

## Effects of Dad Mardan (*Cassia alata*) and Ata leaves (*Annona reticulata*) against skin diseases of calves

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### Abstract

A number of indigenous plants actively used for therapeutic purpose in Bangladesh. The research work was conducted to investigate the effects of indigenous medicinal plants, Dad Mardan (*Cassia alata*) and Ata (*Annona reticulata*) against skin diseases (ringworm, scabies, dermatitis, wounds) in calves. The protective efficacy was observed by the topical application of the 10% combined ointment (Dad Mardan and Ata leaves) and 20% Dad Mardan ointment twice daily on nine calves having skin lesions. Calves treated with combined ointment were almost cured at 21<sup>st</sup> day of post-treatment whereas calves treated with Dad Mardan ointment were completely healed up after 24<sup>th</sup> day of post-treatment with the formation of scar tissue and growth of new of hair around the scar tissue and the healing rate was 99.73 % & 99.64 %, respectively. The skin lesions of untreated calves were aggravated with time (5.51% lesion area increased at 24<sup>th</sup> day from the first inspection). The combined ointment showed the more effectiveness (99.73% healing at 21<sup>st</sup> days) than the dad mardan ointment (93.76% healing at 21<sup>st</sup> days) against skin lesions. It may be concluded the ointments of Dad Mardan and Ata leaves can be used as alternative drugs for the treatment of skin diseases in calves.

(Key words: Effect, Dad Mardan, ata, skin disease, calf).

### Introduction

Plants have been one of the important sources of medicines since the beginning of human civilization. There is a growing demand for plant based medicines, health products, pharmaceuticals, food supplements, cosmetics etc. (Satyanarayana *et al.*, 2013). *Cassia alata* locally known as Dad Mardan in Bangladesh and India. It is a pan tropical shrub, native to tropical Americas. It is widely distributed from tropical America to India and Bangladesh (Kirtikar *et al.*,

1975). Dad Mardan (*Cassia alata*) used as astringent, purgative and laxative. It also has antifungal and antibacterial properties ([https://books.google .co.jp](https://books.google.co.jp)). Ata (*Annona reticulata*) used as a powerful astringent and also used as an anti-inflammatory agent in wound healing, anti-anxiety, anti-stress, anti-mutagenic, and spasmolytic agent. Leaf and stem extract shows inotropic, positive chronotropic and spasmolytic activities (Anon, 1994). Ata plant is reported to contain different acetogenins (Thang *et al.*, 2013). Annonaceous acetogenins exhibit

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broad range of biological activities (cytotoxicity, antitumor, antimalarial, antimicrobial and pesticidal) (Rupprecht *et al.*, 1990).

The healthy and normal skin acts primarily as an organ of protection and thus maintains 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 disease (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). Hoque and Samad (1996) also reported 8.47% incidence of dermatitis in calves. 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) (Dey and Nooruddin, 1993).

In Bangladesh most of the farmers have limited modern treatment facilities for their livestock; in addition to this they cannot afford the cost of treatment for their animals. Under the circumstances, the rural farmers

and owners tend to incline towards traditional systems of animal treatment, which are relatively less expensive and available. So, before taking the animals to the veterinarian, the owners try to treat their animals with various local remedies of which plant sources are most common.

Nowadays the tendency was increased gradually for treatment of skin diseases with indigenous herbal plants. There are many species of plants with medicinal importance which are found in Bangladesh. A survey conducted by the Botany Department of Dhaka University reveals that Babla, Pitraj, Sial kanta, Lazzabati, Ganda, Neem leaves and Thankuni have been reported to possess antibacterial property in the treatment of skin wound (Khan and Haq, 1975). The hexane, chloroform and ethyl acetate extracts of the leaves of *Cassia alata* Linn. were tested for their antimutagenic, antifungal, analgesic, anti-inflammatory and hypoglycaemic properties (Villasenor, 2002). Experimental investigations, therefore, is imperative to assess the therapeutic value of indigenous herbal plants and leaves. Research work in this field till now is limited in our country. Several indigenous plants have reported to be effective against skin diseases like neem (leaves or barks) was effective against humpsore in cattle (Mostofa *et al.*, 1993) and skin lesions in calves and goats (Rahman *et al.*, 2009), ketepung (*C. alata*) leaf was effective against mange (*P. cuniculi*) infestation in rabbits (Murdiati and Manurung, 1991). The present study was therefore carried out to assess the therapeutic value of Dad Mordan and Ata leaves against skin diseases in calves.

## Materials and Methods

### Animals

The experiment was conducted on 9 calves (indigenous calf, *Bos indicus*; reared by free range system) of 9-12 months age irrespective of sex having skin diseases (ringworm, scabies, dermatitis, wounds) at the locality near to Bangladesh Agricultural University to determine the protective effect of some indigenous medicinal plants (Dad Mardan and Ata) against skin diseases in calves.

