strategies*, 86.

Bieski et al., 2015 – *Bieski, I. G. C., Leonti, M., Arnason, J. T., Ferrier, J., Rapinski, M., Violante, I. M. P., da Silva, D. R.* (2015). Ethnobotanical study of medicinal plants by population of

valley of Juruena region, legal Amazon, Mato Grosso, Brazil. *Journal of ethnopharmacology*, 173, 383-423.

Bradley et al., 2015 – *Bradley, F. M., Ellis, B. W., Martin, D. L.* (2015). The organic gardener's handbook of natural pest and disease control: a complete guide to maintaining a healthy garden and yard the Earth-friendly way. Rodale.

Burgess, Cowan, 2012 – *Burgess, N., Cowan, G. O.* (2012). A colour atlas of medical entomology. Springer Science & Business Media.

Edeoga et al., 2002 – *Edeoga, H. O., Ikem, C. I., Jäger, A. K.* (2002). Tannins, saponins and calcium oxalate crystals from Nigerian species of Boerhavia L. (Nyctaginaceae). *South African journal of botany*, 68(3), 386-388.

Eguale et al., 2007 – *Eguale, T., Tilahun, G., Debella, A., Feleke, A., & Makonnen, E.* (2007). In vitro and in vivo anthelmintic activity of crude extracts of Coriandrum sativum against Haemonchus contortus. *Journal of Ethnopharmacology*, 110(3), 428-433.

German et al., 2007 – *German, A. J., Holden, S. L., Bissot, T., Hackett, R. M., Biourge, V.* (2007). Dietary energy restriction and successful weight loss in obese client-owned dogs. *Journal of Veterinary Internal Medicine*, 21(6), 1174-1180.

Jacobs et al., 2015 – *Jacobs, D., Fox, M., Gibbons, L., Hermosilla, C.* (2015). Principles of veterinary parasitology. John Wiley & Sons.

Müller et al., 2015 – *Müller, W. A., Hassel, M., Grealy, M.* (2015). Development and reproduction in humans and animal model species. Springer.

Peattie, 2013 – *Peattie, D. C.* (2013). Green laurels: the lives and achievements of the great naturalists. Trinity University Press.

Sabate et al., 1993 – *Sabate, J., Fraser, G. E., Burke, K., Knutsen, S. F., Bennett, H., & Lindsted, K. D.* (1993). Effects of walnuts on serum lipid levels and blood pressure in normal men. *New England Journal of Medicine*, 328(9), 603-607.

van Emden, 2013 – van Emden, H. F. (2013). Handbook of agricultural entomology. John Wiley & Sons.