STUDY PROTOCOL
(Appendix - I)

Name: 

Male/Female: 

Age: 

Profession: 

Period of infection:

Month
Days

First time / recurrent

Chronic / Acute

Date of application:

Date of complete cure:

Previous treatment history:

1.

2.

3.

4.
# APPENDIX - II

## DISEASE, AGE & SEXWISE DISTRIBUTION OF PATIENTS

<table>
<thead>
<tr>
<th></th>
<th>Age in Years</th>
<th>% of Success</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-10</td>
<td>11-20</td>
</tr>
<tr>
<td>Pityriasis versicolor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n=210)</td>
<td>M 3</td>
<td>M 30</td>
</tr>
<tr>
<td></td>
<td>F 0</td>
<td>F 0</td>
</tr>
<tr>
<td>Tinea pedis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n=63)</td>
<td>M 4</td>
<td>M 4</td>
</tr>
<tr>
<td></td>
<td>F 8</td>
<td>F 8</td>
</tr>
<tr>
<td>Tinea cruris</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n=38)</td>
<td>M 16</td>
<td>M 16</td>
</tr>
<tr>
<td></td>
<td>F 0</td>
<td>F 0</td>
</tr>
<tr>
<td>Tinea corporis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n=16)</td>
<td>M 12</td>
<td>M 12</td>
</tr>
<tr>
<td></td>
<td>F 1</td>
<td>F 1</td>
</tr>
</tbody>
</table>

M = Male  
F = Female
A study on the therapeutic efficacy of *Cassia alata*, Linn. leaf extract against *Pityriasis versicolor*

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Abstract

The therapeutic efficacy of *Cassia alata* leaf extract against *Pityriasis versicolor* has been reported for the first time involving humans. For the collection of clinically effective antifungal compounds from the leaves of *Cassia alata*, a simple procedure has been devised. A 10-year human study indicates that the leaf extract can be reliably used as a herbal medicine to treat *Pityriasis versicolor*. The leaf extract has no side-effects.

*Key words: Cassia alata; Malassezia furfur; Pityriasis versicolor*

1. Introduction

*Pityriasis versicolor*, a chronic superficial mycosis of the skin, caused by the fungus *Malassezia furfur*, affects people worldwide and is common in tropics and subtropics. The disease, affecting mainly the stratum corneum, is characterised by fawn to brown coloured scaly macules of various sizes with geographical patterns involving principally the trunk, but occasionally affecting neck, face, groin, thighs, axillae and even arms (Norman et al., 1971; Canizares, 1975; Berkow, 1982; Faergemann, 1989).

Drugs currently used in the treatment of *Pityriasis versicolor* are many with diversified chemical structures. Local application of solutions containing selenium sulphide, sodium hyposulphite, tolnaftate, alcoholic solution of iodine, propylene glycol, zinc pyrithione, acrisorcin and Whitfield's ointment is practiced for various lengths of time for the treatment of *Pityriasis versicolor*. An oral antifungal agent, Ketoconazole, is also prescribed. The lesions may not become repigmented for several months and the disease may recur in 6–12 months (Norman et al., 1971; Canizares, 1975; Berkow, 1982; Faergemann, 1989).

In order to fulfil its aim of making health care available to all by the year 2000 AD, the World Health Organisation is taking an official interest in herbal medicines which are subjected to systematic and scientific evaluation (Menon and Nair, 1991).

*Cassia alata*, Linn., a shrub belonging to the family Caesalpinioideae, R. Br., is distributed
mainly in tropics and subtropics and is usually referred as 'ring worm Cassia', since the leaf extract is extensively used in curing the skin disease, ring worm (dermatomycosis). In the Indian system of medicines, namely Ayurveda, Siddha and Unani, decoctions of the leaves, flowers, bark and wood are used in skin diseases such as eczema, pruritus, itching and in constipation (Kirtikar and Basu, 1975).

The leaves are found to possess anthraquinones (Hauptmann and Lacerda Nazario, 1950), flavonoids (Rao et al., 1975), quinones and sterols (Mulchandani and Hassarajani, 1975). The constituents of the leaves have been investigated for their laxative (Rai, 1978), antibacterial (Fuzellier et al., 1981), antifungal (Fuzellier et al., 1982), anti-inflammatory and analgesic effects (Palanichamy and Nagarajan, 1990a,b).

In the present investigation, a simple and rapid method for the collection of clinically effective antifungal compounds from the leaves of *Cassia alata* has been devised and for the first time the clinical study of the leaf extract against *Pityriasis versicolor* has been reported.

### 2. Materials and methods

The plant was identified and authenticated at the Regional Herbarium, Southern Circle, Botanical Survey of India, Government of India, Coimbatore, Tamilnadu, India. A voucher specimen was deposited in the Botany Department, K.K. College, University of Madras, Tamilnadu, India.

Leaves used in the present investigation were collected, throughout the year whenever required, from the plants grown in the private garden at Namakkal, Salem District, Tamilnadu, South India, India.

The study was undertaken among the people of Tamilnadu, one of the southern states in the Coromandel Coast of India, between the age group of 16–60 of either sex.

