



A PHARMACOLOGICAL REVIEW OF PUTIKADI LEPA FOR DADRU

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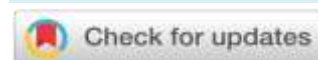
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**ABSTRACT**

The reported prevalence of fungal infection is about 40 million people in developing and underdeveloped countries. The incidence of fungal infection is found to be more during summer and rainy seasons. Local Dermatophytosis / tinea infection i.e. severe itching and annular erythematous scaly patches are the symptoms. As per classical texts, the clinical expression of Tinea infection can be closely related with *Dadru*. Acharya Charak has explained it in *Kshudra Kushtha* while Acharya Sushruta in *Mahakushtha*. Its symptoms include *Kandu*(itching), *Raga*(redness), *Atasipushpvat Pidika* (macular rashes similar to flax flower). For the management of *Dadru*, *Putikadi Lepa* is an effective poly herbal formulation. It consists of *Putik*, *Ark*, *Aragvadh*, *Snuhi*, *Jati* and its local application with *Gomutra*. It has *Kusthagna*, *Kandughna* properties. Many research studies have demonstrated that these drugs possess antifungal, antimicrobial, anti-bacterial properties. The *Gomutra* used for the application of *Putikadi Lepa* contains various elements which hydrates the skin and improves the activity of *Lepa*. Thus, this article deals with the pharmacological action of the ingredients of *Putikadi Lepa*.

Keywords: Dadru, Putikadi Lepa, tinea, antioxidants

INTRODUCTION

Skin disorders have got more importance from medical sciences as well as public health due to experiencing mental, physical and socioeconomic embarrassment in the society by disfigured appearance. In Ayurvedic texts, all skin disorders are considered under the heading of *Kushtha*. Acharya Charak has mentioned *Dadru* in *Kshudra Kushtha* while Acharya Sushruta in *MahaKushtha*¹. Its symptoms include *Kandu* (itching), *Raga* (redness), *Atasipushpvat Pidikā* (macular rashes similar to flax flower). As per Acharya Charaka, the classical symptoms of *Dadru* are *Kandu*, *Raga*, *Pidika* and *Udgata Mandala*². (Raised circular lesions).

In modern science, clinical presentation of *Dadru* is quite similar to that of a localized tinea infection or Dermatophytosis. The term "dermatophytes," which comes from the Greek word for "skin plants," refers to a class of three fungi that typically cause skin diseases in both humans and animals i.e. Microsporon, Trichophyton and Epidermophyton³. In emerging and poor nations, the frequency of fungal infection is estimated to be around 40 million⁴. The spread of Tinea infection can occur through direct human-to-human contact, interaction with pets, clothing exchanges, and unsanitary practices⁵. Its clinical symptoms include annular erythematous scaly areas and intense itching. It is a highly contagious segmented fungal infection that is specified by round lesions that typically have elevated edges and sharp margins. Nomenclature of the Dermatophytosis depends upon the site of involvement e.g. Tinea faciei (ringworm of face), Tinea barbae (ringworm of beard), Tinea capitis (ringworm of scalp and hair), Tinea corporis (ringworm of extremities and thorax), Tinea unguis

(ringworm of nails) and Tinea pedis (ringworm of soles) Tinea cruris (ringworm of buttocks and groin), Tinea manuum (ringworm of palm)⁶

Risk factors: a plethora of skin disorders, primarily fungal and bacterial infections, are caused by environmental pollution, such as humid and hot climates. In tropical nations like India, these fungal infections of the skin and its appendages are more prevalent.⁷ Host factors such as immunologic status (cell mediated immunity) and local factors such as trauma, excessive sweating or skinny clothing along with exposure to the etiologic fungi are the reasons. Modern treatment remedies for tinea are triazoles e.g. Fluconazole, itraconazole orally along with some topical medicaments like topical azoles, allylamines class of drugs e.g. Terbinafine. But in chronic cases steroids can be used but its long-term usage may cause many side effects like thinning of skin, dilation of blood vessels that causes redness, less commonly increased hair growth. Also, these medicaments might develop resistance so there is a need for safer and better treatments that are mentioned in our classical texts. Two methods of Chikitsa are described in our texts: *Antarparimarjana* and *Bahirparimarjana*⁸. *Bahirparimarjana* i.e. external use of medicinal oils, pastes made of herbs etc. in order to facilitate treatment. Various applicability of *Lepa* is mentioned in Ayurvedic scripts, such as *Varnyakar*, *Dahaprashman*, *Keshvridhikar*, *Kushthaghna*, etc. For *Dadru* Ayurvedic texts mentioned a number of *Lepa* e.g. one of them is *Putikadi Lepa*, which is described in *Ashtang hridaya*⁹ and Chakradatta having *Putik*, *Ark*, *Aragvadh*, *Snuhi*, *Jati*, and *Gomutra*.

