EFFICACY OF AV/FRC/18 (KEETGUARD LIQUID) AGAINST LICE AND TICK INFESTATION IN BUFFALOES

A.K. Tripathi[1], J.S. Soodan[2] and Rajesh Katoch[2]

ABSTRACT

Present study deals with efficacy of AV/FRC/18 (Keetguard Liquid), a Polyherbal ectoparasiticidal against lice and tick infestation in buffaloes. All the buffaloes were infested with *Haematopinus* spp. (Lice) and *Boophilus* spp. (Ticks). Lice infestation was mostly seen on scapular region, back, groin and axilla region while tick Infestation was mostly seen in the region of perineum, inner thigh, ears, neck, groin and axilla regions. Percent efficacy of AV/FRC/18 against lice and tick infestation was recorded and it was found that thrice a week application of 1:20 dilution results in 99% and 95% respectively on day 7th post-treatment and maximum period of effectiveness was found 95% and 90% respectively up to 30 days post treatment.

Keywords: AV/FRC/18, polyherbal ectoparasiticidal, tick, lice, efficacy, buffaloes

INTRODUCTION

Problem of ectoparasitic load pose a serious impact on the individual and national economics of developing countries (Radostits *et al.*, 2000). Therefore, it has been suggested that developing countries like India should make ectoparasite control a priority. For an effective chemical control strategy, periodic monitoring of the effectiveness of drugs and identification of resistant strains is essential. Therefore, there is always a need of new and non-conventional herbal ectoparasiticidal drugs. The present study was, therefore planned to evaluate the efficacy of an herbal ectoparasiticidal compound AV/FRC/18 (Keetguard Liquid) provided by Ayurvet Pvt. Ltd. against natural cases of ectoparasitic infestation in buffaloes with its comparative evaluation with commercially available Cypermethrin solution.

MATERIALS AND METHODS

Evaluation of efficacy of AV/FRC/18 (Keetguard Liquid) against Lice Infestation

Study includes, sick buffaloes brought for treatment at college clinic and buffaloes of local farmers from R.S. Pura and Satwari localities of Jammu, India, were included in the study. A total of 32 buffaloes irrespective of age and sex, which revealed heavy to moderate lice infestation

[1]Department of clinical medicine, College of Veterinary Science and Animal Husbandry, UP Pandit Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidyalaya Evam Go-Anusandhan Sansthan DFUVASU, Mathura, Uttar Pradesh, India, E-mail: arvindvet04@rediffmail.com

[2]Division of Parasitology, UP Pandit Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidyalaya Evam Go-Anusandhan Sansthan DFUVASU, Mathura, Uttar Pradesh, India

(*Haematopinus* spp.) infestation were selected. Infestation was mostly seen on scapular region, back, groin and axilla region. The animals were divided in four equal groups, A, B, C and D with 8 animals in each. Animals of group A treated with 1:20 dilution of AV/FRC/18 applied twice for a week, Group B treated with 1:20 dilution of AV/FRC/18 applied thrice for a week, Group C treated with 1:1000 dilution of Cypermethrin applied twice for a week. Animals of Group D were kept as lice infested untreated control, which were simultaneously applied plain tap water.

The percentage efficacy of test drug against lice infestation was determined by comparing the mean lice counts in unit area of treated group and control group at different days of post-treatment observation by general examination of different body regions for lice counting. The time required for disappearance of skin lesions and itching was also recorded**.** Re-infestation time was also recorded for each group.

The percentage efficacy of test drug against lice infestation was determined by comparing the mean lice counts in unit area of treated group and control group using the following formula (EMEA, 2004) at different observation days.

$$\%\text{Efficacy} = 100 \text{ X } (C-T)/C$$

Where C = mean of the controlled group
T = mean of the treated group

(Counts of adult lice and nymphs (visible by eye) in individual animals were done at different days of observations, by counting 1cm x 10 cm area at 6 places such as shoulder, rump and axilla area of both sides, evaluating a total of 60 cm^2 body surface. Mean counts at different observation day were calculated for each group.)

