

## COMPARATIVE EFFICACY OF DADMARDAN, NEEM AND IVERMECTIN AGAINST SKIN LESIONS IN CALVES AND GOATS

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### ABSTRACT

The experiment was conducted to investigate the comparative efficacy of indigenous medicinal plants, dadmardan (*Cassia alata*) and neem (*Azadiracta indica*) and ivermectin against skin lesions in calves and goats. Twelve calves of 8- 12 months and twelve goats of 1-2 years of age irrespective of sex having skin lesions (ringworm, scabies, humpsore, wounds) were used in the experiment. Selected calves and goats were divided into four equal groups (group A,BC and D), each group consists of 3 calves and 3goats. The group A kept as control group. The group B was treated with ivermectin (Cevamec 1%<sup>(R)</sup> @200 ug/kg body weight subcutaneously ,group C with dadmardan ointment (30%) ointment topically and group D with 30% combined ointment(dadmardan and neem leaves) topically. Calves and goats treated with ivermectin were almost cured within18 days and the rate of healing was 98.36% & 99.03% respectively whereas animals treated with dadmardan ointment cured at 30<sup>th</sup>days of treatment in calves and at 27<sup>th</sup>days of treatment in goats and the rate of healing was 99.80% & 99.88% respectively and those treated with combined ointments of dadmardan and neem leaves cured at 27<sup>th</sup>days of treatment in calves and at 24<sup>th</sup> day of treatment in goats and the rate of healing was 99.94% & 99.35% respectively. Ivermectin treatment was more effective in comparison to other treatments considering the time required for healing. On the other hand, treatment with the ointments of indigenous medicinal plants were more effective considering the rate of healing. It may be concluded that the ointments of indigenous medicinal plants (dadmardan ointment and the combined ointment of dadmardan and neem leaves) may be used as alternative drugs for the treatment of skin lesions in calves and goats.

**Key words:** Dadmardan,Neem ,Ivermectin and skin lesions

### INTRODUCTION

Animal welfare has, in recent years, become a prominent issue both inside and outside of industry (Cullen,1991).As Bangladesh is an agro based developed country, livestock is firmly integrated into the economic structure of farm and village life. It is considered to be the backbone of agriculture (Anon, 1985).It play an important role to promote human health by supplying animal protein in the form of milk and meat. Very recently Government has taken "Poverty alleviation programme" by increasing goat production. The normal healthy skin acts as an organ of protection and plays an important role to maintain homeostasis. Various skin diseases are prevalent in livestock, which may cause a serious loss in the production performance. Skin diseases were found to be the second major group (20.63%) of calf diseases (Debnath *et al* .1990). Dermatitis (9.64%) was recorded as the major skin diseases of calves, followed by ectoparasitism (2.54%) and skin wound (2.13%) with limited incidence of burn (0.36%) and myiasis (0.24%) cases (Samad, 2003). Bangladesh leathers have good inherent quality because of warmer climatic condition and food habits. Leathers made from hides and skins of animals maintained in warmer climates are superior to those of animals raised in colder climates,but such advantages are overshadowed by various defects (FAO, 1997).Surprising leather defects due to skin disease, postmortem defects or curing defects, and industrial processing defects, cut about 55.2% value of leathers resulting in annual economic loss of approximately Taka 818 core (US\$ 220.95 million).Among such economic losses , US\$ 24.1 million was due to Black Bengal goats skin defects in Bangladesh (Dey and Nooruddin ,1993).