Table no.1 Drugs Description

Drugs	Botanical Name	Family	Part Used	ratio
<i>Putik</i>	<i>Pongania pinnata</i> Linn.	Leguminosae	Leaves	1 part
<i>Ark</i>	<i>Calatropis procera</i> Ait	Asclepiadaceae	Leaves	1 part
<i>Snuhi</i>	<i>Euphorbia nerifolia</i>	Euphorbiaceae	Leaves	1 part
<i>Aragvadh</i>	<i>Cassia fistula</i> Linn.	Caesalpinaceae	Leaves	1 part

Jati	Jasminium officinale L.Var.	Oleaceae	Leaves	1 part
Gomutra	-	-	-	

Table no.2 Drugs review: showing Rasa Panchak of the formulation¹⁰

Drugs	Rasa	Guna	Virya	Vipaka	Karma
Putik	Katu, Tikta	Laghu, Tikshna	Ushna	Katu	Kushthaghna, Kandughna, Kaphvata Shamak
Ark	Katu, Tikta	Laghu, Tikshna, Ruksha	Ushna	Katu	Kushtaghna, Jantughna, Krimighna
Snuhi	Katu	Laghu, Tikshna	Ushna	Katu	Kaphavata Shamak
Aragvadh	Madhur	Guru, Snigdha, Mridu	Sheeta	Madhur	Kushthaghna, Pittashamaka
Jati	Tikta, Kashaya	Laghu, Snigdha, Mridu	Ushna	Katu	Kushthaghna, Kandughna, Vishaghna
Gomutra	Samadhur				Doshgahn, Krimi Kushtghn

JATI (*Jasminium officinale*)

Ayurvedic pharmacological properties of Jati:

Karma-Mukharoganashaka, Saumanasyajana, Medhya, Vajikarana, Vranashodhana, Vranaropana, Vedanasthapana, Kushthaghna, Kandughna. Artavanjana, Vatashamaka, Anulomana, Raktaprasadana, Mootrajanana, Vishaghna.

The Traditional System of Medicine states that the leaves of *Jati* are beneficial for treating odontalgia, loose teeth, ulcerative stomatitis, leprosy, skin conditions, otorrhoea, otalgia, strangury, dysmenorrhea, ulcers, wounds, ringworm, and corns. As stated by Sharma et al. in 2005 the plant has antiacne, wound-healing, cytoprotective, antibacterial, antioxidant, antiulcer, and spasmolytic properties.

Phytochemicals of Jati: The phytochemical composition of *Jati* as per Brinda et al. (1998) it contains isolated Resin, Salicylic Acid, and Jasminine. Sambacein I-III.200-epifraxamoside, demethyl200-epifraxamoside, jasminanhydride [Sadhu et al., 2007]; indole oxygenase [Divakaret al., 1979]; kaempferol-3-O-a-L rhamnopyranosyl(1-3) a-L-rhamnopyranosyl (1-6) b-Dgalactopyranosyl, rutinoside, 7-ketologanin, oleoside are the phytochemicals found thus far from the leaves.11-methylester, ligstroside, oleuropein, and 7-glucosyl-11-methyl ester [Zhao et al., 2007]

Pharmacological action of Jati:

Exfoliating Action -*Jati* contains salicylic acid and 30% salicylic acid is considered a superficial chemi-

cal peeling agent¹¹ because it does not penetrate the skin beyond the stratum corneum (or granulosum at most). Peeling of stratum corneum should get rid of the fungus because keratinophilic dermatophytes reside in stratum corneum. It has been discovered to remove desmosomal proteins such as desmogleins. As a result of this activity, the cohesiveness of epidermal cells is destroyed, that results in exfoliation by enhancing the penetration of topical antifungals and assisting in the clearance of dermatophytes.