### Medicinal plants and chemicals

We used two plants namely *Cassia alata* (family: Caesalpinaceae; local name: Dad Mardan) and *Annona reticulata* (family Annonaceae; local name: Ata) in this study (Fig 1-2).

The leaves of Dad Mardan and Ata were collected from the Medicinal Plants' Garden belongs to Professor Dr. Mahbub Mostofa, Department of Pharmacology, Bangladesh Agricultural University, Mymensingh, Bangladesh. Vaseline (Unilever Pvt Ltd.,

Bangladesh) was used as vehicle in the experimental herbal ointment. Butylated hydroxyl anisol (BHA) (Loba chemie Pvt Ltd, Mumbai, India) was purchased from local market and used as preservative in the ointment.

### Preparation of ointments

Dad Mardan and Ata leaves were dried in hot air oven maintaining the temperature first at 37°C and then gradually increased at 40°C, 50°C and 60°C with relative humidity 60%. The dried leaves were grinded separately into leaf particles and sieved. We made 10% combined ointment (10 gm Ata leaves, 10 gm Dad Mardan leaves, 79.5 gm Vaseline and 0.5 gm BHA) and 20% Dad Mardan ointment (20 gm Dad Mardan leaves, 79.5 gm Vaseline and 0.5 gm BHA) and stored in plastic containers.

### Experimental design

The selected 9 calves were divided into 3 equal Groups (Group A, B, C) each comprising of 3 calves (indigenous calf; reared by free range system). Calves of

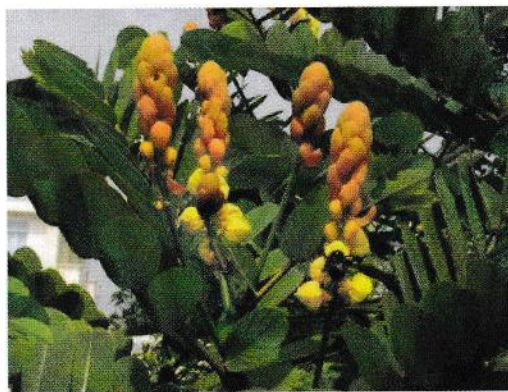


Fig 1: Leaf and fruit of Ata (*Annona reticulata*) Fig 2: Leaf and fruit of Dad Mardan (*Cassia alata*)

group A was kept as infected control group. Calves of group B and C treated with the 10% combined ointment and 20% Dad Mardan ointment respectively. The ointments were applied topically on the skin lesions twice daily after washing the lesions by Potassium permanganate solution (0.001%) with help of sterile cotton. The fate of the lesions was inspected in all groups at every 3 alternative days for several weeks from the first application of the ointments. Efficacy of Dad Mardan and combined ointment (Dad Mardan and Ata leaves) was assessed by clinical healing of the lesions.

### Statistical Analysis

The data were analyzed statistically by well-known student's t-test with the help of SPSS Statistics version 20.

### Results and Discussion

The present research work was undertaken to determine the protective efficacy of Dad Mardan ointment and combined ointment of Dad Mardan and Ata against naturally infected skin diseases (ringworm, scabies, dermatitis, wounds) in calves. Topical application of both the ointments was found highly effective without any side effect against skin lesions in calves. Calves with skin lesions were fully cured within 20-24 post-treatment days.

Treatment with the 10% combined ointment (Dad Mardan and Ata leaves) showed the skin lesions of calves were completely healed up with the formation of scar tissue and growth of new hair around the scar tissue

at 21<sup>st</sup> day of post-treatment (Fig. 4 & 5). On the other hand, treatment with 20% Dad Mardan ointment exhibited the skin lesions of calves were completely healed up with formation of scar tissue after 24<sup>th</sup> day of post-treatment (Fig. 6 & 7). Whereas the skin lesions in the calves of this control group (with no treatment) were aggravated with time. So both the ointments (10% combined ointment; Dad Mardan and Ata leaves and 20% Dad Mardan ointment) were effective (99.73% and 99.64% healing rate) against skin lesions in calves at 21<sup>st</sup> and 24<sup>th</sup> post-treatment days respectively (Table 1). So the 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 findings of the present research work were 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. 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. The present study is also correlated with the findings of Taher, 2005. He used three indigenous medicinal plants named as Turmeric, Garlic and aloe against artificially induced wound in guinea pigs. The paste of Turmeric, Garlic and gel of Aloe were applied. Turmeric paste showed the more

effectiveness where healing was completed in 12 days. Garlic paste took 15 days for healing. The Aloe gel was least effective in which healing occurred on 17 days. The variation of the findings of the present study with the findings of Taher (2005) may be due to species variation.