Ivermectin a new patent drug, which is effective against both endo and ecto parasites and skin lesions of animals. Recently much interest in the field of medicinal plants has been grown in all over the world. Many countries have already come to realize the medicinal plants as a potential means of alleviate therapeutic agent and also their economic value (Mostofa,1983). Various types of herbal extracts showed the larvicidal and acaricidal effects (Chungsamarnyart,et al. 1991). In fact, the preliminary study on the traditional system of Veterinary Medicine by Food and Agriculture Organization (FAO,1980), revealed that indigenous system for the treatment of animal diseases is popular in man in Asian countries including Bangladesh. There are several indigenous medicinal plants (neem, pineapple, tobacco) have anthelmintics action( Nath, 1983, Mostofa, 1983 and Hossain, 1994) and used against both ecto and endo parasites in Bangladesh, (Mostofa, 1983, Safique 1983, Mannan, 1997).At present there are no available effective drugs without toxicities. Although ivermectin is safe and effective against both ecto and endo parasites of animals but it is expensive. In contrast, the alternative cheapest and available source of drug is herbal therapy. Experimental investigations, therefore, is imperative to assess the

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therapeutic value of indigenous herbal plants and leaves. Research work in this field is till now limited in our country. From this point of view, this research work has been designed to investigate the comparative efficacy of indigenous medicinal plants (dadmardan and neem ) and ivermectin against skin lesions in calves and goats with their adverse effects if any.

## MATERIALS AND METHODS

The experiment was conducted from July 2007 to August 2007 in the Department of Pharmacology, Bangladesh Agricultural University on twelve calves of 8-12 months and twelve goats of 1-2 years age irrespective of sex having skin lesions (ringworm, scabies, humpsore, wounds) to determine the comparative efficacy of some indigenous medicinal plants (dadmardan and neem) and ivermectin against skin lesions in calves and goats.

### Collection of Drugs, Medicinal Plants and Chemicals

Injectable ivermectin preparation (Cevamec 1 % <sup>(R)</sup>, ACI Bangladesh Ltd.) , Vaseline (used as vehicle in the herbal ointment) and Butylated hydroxy anisole (BHA, Loba chemie Pvt Ltd, Mumbai, India) (used as preservative in the ointment) was purchased from local market .The leaves of the dadmardan (*Cassia alata*) and neem (*Azadiracta indica*) were collected from the medicinal plant garden, Bangladesh Agricultural University.

### Preparation of test materials

The fresh leaves (dadmardan and neem) were dried in hot air oven and then grinded (three times) separately by grinder to fine particles. The particles were then sieved separately by a sieve.300 gm 30 % combined ointment (15 gm neem leaves, 15 gm dadmardan leaves, 69.5 gm vaseline and 0.5 gm of BHA) and 300 gm of 30 % ointment of dadmardan leaves (30 gm leaves, 69.5 gm Vaseline and 0.5 gm BHA) was prepared and the ointments were taken in small plastic tubes (30 tubes) of 20 gm capacity/tube.

### Experimental schedule

Selected calves and goats were divided into four equal groups (3 calves and 3 goats) and treated with indigenous medicinal plants and Ivermectin as per following schedule:

Groups of animal	Drug with dose and route
Group A	: Without treatment (Infected control group)
Group B	: Ivermectin (Cevamec 1% ® @ 200 µg /kg body weight, SC at 1 <sup>st</sup> , 7 <sup>th</sup> & 14 <sup>th</sup> day
Group C	: Dadmardan ointment (30 % ointment) topically twice daily after washing the lesions by potassium permanganate solution ,30 days for calves and 27 days for goats
Group D	: 30 % combined ointment (dadmardan and neem leaves) topically twice daily after washing the lesions by potassium permanganate solution, 27days for calves and 24 days for goats.

### Statistical Analysis

Results of treatment in all groups were analyzed by using student's test (t-test).

## RESULTS AND DISCUSSION

Ivermectin is a semi-synthetic derivative of avermectin (Macrocyclic lactone) that has a broad spectrum of activity against a wide variety of arthropods and nematodes of wild and domestic animals and human. Its use has revolutionized the treatment of nematode and arthropod parasites in animals and has provided hope for the control or even eradication of filariasis in humans. Hence, ivermectin has earned the title of 'wonder drug' (Woodruff and Brug, 1986). In the present study, application of ivermectin subcutaneously @ 1 ml/50 kg body weight was found 98.36% and 99.03% effective in calves and goats respectively without any side effect. Animals with both larger and smaller lesions were cured within 18 post treatment days. After the first treatment, the percentage of healing of the lesion was not so remarkable.