A direct microscopic examination method was adopted to confirm the presence of the fungus (Norman et al., 1971). Fine scales scraped from the infected sites were stained with methylene blue and mounted in 10% KOH solution and observed for the presence of fungal spores (usually in grape-like clusters) and hyphal fragments.

A 100-g sample of fresh, mature, and healthy leaflets of *Cassia alata* were washed first with tap water and then with distilled water. The washed leaflets were mashed thoroughly by hand using 50 ml distilled water (in a stainless steel vessel) and the leaf extract was obtained by squeezing the mash by hand and was filtered using 100 mesh filter cloth. The filtered leaf extract thus obtained was considered as 100% concentrated solution. This was diluted with distilled water to appropriate concentrations and applied to the affected areas of infection as indicated in Table 1. The fresh leaf extract was applied generously over the infected areas at bed-time (2 h before sleep), once only, and washed off thoroughly in the next morning, without using soap. In our preliminary studies, the concentrations below 70% were found to be ineffective, hence further studies were conducted at concentrations varying from 70% to 100% as indicated in Table 1. The effects of application of the extract is given in Table 2.

If portions of stratum corneum peeled off, including in non-infected regions, after the application of the leaf extract, then the leaf extract was to be applied with the concentration diluted to the next descending order of 10% using distilled water whenever required as indicated in Table 1.

### 3. Results and discussion

Plate 1 represents the plant *Cassia alata*, Linn., used in the present study (Kirthikar and Basu, 1975). Fig. 1 shows the presence of the fungus in budding forms and hyphal fragments, found in the scales of the infected regions.
Table 2
Clinical improvement of *Cassia alata* leaf extract against *Pityriasis versicolor* on the surface of the human skin after application

<table>
<thead>
<tr>
<th>1st week&lt;sup&gt;a&lt;/sup&gt;</th>
<th>2nd week</th>
<th>3rd week</th>
<th>3rd month</th>
<th>4th–10th month</th>
<th>11th–12th month</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd and 3rd day</td>
<td>4th and 5th day</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mild irritation</td>
<td>Mild itching</td>
<td>Portions of stratum corneum peeled off in the areas of infection</td>
<td>Infected regions begin to disappear</td>
<td>Repigmentation begins in the hypopigmented zones</td>
<td>Original skin colour is restored without any signs of underlying fungus; skin appears healthy</td>
</tr>
</tbody>
</table>

<sup>a</sup>As reported by 15 fair skinned individuals.

The *Pityriasis versicolor* infected regions before the application of *Cassia alata* leaf extract is shown in Fig. 2. Fig. 3 shows the curative efficacy of the leaf extract over the affected regions of the same subject after the single application. The screening and evaluation of the therapeutic efficacy of the single application of the leaf extract against *Pityriasis versicolor* in an individual requires 9 months. The present study was extended for a period of 10 years covering 200 individuals of either sex between the ages of 16–60 years. The falling of scales from infected regions and the disappearance of hypopigmented zones at the infected sites were the first signs of the efficacy of the treatment.

The current therapeutic measures with known antifungal agents involve application of the medicines over the infected regions for a period ranging from 1 to 3 weeks, resulting in apparent cure followed by relapses between 6 and 12 months.

![Plate 1. *Cassia alata*, Linn.](image)

![Fig. 1. Photograph shows the budding forms and hyphal fragments of the fungus, *Malassezia furfur* in the infected region.](image)
Fig. 2. Photograph shows the infected region of the patient before application.

Fig. 3. Photograph shows the infected region of the same patient after one application of *Cassia alata* leaf extract observed after 9 months.
(Norman et al., 1971; Canizares, 1975; Berkow, 1982; Faergemann, 1989). The fact that a single application of the leaf extract of *Cassia alata* over the infected regions can protect the individual from recurrence for a maximum period of 1 year from *Pityriasis versicolor* establishes the therapeutic supremacy of *Cassia alata* leaf extract over the existing medicines. It is to be noted that permanent cure of the infection is a very difficult and time-consuming process (Norman et al., 1971; Canizares, 1975; Berkow, 1982; Faergemann, 1989). Our studies also concur with the above findings. For permanent cure the leaf extract should be applied three times/year, once every 4 months for 3 consecutive years after apparent cure.

A perusal of the literature on antifungal therapeutical agents reveals that the best chemotherapeutic agents are those that combine a maximum of efficacy against the invader with no deleterious effect on the host (Gale et al., 1984). The fact that application of this extract over the body of individuals involved in the present study caused no side-effects and no changes on the skin characteristics suggests that the leaf extract of *Cassia alata* can be used as an effective, reliable and safe herbal medicine.

4. Conclusions

In conclusion, the present study reports three advantages of *Cassia alata* over existing medicines: (1) the collection of antifungal compounds from the leaves of *Cassia alata* is a simple, cheap and rapid method; (2) its single application over the infected regions cures the disease throughout a year; and (3) *Cassia alata* leaf extract is a reliable, cheap and effective herbal medicine without side effects.

5. References


