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Ethnobotanical studies and validation of lead: a case study on evaluation of *Calotropis sp.* on dermal fungal infections

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Abstract

The lead obtained from the classical and ethnic literature on the use of *Calotropis* spp. on dermal fungal affections (Ringworm, Athlete's foot) was tested. Author noticed the great prevalence of skin disease in the contemporary society. It appears that the humid atmosphere of south Gujarat perhaps plays a role in the precipitation of these diseases. It was also noticed that the fungal infections are very difficult to treat. It was also learnt that though *Calotropis* spp. are highly hailed in the classic and ethnic literature, for skin ailments including fungal infections, no preparation involving *Calotropis* is available in the market, as far as the authors are aware. This prompted the author to undertake this work. The work involved two major aspects: 1) Development of standard, dispensable drug 2) Clinical trial of dispensable medicine.

Key-Words: *Calotropis Sp.*, Dermal fungal infection, Clinical trials

Introduction

Species of *Calotropis R. Br.* are regarded as useful components of indigenous *Materiae Medicae*. They are well known plants throughout the tropical world, originally from warm parts of Africa and Asia, commonly known as Giant Milk Weed or Swallow-wort. In Gujarat it is commonly known as *Aakado*. The genus *Calotropis* R.Br. is distributed in tropical and subtropical regions of Asia and Africa. It is cosmopolitan in distribution. *C. procera* is widely distributed in arid to semiarid regions of Caribbeans, Central America, South America[1], Israel, North Western and Central India, Sindh, Punjab, Upper Bengal, Bihar and drier climate of the South[2] . It occurs very commonly in plains and occasionally in the hills, up to an altitude of 3,000 feet including the Andamans[3]. Classical medicinal claims includes usage of the plant in the treatment of diarrhea, dysentery, piles, wounds, spondylosis, vaginal infection, leprosy, earache, asthma, rabies, dental caries, spleen dysfunction, syphilis, scabies, hydrocoel, elephantiasis, scorpion bite, black scars of face, eye diseases, sty, dandruff, tuberculosis, jaundice, boils, cough, as blood purifier etc.[4].

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ethnobotanical lore the plant is ascribed for usage in bronchial asthma[5] (Shankara, 1979), fever[6-7], rheumatism[8], smallpox, toothache[9], Plants are said to be useful in various skin diseases[10-14]. Skin ailments[15] viz. boils, sores, scabies, ringworm, eczema, Different parts of the plant have been used as purgative, anthelmintic and also in the treatment of diseases, such as leprosy, ulcers, tumors and piles, disease of spleen, liver and abdomen[16] and leaves are reported to cure abdominal pain[17].

Different plant parts have shown biological activities viz., antipyretic[18], anti-inflammatory[19], wound healing[20-21], analgesic[22], antidiarrhoeal[23-24], antioxidant and as an anti-diabetic[25], antinociceptive[26], fibrinogenolytic[27], anti-coagulant[28]. Latex has good ovicidal and larvicidal properties[29-30] etc.

Ringworm is a fungal skin infection caused by several different fungi and generally classified by its location on the body viz. Groin Ringworm, Scalp Ringworm, Nail ringworm, Body ringworm, Beard Ringworm *etc*. It can be caused by variety of fungi and yeasts viz. *Tricophyton* or *Microsporium etc*. The infection produces red, ring like areas, sometimes with small blisters in the skin the condition can be quite itchy and even painful. Recurrence is common because the fungi can survive indefinitely on the skin. Even with proper treatment, a susceptible person may have repeated infections. Most fungal skin infections, except those of the scalp and nails, are mild, and antifungal creams or

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powders usually cure them. The active ingredients in antifungal medications include miconazole, clotrimazole, econazole and ketoconazole. Corticosteroid creams are often used to help relieve itching and pain. Griseofulvin, which is taken by mouth, is very effective, but it may cause side effects such as headache, upset stomach, sensitivity to light, rashes, swelling, and reduced numbers of white blood cells. A doctor may also prescribe ketoconazole for the recurring episodes after the treatment with griseofulvin. Oral ketoconazole can have serious side effects, including liver disease. If a fungal skin infection oozes, a bacterial infection may develop, warranting treatment with antibiotics. The doctor may prescribe oral or topically applied antibiotics. Dilute Burow's solution or Whitefield's ointment is also used to help dry the oozing skin[31].

Since the weather of south Gujarat is humid, this can be favorable for various kinds of fungal infections of skin. Also there are no scientific reports available for activity on skin fungal infections; hence authors were directed to carry out the research.

Material and Methods

The treatment included systematic medicine, administered orally; comprised the fresh decoction made out of *Mahamanjishthadi quath* and the topical medicines were in three forms, Liniment, waxy ointment, and watery cream. Liniment was given if it was to be used on scalp as the greasy ointment was not found comfortable with the crowning glory of hair, on burning sensation the cream was a good demulcent whereas for other body parts, where drying caused itching caloderm was recommended. The patients have been advised to take less salt diet and avoid sour items and fermented food.