*Comparative efficacy of medicinal plants and ivermectine*

In subsequent treatment on the 7<sup>th</sup> and 14<sup>th</sup> day the healing was remarkable with scar tissue formation and growth of new hair around the scar tissue. This may be due to strong anti parasitic action of the ivermectin. The present finding has close correlation with the finding of Gill *et al.* (1988) and Venugopal *et al.* (1992). The efficacy of the ivermectin may vary due to variation of species and geographical location ( Gill *et al.* 1988 ;Venugopal *et al.* 1992 ,Taher,2005). Topical application of both the ointments were found highly effective without any side effect against skin lesions in calves and goats. Calves skin lesions were cured within 27-30 post-treatment days and goats skin lesions were cured within 24-27 post-treatment days.

Table 1. Comparative efficacy of Ivermectin, Dadmardan and Dadmardan & Neem leaves against skin lesions in calves

Experi- mental days	Area (cm <sup>2</sup> ) of skin lesion in Group A (control) (mean±SE)	% of wound/ lesion area increased	Area (cm <sup>2</sup> ) of skin lesion in Group B after application of the Ivermectin (mean±SE)	% of wound/ lesion area reduction	Area (cm <sup>2</sup> ) of skin lesion in Group C after application of Dadmardan ointment (mean±SE)	% of wound/ lesion area reduction	Area (cm <sup>2</sup> ) of skin lesion in Group D after application of combined ointment (Dadmardan and Neeem) (mean ±SE)	% of wound on area reduction
0	21.85±0.64	-	93.33±0.33	-	35.20±0.47	-	75.17±0.61	-
3 <sup>rd</sup>	21.95±0.85	0.46	71.33±0.21	23.57	23.67±0.40	12.86	66.67±0.56	11.30
6 <sup>th</sup>	22.15±0.56	1.37	53.33±0.17	42.85	26.00±0.42	26.13	55.00±0.58	26.83
9 <sup>th</sup>	22.36±0.77	2.33	37.67±0.24	59.63	20.16±0.37	42.72	45.30±0.59	39.73
12 <sup>th</sup>	22.40±0.64	2.51	16.66±0.16	82.14	15.16±0.29	56.93	34.00±0.56	54.76
15 <sup>th</sup>	22.45±0.56	2.74	6.70±0.10	92.82	8.50±0.35	75.85	20.00±0.46	73.39
18 <sup>th</sup>	22.48±0.48	2.88	1.53±0.07	98.36	4.75±0.25	86.50	9.40±0.40	87.49
21 <sup>st</sup>	22.55±0.45	3.20	-	-	2.53±0.20	92.81	2.50±0.50	96.67
24 <sup>th</sup>	22.60±0.36	3.43	-	-	0.85±0.20	97.58	0.60±0.32	99.20
27 <sup>th</sup>	22.65±0.18	3.66	-	-	0.25±0.12	99.28	0.04±0.04	99.94
30 <sup>th</sup>	22.70±0.09	3.89	-	-	0.07±0.05	99.80	0	-

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The calves and goats treated with the dadmardan ointment (Group C), cured completely at 30<sup>th</sup> day of and 27<sup>th</sup> day of treatment in calves and goats respectively. On the other hand, calves and goats treated with the combined (dadmardan and neem leaves) ointment (Group D), cured completely at 27<sup>th</sup> day and 24<sup>th</sup> day of treatment in calves and goats respectively. Our present observations were agreed well with Ghani (2003), Habluetzel et al.(2007) and Ajose (2007) as they observed that the dadmardan and neem leaves act effectively against skin lesions ,tick and mite infestations.

