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INVIVO ANTI-PSORIATIC ACTIVITY OF *PEDALIUM MUREX* LEAF EXTRACT

Dhandapani R[1], Jayakumar P[2] and Jaikumar S[3]*

[1]Assistant Professor, Department of Dermatology, Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry.
[2]Professor, Department of Pediatric Surgery, Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry.
[3]Assistant Professor, Department of Pharmacology, Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry.

ABSTRACT

Psoriasis is a chronic, cutaneous-articular disease affecting 2-3% of the worldwide population. This inflammatory disease is usually involves extensor surfaces and scalp and is now recognized to be mediated in part by immune alterations. Herbal remedies have been used effectively in skin disorders for thousands of years worldwide. *Pedalium murex* belongs to Pedaliaceae, traditionally used for various skin disorders. An attempt was made to evaluate the anti-psoriatic activity of 250 mg/kg ethanolic leaf extract of *Pedalium murex* in mouse tail test method. Isoretinoic acid was used as reference drug. Anti-psoriatic activity was assessed by measuring the Degree of Orthokeratosis and Relative Epidermal Thickness. Result shows that, *Pedalium murex* produced significant increase in Orthokeratosis and the Relative epidermal thickness compared to control. Present study concludes that, *Pedalium murex* exhibited anti-psoriatic activity and it may be considered for psoriasis.

Key words: Psoriasis, *Pedalium murex*, Orthokeratosis and Isoretinoic acid.

INTRODUCTION

Psoriasis is a chronic, non-communicable, painful, disfiguring and disabling disease for which there is no cure and with great negative impact on patients' quality of life. It can occur at any age, and is most common in the age group 50–69 (Anonymous, 2012). The reported prevalence of psoriasis in countries ranges between 0.09% (Gibbs, 1996) and 11.4% (Danielsen *et al.,* 2013) making psoriasis a serious global problem. The etiology of psoriasis remains unclear, although there is evidence for genetic predisposition (Harden *et al.,* 2015). Although there is a suggestion that psoriasis could be an autoimmune disease, no autoantigen that could be responsible has been defined yet. Psoriasis can also be provoked by external and internal triggers, including mild trauma, sunburn, infections, systemic drugs and stress (Boehncke and Schon, 2015). Psoriasis severely affects patients with the quality of life and the treatment being expensive (Krueger *et al.,* 2001).

Corresponding Author

S. Jaikumar
Email: sengt@rediffmail.com

Medicinal plants are considered safe, as for the human health and are widely employed by the traditional healers for the treatment of various diseases including psoriasis. Medicinal plants are known to be a rich castle of variety of chemical compounds and have attracted researcher's attention to find new treatment for psoriasis (Kaur and Kumar, 2012). There are many plants were used for the treatment and control psoriasis which includes, *Psoralen coryliforia, Coleus forskoli, Sarsaparilla,* also topical herbs which are effective are tea tree oil, oats, evening primrose oil, cayenne peppers, apple cider vinegar, aloe etc (Gazi Shaikh *et al.,* 2012).

Pedalium murex is a member of the sesame family, Pedaliaceae. It is found in different parts of the world such as tropical Africa, Srilanka, India, Mexico and Pakistan. In India, it occurs mainly in the Western and Corommandal coasts as a weed of waste places. According to Ayurveda, *Pedalium murex* is mainly used as tonic, aphrodisiac, improves appetite and useful in strangury, urinary discharges, vesicular calculi, cough, asthma, pain, cures skin diseases and heart troubles, piles and leprosy.

It purifies blood, removes stone in the bladder. According to Unani system of medicine, it is used as diuretic, cures strangury, gleet, lumbago, tonic, enriches blood, increases mensural flow, good gargles for mouth troubles and painful gums, stomachic, appetizer, emmenagogue etc (Singh and Panda, 2005; Agharkar, 1991; Das *et al.,* 1966). Few of its ethnobotanical claims were scientifically proved and no literature is available for its anti-psoriatic activity. Based on the above current study was planned to evaluate the effect of *Pedalium murex* leaf extract using mouse tail test.

MATERIALS AND METHODS

Plant Material

The *Pedalium murex* was collected from Kolli hills and it was identified, authenticated as *Pedalium murex* by Scientist 'F' Botanical survey of India, Southern Regional Centre, Tamilnadu Agriculture University, Coimbatore. The Voucher specimen (BSI/SRC/5/64/14-15/Tech - 1258) has been deposited in department for further references.

Preparation of Extract

The collected leaves were washed, shade dried and then ground into coarse powder. The powder was then subjected to exhaustive extraction by a maceration process using 90% ethanol as a solvent at room temperature for 7 days. The ethanolic extract was concentrated by vacuum distillation to dry. The collected extract was stored in desiccators and used for further pharmacological study.