Preparation of drug

Mature leaves were crushed and the juice was extracted. It was mixed with the fine paste of fresh turmeric. Both were soaked in sesame oil and boiled till the water evaporated. This was to basic oil called Caloil. This oil was fortified with wax to have an ointment, the Caloderm. The oil was also emulsified with water using *Shorea robusta* Linn. resin to make Calocream.

Clinical trials

Clinical trials were carried out with the help of ayurvedic hospital and an ayurvedic doctor. Advertisements were given and the free treatment was offered at Mata Bhagwatidevi Ayurvedic Hospital, Navsari. The patients were treated and kept under observation for about nine months. The degree of relief had been classed as different degree of severity considering itching, erythema, body surface area covered etc. Treatment was analysed on seven points scale as follow.

Table 1: Assessment of criteria for evaluation of treatment

Observations about the symptoms	Symptoms presence in %	Rank given
Complete cure	No signs/symptoms of the disease	1
Excellent response	>75% improvement	2
Good response	>50-75% improvement	3
Fair response	>25-50% improvement	4
Poor response	≤ 25% improvement	5
Condition unchanged		6
Condition worsened		7

Results and Conclusion

Sixty one patients for ringworm and 10 patients for athlete's foot were enrolled for the treatment. In ringworm lesions were noticed on scalp, groin, nails and on various body parts such as buttocks, thighs, abdomen, legs, face, eyelashes, palm, front body, neck, arms, chin, chick, armpits, angles, ears, waist, fingers etc were noticed. Five (8.19%) patients were having the infection all over the body. The patients' ages were between 4 to 78 years. Out of 61 patients, 40 (65.57%) were male and 21 (34.43%) were female. Their occupations were farmer, barber, service man, house wife, fisher man, retired person, business man, diamond worker, labourer, mesoner, student, working in metallic yarn, and some of them were unemployed. Thirty five (57.37%) of them were having mixed type and 26 (42.62%) were having vegetarian type of food habit. The age of the patients from which the symptoms had started developing was noted between 3 to 75 years. The patients were found suffering the symptoms from 1 week to 11 years. Nine (14.75%) patients had complained of the aggravation of symptoms along with specific conditions such as night (6), summer (1) and monsoon (2). The aggravation was in terms of either itching or the area covered. Twenty

five (40.98%) patients had done previous treatment to get rid of the symptoms. 17 (27.86%) of them had received allopathic treatment, 1 (1.63%) had ayurvedic and 7 (11.47%) had tried self medication such as external application of coconut oil, castor oil etc. Duration of such previous treatment was from 2 months to 1.5 years. Eight patients had continued with the treatment till they approached us for the present treatment. Responses towards the past treatments were poor or good or no response at all. In some of the patients though they had given good response to the treatment the symptoms recurred as soon as the medications had been stopped. Thus they have opted for the present treatment. Other health problems were also noted and they were diabetes, Parkinsoniasm, hypertension, bronchitis and hyper thyroidism.

Ten patients were found to be suffering from Athlete's foot. Duration from which the patients were suffering from the symptoms was 1 month to 12 years. Two (20%) of them had taken the allopathic treatment. The duration of such past treatment was 1 month in 1 and 9 month in another patient. One patient had received good response to the treatment but as soon as the treatment was terminated the symptoms were found to be recurring while another patient had not shown any response to the treatment and thus they have opted for the present treatment.

Response to the proposed treatment

The analysis of present treatment for ringworm reveals that 3 (4.91%) have abandoned the treatment, 18 (29.50%) were completely relieved from the symptoms, 24 (39.34%) had shown excellent response, 8 (13.11%) had good response, 7 (11.47%) had shown fair response and 1 (1.63%) had poor response.

Results showed encouraging response in Athlete's foot. After receiving the present treatment 7 (70%) were completely relieved of the disease, 2 (20%) had shown excellent response and 1 (10%) had given good response to the treatment. None (0%) abandoned the treatment.

It was interesting to note that the fungal diseases got aggravated due to varied reasons, like winter, monsoon, summer, nights, full moon night and the high tides. Aggravation was judged from the degree of itching narrated and related by the patients.

Onset of the fungal affections had mostly commenced from the limbs with minor itching at sock's gaitor marks. For ladies it began with the itching at waist. One can roughly deduce from the limited observations that skin under pressure and stress causes irritation on release of stress. Person, who cannot control the itching, contracts fungal infections. This also holds true for the tight underwear leaving marks on loins and buttocks or brassier marks in ladies and spectacle marks in some patients. The moisture at armpits, testicles, loins and between foot fingers also initiated fungal infections.

It was noticed that omission of any one, i.e. oral or topical treatment, does not yield positive result. Both the treatments were found vital for obtaining positive results.

Author understands that, this is a pilot work providing lead for the future project on a wider basis.

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