The efficacy of ivermectin against skin lesions in calves and goats ointments was the highest considering the time required for healing as ivermectin treated animals skin lesions were cured within 18days whereas animals treated with the ointments of indigenous medicinal plants took 24-30 days (Table 1,2).Our present observations were agreed well with Hossain et al. (2002), Mannan et al. (1997) and Hossen and Mostofa (1999).Between two types of herbal ointments ,combined ointments (dadmardan and neem leaves) was more effective than the ointment of dadmardan leaves as animals treated with the combined ointment took 24-27 days whereas animals treated with the dadmardan ointment took 27-30 days.On the other hand, the indigenous medicinal plants (ointment form) against skin lesions in calves and goats showed slightly more effective than ivermectin. These findings have a correlation with the findings of Mostofa *et al.*( 1993). They applied neguvon® ointment with neem leaves against humpsore in cattle. They observed that 100% animals were cured in 30 days with the formulation (neguvon® +neem leaves). The finding of the present research work is highly correlated with the findings of Murdiati and Manurung (1991). They used an aqueous suspension of 50% ketepung (*C. alata*) leaf in the treatment of *P. cuniculi* infestation in 10 New Zealand rabbits.

Table 2: Comparative efficacy of Ivermectin, Dadmardan and Dadmardan & Neem leaves against skin lesions in Goats

Exper i- mental days	Area (cm <sup>2</sup> ) of skin lesion in Group A (control) (mean±SE)	% of wound/ lesion area increased	Area (cm <sup>2</sup> ) of skin lesion in Group B after application of the Ivermectin (mean±SE)	% of wound/ lesion area reduction	Area (cm <sup>2</sup> ) of skin lesion in Group C after application of Dadmardan ointment (mean±SE)	% of wound/ lesion area reduction	Area (cm <sup>2</sup> ) of skin lesion in GroupD after application of combined ointment (Dadmardan &Neem) (mean±SE)	% of wound /lesion on area reduction
0	2.35± 0.18	-	10.33± 0.26	-	35.33± 0.25	-	12.37 ± 0.11	-
3 <sup>rd</sup>	2.37± 0.22	0.85	9.41 0.21	8.90	32.10± 0.20	9.14	11.57± 0.15	6.47
6 <sup>th</sup>	2.40± 0.15	2.12	7.45± 0.24	27.87	28.23± 0.23	2.095	9.93± 0.13	19.72
9 <sup>th</sup>	2.45± 0.14	4.25	4.93± 0.20	52.27	23.20± 0.19	34.33	7.90± 0.17	36.13
12 <sup>th</sup>	2.46± 0.17	4.68	2.94± 0.15	71.53	18.50± 0.18	47.63	5.70± 0.16	53.92
15 <sup>th</sup>	2.50± 0.20	6.38	1.17± 0.07	88.67	12.50± 0.13	64.61	3.00± 0.18	75.74
18 <sup>th</sup>	2.51± 0.15	6.80	0.10±0.04	99.03	5.30± 0.20	84.99	1.10± 0.17	91.10
21 <sup>st</sup>	2.53±0.10	7.65	-	-	1.83± 0.19	94.82	0.32± 0.10	97.41
24 <sup>th</sup>	2.56± 0.12	8.93	-	-	0.55± 0.05	94.44	0.08± 0.09	99.35
27 <sup>th</sup>	2.60± 0.08	10.63	-	-	0.04± 0.03	99.88	0	-

After 4 weeks of treatment, there was a significant reduction in the number of mites on the ears of the treated animals; the total area of the ears infested by *P. cuniculi* and covered by scabs was also reduced in treated animals. On the other hand, our present observations were somewhat different because in our experiment, the realing rate were 98.36% and 99.03% in ivermectin, 99.80% and 99.88% in dadmardan ointment and 99.94% and 99.35% in combined ointments in calves and goats respectively but Hossain et al.(2002) and Islam et al.(2003) found 100%healing rate in animals those were treated with ivermectin.

In case of control group (Group A), the lesions were aggravated gradually. Our present findings were same as Hossain et al. (2002). There were no adverse effects found in the calves and goats those were treated with ointments of the indigenous medicinal plants against skin lesions. Our present observation was agreed well Bagherwal (1999).

Considering the above findings, we want to conclude that in the treatment of skin lesions in calves and goats herbal preparation may be used especially in the form of ointment. Herbal preparation are inexpensive, easily available, so ointments of indigenous medicinal plants especially dadmardan and neem leaves may be used as alternative drugs for the treatment of skin diseases.

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