Antioxidant Activity- The primary components of *J. Grandiflorum* essential oil are linalool (9.6%), benzyl acetate (37%), and benzyl benzoate (34.7%). Using the DPPH method, *J. grandiflorum*'s antioxidant activity was shown to be 584.7% which corresponds to 220.93 trolox equivalent antioxidant capacity (TEAC).¹²

Antibacterial activity- Using the standard antibiotic penicillin as a reference, extracts of *Jasminum grandiflorum* Linn. (Oleaceae) were tested for in-vitro antibacterial activity using the agar diffusion method. Using *Staphylococcus aureus*, *Bacillus subtilis*, *Escherichia coli*, and *Pseudomonas aeruginosa* as test organisms, the antibacterial activity of petroleum ether, chloroform, acetone, methanol, and aqueous plant leaf extract was investigated. The results of the tests indicated that the aqueous, methanol, and petroleum ether extracts were the most effective against all four microorganisms.¹³

PUTIK (*Pongamia pinnata*)

Ayurvedic pharmacological properties of putik:

Karma -Jantughna, Kandughna, Kushthagha, Shothahara, Vranaropana, Vedanasthapan, Shirovirechana, Deepana, Pachana, Bhedana, Yakriduttejaka, Krimighna, Raktaprasadana, Kaphaghna, Kasahara, Garbhashayavishodhana, Mootrasangraheeya. **Karanj** leaves balances *kapha* and *vata* and increases *Pitta*.

Useful in piles/hemorrhoids relieves worm infestation, inflammation. Induces diarrhea, relieves constipation. Its Fruits balances *Kapha* and *Vata*, is useful in urinary tract disorders and diabetes, piles/hemorrhoids, relieves worm infestation.¹⁴

Phytochemicals of putik: Triterpenoids, Beta Sitossterol, Furanoflavones, Karanjin, pongapin, kanjone, lonchocarpin, isonchocarpin, carotene glabra chromene are major phyto constituents in leaves .

Pharmacological action of putik:

Antifungal property -When the plant's antifungal properties were tested, it was discovered that the seed oil had the strongest effect against *Aspergillus niger*, *Aspergillus terreus*, and *Candida albicans*¹⁵. This plant contains cycloart-23-ene-3 β ,25-diol, a triterpene molecule whose antifungal properties are being investigated. The result showed strong activity against *C. albicans*. Many studies have reported the antibacterial, antifungal, and antiviral properties of extracts and chemicals from *Pongamia pinnata* leaves, bark, seeds, and seed oil¹⁶.

Immunomodulating action- The leaves aqueous extract has been shown to have immunomodulating effect using immunomodulating action studies¹⁷. This plant has been used to improve skin pigmentation brought on by scabies or leukoderma¹⁸.

Antioxidant properties - The ethanolic extract of the leaves mainly possesses antioxidant properties. Results of the experiment, which was carried out in rats with NH_4Cl -induced hyperammonemia, indicated that oral administration (300 mg/kg wt) significantly increased the levels of glutathione (GSH) peroxidase, superoxide dismutase, catalase, and GSH in the liver and kidney and significantly decreased the levels of HP, CD, and thiobarbituric acid reactive substances

(TBARS)¹⁹. The flavonoids and polyphenols of extract have antioxidant qualities.

ARKA (*Calotropis procera*)

Ayurvedic pharmacological properties of Ark:

Karma -vedanasthapan, shothara, vranshodhan, Kushthagha, Jantughna, Vamanopaga, Deepana, Pachana, Pittasaraka, Rechana, Krimighna, Amashayakshobhaka, Hridayottejaka, Raktashodhaka Flower - Raktapittaprashamana, Kaphanisarak, Kushthagha, Jwaraghna, Vishamajwara-pratibandhaka, Katupaushtika, Balya.

Phytochemicals of Ark: mudarine is the principal active constituent as well as a bitter yellow acid, resin and 3 toxic glycosides calotropin, uscharin and calotoxin. Beta Amyrin, Calotropin, Calotropagenin is also present in leaves.