Evaluation of efficacy of AV/FRC/18 (Keetguard Liquid) against Tick Infestation

To assess the efficacy of AV/FRC/18 against ixodid tick infestation on dairy animals, a total of 24 buffaloes irrespective of age and sex, includes sick animals brought for treatment at college clinic, buffaloes of local farmers from R.S. Pura and Satwari localites of Jammu, carrying tick infestation were selected. Ticks were identified as *Boophilus* spp. Infestation was mostly seen in the region of perineum, inner thigh, ears, neck, groin and axilla region. The animals were divided in four equal groups, A, B, C and D with 6 buffaloes in each. Animals of group A treated with 1:20 dilution of AV/FRC/18 applied twice for a week, Group B treated with 1:20 dilution of AV/FRC/18 applied thrice for a week, Group C treated with 1:1000 dilution of Cypermethrin applied twice for a week. Animals of Group D were kept as tick infested untreated control, which were simultaneously applied plain tap water.

The percent efficacy of treatment was assessed by percent ratio of mean tick count of treated and control group of animals at different days of post-treatment observation by general examination of different body regions for tick counting**.** The disappearance of skin lesions and itching were also recorded**.** Re-infestation time was also recorded for each group.

The percent efficacy of test drug against tick infestation was determined by comparing the mean tick counts in unit area of treated group and control group using the following formula (EMEA, 2004) at different observation days.

$$\%\text{ Efficacy} = 100 \text{ X } (C-T)/C$$

Where C = mean of the controlled group
T = mean of the treated group

(Counts of ticks (visible by eye) in individual animals, were done at different days of observations, by counting 1cm x 10 cm area at 6 places such as perineum and inner thigh, neck, and axilla area of both sides, evaluating a total of 60 cm^2 body surface. Mean counts at different observation day were calculated for each group.)

RESULTS AND DISCUSSION

Evaluation of efficacy of AV/FRC/18 (Keetguard Liquid) against Lice Infestation

Maximum efficacy of AV/FRC/18 in lice infested buffaloes, in group A was 92% on 7th day and in group B it was 99% on 7th day however, in group C maximum efficacy was 60% on 7th day The lesions and itching subsided in all the treated groups with maximum efficacy in group B followed by group A and least in group C. maximum re-infestation takes place in group C, and drug not found effective up to 30 days, while in AV/FRC/18 treated group B and A the drug remains effective up to 30 days and minimum re-infestation takes place in group B followed by group A. in Group B the effect of drug persist with minimum re-infestation (>60% efficacy upto 60 days of observations) this was as per the recommendation of WHO (1996) Criterion which states that there should be Minimum 90% reduction in infestation for one week and 75% reduction in infestation for one month based on pre and post- treatment counts in comparison with untreated controls.

During the entire study period no adverse effect was recorded clinically in any animal treated by AV/FRC/18 however in Cypermethrin treated groups the redness and skin rashes had been recorded in few animals. During present investigation it was found that efficacy of AV/FRC/18 was remains the same even after repeated applications on the same animals, while in Cypermethrin efficacy is gradually reduced on repeated application on the same animals it suggests that lice are not showing resistance. The AV/FRC/18 is a polyherbal mixture therefore it had several advantageous effects such as more effective, no chemical reactions than synthetic compound (cypermethrin) without showing any resistance. Similar observations were earlier made for herbal preparation in clinical practice (Swarup and Patra, 2005).

AV/FRC/18 application 1:20 dilutions thrice a week can be used to control lice infestation with maximum efficacy (99%) on day 7, and maximum period of effectiveness (95% up to 30 days) and without any noticeable adverse effect. It might had occurred due to the fact that thrice application kills the all the developing stages (nymphs) of lice infested on animals which might not be achieved by twice application which was visible on lice counting at different days of observations therefore in animals where AV/FRC/18 applied thrice/week showed minimum re-infestation of lice which might had been occurred from surrounding untreated infected animals. Similar findings were earlier reported (Kumar *et al*., 2000).

Evaluation of efficacy of AV/FRC/18 (Keetguard Liquid) against Tick Infestation

Maximum efficacy in group A was 80% on 7th day and in group B it was 95% on 7th day .However in group C maximum efficacy was 60% on 7th day. The lesions and itching subsided in all the treated groups with maximum efficacy in group B followed by group A and least in group C. maximum re-infestation takes place in group C, and drug not found effective up to 30 days, while in AV/FRC/18 treated group B and A the drug remains

effective up to 30 days and minimum re-infestation takes place in group B followed by group A. in Group B the effect of drug persist with minimum re-infestation (>50% efficacy up to 60 days of observations) this is as per the recommendation of WHO (1996) Criterion which states that there should be Minimum 90% reduction in infestation for one week and 75% reduction in infestation for one month based on pre and post- treatment counts in comparison with untreated controls.