Animals

Swiss albino mice of either sex, weighing between 20 - 25 gm were used for this study. The animals were obtained from animal house, of Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry. The animals were placed at random and allocated to treatment groups stainless steel cages. Animals were housed at a temperature of 24±2^{o}C and relative humidity of 30 – 70 %. A 12:12 light: day cycle was followed. All animals were allowed to free access to water and fed with standard commercial pelleted rat chaw (M/s. Hindustan Lever Ltd, Mumbai). All the experimental procedures and protocols used in this study were reviewed by the Institutional Animal Ethics Committee.

Antipsoriatic Activity – Mouse Tail Test

Pedalium murex leaf extract was evaluated for antipsoriatic activity by the mouse tail test for psoriasis. Eighteen animals were divided into 3 groups of six each. Group I served as normal control (0.1% CMC), group II served as reference control (Isoretinoic acid, 0.5 mg/kg) and group III was treated with the extract at 250 mg/kg body weight. Test drugs were administered once daily for 14 days, by suspending in 0.1 % CMC solution. At the end of the 14th day treatment, mice were sacrificed by phenobarbitone anesthesia and the proximal parts of their tails were cut and each group tails stored in separate containers containing 10 % formalin in saline (Vogel, 2008).

Histopathological Examination

Longitudinal histological sections were prepared from the tail skin and stained with hematoxylin eosin. The specimens were histometrically analyzed for:

(I) The horizontal length of an individual scale lying in between adjacent hair follicles including sebaceous glands (n = 10 scales per animal, n= 6 animals per treatment group; i.e. a total of 60 measurements per treatment),

(II) The horizontal length of the fully developed granular layer within an individual scale (n = 10 scales per animal, n = 6 animals per treatment group; i.e. a total of 60 measurements per treatment), and

(III) The vertical epidermal thickness between the dermo-epidermal junction and the lowest part of the stratum corneum (n = 5 measurements per scale, n = 10 scales per animal, n = 6 animals per treatment group; i.e. a total of 300 measurements per treatment).

From these raw data (I to IV) the following parameters were calculated according to the method Bosman *et al.,* 1992.

(IV) The degree of orthokeratosis of an individual scale defined as the percentage ratio of (2) divided by (1) (n = 60 data per treatment condition),

(V) The control related 'drug activity' upon epidermal differentiation,

$$\text{Drug activity} = \frac{OKs - OKc}{100 - OKc} \times 100$$

with OK (i.e. orthokeratosis) as the mean of the parameter explained under (IV) for a test substance (s) and the untreated control condition (c), respectively, and

(IV) the relative epidermal thickness of individual scales as the percentage ratio of the measure under (III), for a given treatment in relation to the mean of untreated controls set to 100% (n = 300 data per treatment condition). The three overall parameters namely, the degree of orthokeratosis, drug activity and relative epidermal thickness were eventually used for the evaluation of drug effects.

Statistical Analysis

Data obtained in the present study is presented as weighed mean ± standard error. In the mouse tail test for statistical comparisons, explorative probabilities were obtained by the Mann–Whitney U test. Statistical calculations were performed using GraphPad prism software. Values with $P < 0.05$ are considered significant.

RESULTS

Table 1. Effect of *Pedalium Murex* leaf extract on the degree of orthokeratosis and relative epidermal thickness in the mouse tail test

Drug Treatment	Degree of Orthokeratosis (%)	Drug Activity (%)	Relative Epidermal Thickness (%)
Vehicle Control (0.1% CMC)	16.42±0.96	-	100±0.83
Reference Control (Isoretinoic Acid, 0.5 mg/kg)	62.63±3.55***	55.29	121.58±3.69
Pedalium Murex (250mg/kg)	58.53±4.21***	50.38	114.66±4.82

Values are expressed as mean±S.E.M.
*P<0.05 , **P<0.01, ***P<0.001 Vs Control

Anti-psoriatic activity of the leaf extract of *Pedalium murex* was evaluated in the mouse tail test method, the % Degree of Orthokeratosis and the % Relative Epidermal Thickness were studied and the result were given in table I. Keratotic condition is seen in the adult mouse tail which is one of the main features of psoriasis. Induction of orthokeratosis in the adult mouse tail is the basis behind the mouse tail test. Isoretinoic acid was used as reference drug and ethanolic leaf extract of *Pedalium murex* (250mg/kg) were used in the study. Isoretinoic acid and the test drug *Pedalium murex* significantly (P>0.001) enhanced the degree of Orthokeratosis and Relative Epidermal Thickness in the mouse tail method. The % drug activity of Isoretinoic acid and *Pedalium murex* were 55.29% and 50.38% respectively.

CONCLUSION

Psoriasis is a chronic and disabling disease which affects the quality of life. Number of herbal plants were evaluated for anti-psoriatic activity and documented. Traditionally, *Pedalium murex* was used for various skin disease and especially for psoriasis. Present study was conducted to evaluate the anti-psoriatic effect of *Pedalium murex* leaf extract on mouse tail test method. From the result it was concluded that ethanolic leaf extract of *Pedalium murex* exhibited.

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CONFLICT OF INTEREST:
The authors declare that they have no conflict of interest.

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