Pharmacological action of Ark:

Antifungal activity- An aqueous ethanolic extract of *Calotropis procera* R.Br. leaves was tested for antifungal activity using the disc method against *Rhizopus oryzae*, *Fusarium oxysporum*, and *Botrytis cinerea*. According to the results, a 50% aqueous ethanolic leaf extract of *Calotropis procera* inhibits the growth of isolates. The effect that the leaf extract with ethanol showed was remarkable.²⁰

According to Ahmed et al 2006²¹⁻²², Experimental Pharmacological Action of *Ark*. "demonstrated the antifungal, insecticidal, and anticancer properties of *C. procera*. According to reports, the plant's latex has analgesic, wound-healing, anti-inflammatory, and antibacterial properties (Yoganarasimhan, 2011).²³

ARAGAVADHA (*Cassia fistula*)

Ayurvedic pharmacological properties of Aragvadh:

Karma -shothahara, vedanasthapan, kushtaghna, anuloman, Shrestha mriduvirechak, Hridaya, raktashodhak, kaphanissarak, mootrajanan, Kushthagha, dahaprashmana, amashodhsna pittashamak, jwaraghna.

It possesses therapeutic potential in skin diseases, cardiac problems, gout, blood disorders, diabetes mellitus, herpes, febrile conditions etc. Various parts of plant are found hypoglycemic, laxative, antibacterial, antipyretic, anti-inflammatory, smooth muscle

stimulant, hepatoprotective, analgesic, anticancer, abortifacient, anti-colic, anti-fertility, estrogenic, anti-inflammatory, anti-tussive, antifungal and also used to check wounds healing and antibacterial properties etc.

Phytochemicals of Aragvadha: Rhein and its Glucoside, Sennosoids A and B are mainly found in leaves.

Pharmacological action of Aragvadha:

Antibacterial and Antifungal Action-The antibacterial and antifungal activities of extracts (5, 25, 50, 100, 250 µg/ml) of Cassia fistula were tested against two Gram-positive-Staphylococcus aureus, Streptococcus pyogenes; two Gram-negative-Escherichia coli, Pseudomonas aeruginosa human pathogenic bacteria and three fungal strains-Aspergillus niger, Aspergillus clavatus, Candida albicans. when compared with standard drugs like ampicillin, ciprofloxacin, norfloxacin, and chloramphenicol for antibacterial activity and nystatin and griseofulvin for antifungal activity. The antibacterial and antifungal activities of the extracts increased linearly with increase in concentration of extracts (µg/ml). when analyzed with standard drugs, the results revealed that in the extracts for bacterial activity, S. Pyogenes and S. Aureus were more sensitive as compared with E. Coli and P. Aeruginosa, and for fungal activity, C. Albicans shows good result as compare with A. Niger and A. Clavatus. The hydroalcoholic extracts of Cassia fistula were found to be active on most of the clinically isolated microorganism and fungi, when correlated with standard drugs.²⁴

SNUHI (euphorbia nerifolia)

Ayurvedic pharmacological properties of Snuhi:

It is included under *Guduchyadi Varga*, *Abhyadi varga*, *Shalmalyadi varga*, *Nikumbhadi Varga*, *Satpushpadi varga*, *Amlakyadi varga*. By applying on Vrana the steamed leaves of *Snuhi* for 5-6 days, gashes are healed²⁵. It is *Pittahar*, *Dahahar*, *Kushathahar*, *Vatahar*, *Pramehahar*, *Vishaghana*, *Adhamanhar*, *Gulmahar*, *Udarhar*²⁶

Phytochemicals of Snuhi: *Snuhi* contains Triterpenoids, euphol, euphorbol etc in leaves.

Pharmacological action of Snuhi:

Immunomodulatory activity - By giving healthy albino rats an oral dose of 400 mg/kg/day of body weight, a 70% v/v hydro-alcoholic extract of dried *Euphorbia nerifolia* leaves was found to have immunomodulatory activity by Kalpesh Gaur et al. Rats survival rate against E. coli-caused abdominal sepsis was utilized to determine the immunomodulatory action. It was discovered that the hydro-alcoholic extract of E. nerifolia showed significant protection against e. coli-induced abdominal sepsis. These findings suggest that the hydro-alcoholic extract of dried E. nerifolia leaves has immunomodulatory properties.^{27, 28}

Antimicrobial effect - The phytochemical and antibacterial analyses of E. Neriifolia leaf extract was determined by Kumara Swamy et al. The antibacterial activity of leaf extracts from the medicinal plant E. Neriifolia against bacterial isolates such as Staphylococcus aureus, Klebsllia pneumonia, E. Coli, Proteus vulgaris, and Pseudomonas fluroscens were examined using phytochemical analysis. The phytochemical examination identified flavonoids, tannins, cadenoids, phenol, saponin, and terpenoids. Chloroform extract showed the highest level of efficacy against K. pneumoniae (5 mm). There was virtually little action in the ethyl acetate extract and water. This study supports the traditional use of E. nerifolia leaves for treating bacterial infections and wound healing.²⁹