During the entire study period no adverse effect was recorded clinically in any animal treated by AV/FRC/18 however in Cypermethrin treated groups the redness and skin rashes had been recorded in few animals. During present investigation it was found that efficacy of AV/FRC/18 was remains the same even after repeated applications on the same animals, while in Cypermethrin efficacy is gradually reduced on repeated application on the same animals it suggests that ticks are not showing resistance. The AV/FRC/18 is a polyherbal mixture therefore it had several advantageous effects such as more effective, no chemical reactions than synthetic compound (cypermethrin) without showing any resistance. Similar observations were earlier made for herbal preparation in clinical practice (Swarup and Patra, 2005).

AV/FRC/18 application in dose rate of 1:20 dilutions thrice a week can be used to control tick infestation with maximum efficacy (97%) on

Table 1. Ectoparasiticidal efficacy of AV/FRC/18 (Keetguard Liquid) against natural infections of lice and ticks in buffaloes.

DPT/ Observation day	**Mean Percent Control (Efficacy) and Mean count (live lice) at unit area against natural cases of lice infestation in buffaloes**			
	Group A (n=8)	Group B (n=8)	Group C (n=8)	Group D (n=8)
1	40.00 (42)	40.00 (42)	25.00 (52)	00.00 (70)
3	75.00 (18)	85.00 (10)	50.00 (35)	00.00 (70)
7	**92.00 (6)**	**99.00 (1)**	**60.00 (32)**	00.00 (80)
21	85.00 (15)	99.00 (1)	25.00 (75)	00.00 (100)
30	**60.00 (40)**	**95.00 (5)**	**20.00 (80)**	00.00 (100)
Note:- counts were done on 24 h after the application of drugs				
DPT/ Observation day	**Mean Percent Control (Efficacy) and Mean count (live tick) at unit area against natural cases of Tick infestation in buffaloes**			
	Group A (n=6)	Group B (n=6)	Group C (n=6)	Group D (n=6)
1	50.00 (15)	50.00 (15)	25.00 (22)	00.00 (30)
3	80.00 (6)	80.00 (6)	50.00 (15)	00.00 (30)
7	**80.00 (6)**	**97.00 (1)**	**60.00 (12)**	00.00 (32)
21	60.00 (16)	95.00 (2)	25.00 (30)	00.00 (40)
30	**50.00 (20)**	**90.00 (4)**	**20.00 (32)**	00.00 (40)
Note:- counts were done on 24 h after the application of drugs				

DPT :Days post treatment

day 7, and maximum period of effectiveness (90 % up to 30 days) and without any noticeable adverse effect. It might had occurred due to the fact that thrice application kills the all the developing stages of ticks infested on animals which might not be achieved by twice application which was visible on tick counting at different days of observations therefore in animals where AV/FRC/18 applied thrice/week showed minimum re-infestation of tick which might had been occurred from surrounding untreated infected animals. Similar findings were earlier reported (Kumar *et al*., 2000).

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REFERENCES

European Medicines Agency (EMEA). 2004. *Guidelines on specific efficacy requirements for ectoparasiticides in cattle*. London, UK: Final report EMEA/MB/58/03/en/final. EMEA work programme for 2004.

Kumar, R., P.P.S. Chauhan, R.D. Agrawal and D. Shankar. 2000. Efficacy of herbal ectoparasiticide AV/EPP/14 against lice and tick infestation on buffalo and cattle. *Journal of Veterinary Parasitology*, **14**: 67-69.

Radostits, O.M., G.C. Gay, D.C. Blood and K.W. Hinchcliff. 2000. *Veterinary Medicine: A Textbook of the Diseases of Cattle Sheep, Pigs, Goats and Horses,* 9th ed. WB Saunders Company, Philadelphia, USA.

Swarup, D. and R.C. Patra. 2005. *Herbal therapy in veterinary practice*. National workshop under ASCAD on use of alternative medicine in veterinary practice. *Compendium.* 1-13.

World Health Organization (WHO). 1996. *Evaluating and testing of insecticides*. Report of the WHO Informal Consultation on the evaluation and testing of insecticides. WHO, Geneva. CTD/WHOPES/IC/96.1: 32.