After the first treatment by the ointments, the percentage of healing of the lesion was not remarkable. In subsequent treatments, from the 2<sup>nd</sup> treatment (on 3<sup>rd</sup> day) the healing was remarkable and a significant ( $p < 0.01$ ) reduction of lesion area with scar tissue formation and growth of new hair around the scar tissue (Table 1). Comparative protective efficacy between two herbal ointments was shown in fig 3. The combined ointments (Dad Mardan and Ata leaves) was more effective than the ointment of Dad Mardan leaves as calves treated with the combined ointment took 21 days with healing rate

99.73% whereas calves treated with the Dad Mardan ointment took 24 days (93.76% at 21<sup>st</sup> day) to become fully cured.

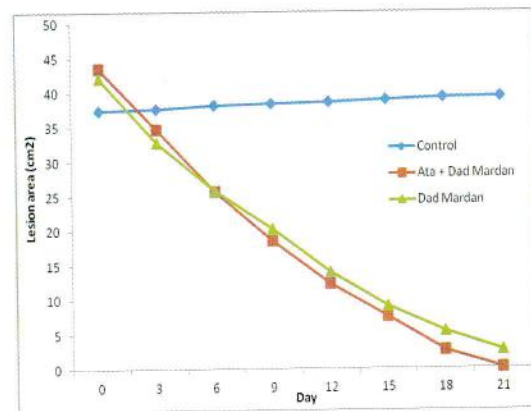


Fig 3. Comparative efficacy of Dad Mardan and combined (Ata + Dad Mardan) ointments against skin lesion in calves. At Day 21, 93.76% healing occurred by Dad Mardan ointment whereas 99.73% healing occurred by combined ointment but 4.80% lesion area increased from the first inspection in untreated calves.

Table 1. Efficacy of Dad Mardan and Ata leaves against skin diseases in calves.

Experimental days	Area (cm <sup>2</sup> ) of skin lesion in group A (mean±SE)	% of wound/lesion area increased	Area (cm <sup>2</sup> ) of skin lesion in group B (mean±SE)	% of wound/lesion area reduced	Area (cm <sup>2</sup> ) of skin lesion in group C (mean±SE)	% of wound/lesion area reduced
0	37.50±0.34	0	43.53±0.84	0	42.06±0.63	0
3 <sup>rd</sup>	37.70±0.89	0.53	34.75±0.61*	20.17	32.83±0.60*	21.93
6 <sup>th</sup>	38.13±0.37	1.68	25.70±0.38*	40.96	25.81±0.56*	38.59
9 <sup>th</sup>	38.33±0.66	2.22	18.49±0.57*	57.52	20.27±0.58*	51.77
12 <sup>th</sup>	38.53±0.46	2.75	12.21±0.68*	71.94	13.96±0.59*	66.76
15 <sup>th</sup>	38.83±0.72	3.55	7.49±0.56*	82.80	9.03±0.58*	78.45
18 <sup>th</sup>	39.13±0.40	4.35	2.59±0.12*	94.05	5.39±0.56*	87.11
21 <sup>st</sup>	39.30±0.55	4.80	0.12±0.04*	99.73	2.59±0.10*	93.76
24 <sup>th</sup>	39.56±0.12	5.51	-	-	0.12±0.04*	99.64

From 2<sup>nd</sup> treatment, area of skin lesion was significantly ( $p < 0.01$ ) reduced from the previous treatment in group B and C.



Fig 4. Photograph showing the lesion before treatment with the combined (Dad Mardan + Ata) ointment



Fig 5. Photograph of healed skin at 21<sup>st</sup> post-treatment day with combined (Dad Mardan + Ata) ointment



Fig 6. Photograph showing the lesion before treatment with the Dad Mardan ointment



Fig 7. Photograph of healed skin at 24<sup>th</sup> post-treatment day with Dad Mardan ointment

In case of control group (Group A), the lesions were aggravated gradually. A 5.51% lesion area increased at 24th day from the first inspection in untreated calves. Our present findings were same as Hossain *et al.*, (2002). There was no adverse effect found in the calves those were treated with ointments of the indigenous medicinal plants against lesions. Bagherwal (1999) also reported the same about the adverse effect on treatment by indigenous medicinal plants.

Considering the above findings, it is concluded that in the treatment of skin diseases in calves herbal preparation may be used especially in the form of ointment. Herbal preparations are inexpensive and easily available, so ointments of indigenous medicinal plants especially Dad Mardan and Ata leaves may be used as alternative drugs for the treatment of skin diseases.

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