GOMUTRA

Ayurvedic pharmacological properties of Gomutra: *Doshgahn*, *Krimi Kushtaghn*

Phytochemicals of Gomutra: Phenolic acids (gallic, salicylic acid, gallic acid), allantoin

pharmacological properties of Gomutra: Using samples of *Gomutra* from both indoor and outdoor feeding, Dr. Sanyogita s. et al. conducted research against a variety of fungus. The effectiveness of *Gomutra* as an antifungal agent has been demonstrated. When a urine sample from an outdoor feeding cow was used instead of one from an indoor feeding cow, the amount of fungal growth inhibition was greater.³⁰ Another research was carried out by Dhananjay Desai et.al. against test fungus *Aspergillus niger*, *aspergil-*

lus flavus and Fusarium sp. It was concluded that *Gomutra* can be used to minimize fungal infections.

³¹ K.N. Rakesh et al. conducted another study to determine whether test fungus can be inhibited by *Gomutra*, Fresh cow urine was found to be less efficient than preserved *Gomutra* ³².

Because of the urea, creatinine, aurum hydroxide, carbolic acid, phenols, calcium, and manganese, it demonstrated anti-microbial properties. Allantoin induces keratinolytic activity and wound healing. Owing to allantoin and uric acid, antioxidant properties. Phenolic acids (salicylic, caffeic, ferulic, o-coumaric, and cinnamic acids) are responsible for the antifungal activity. Within 6 to 8 hours of being obtained from the cow, *Gomutra* becomes toxic, hence distillation must be done right away ³³.

DISCUSSION

In contrast to *Kapha's Shitata*, *Guruta*, *Snigdha* and *picchilta* traits, *Putikadi Lepa* has *Ushna*, *Laghu*, *Ruksha*, *Kaphashamaka*, *Kushthaghna* and *Kandughna* qualities. Consequently, both *Kapha* and *Kandu* eventually decline. The mandala suggests *Rakta dushti* and the lesion's *Visarpa* are due to *Tikshnata* of *Pitta*. This *Lepa* decreases *Mandala* and helps with *Pitta* and *Rakta* dominant disorders because of its *Tikta*, *Kashaya*, and *Madhura Rasatmak* properties.

Putikadi Lepa ingredients are thought to have antifungal, anti-inflammatory, antimicrobial, immunomodulatory, and antioxidant qualities. Although *tinea corporis* does not pose a threat to life, the deformity of bodily parts makes the disorder embarrassing. Patients with low defensin beta 4 may be susceptible to all dermatophytes, according to Jaradat et al. ³⁴ As it is widely stated that cell-mediated immune response is responsible for the check of dermatophytosis. ³⁵

The use of immunomodulation techniques may improve the efficacy of antifungal drugs, hence lowering the rates of morbidity related to fungal infections. However, the use of immunomodulating medications to treat fungal infections is still in its early stage. ³⁶ Patients with impaired immune systems are more vulnerable to fungal infections. Antibacterial

and other compounds may be used for prophylactic and therapeutic purposes in parallel or sequential with antifungal drugs, as it is important to emphasize that patients at risk for invasive fungal infections are also at risk for developing serious bacterial infections (Stergiopoulou et al 2009). As Antifungal medications and antibacterial compounds have an impact on each other e.g. tetracycline directly affects mitochondrial function, it reduces sterol metabolism, which in turn lowers ergosterol levels. Reduced sterol levels in tetracycline-grown cells increase the susceptibility to amphotericin B because they result in a larger ratio of amphotericin B to ergosterol at the cell surface ³⁷. prior to the fungal infection and even after receiving antifungal therapy, the skin always exhibits symptoms of high oxidative stress from both external and endogenous sources. Determining the best ways to fortify the skin's defenses and enhance its inherent antioxidant system is crucial. There aren't any commercially available formulations that offer antioxidant and long-lasting antifungal effects presently. ^{38, 39}

Putikadi Lepa may be a safer and more effective herbal remedy for skin infections due to its antioxidant qualities. For instance, ascorbic acid is an antioxidant that helps the body recuperate from fungal infections and reduces the inflammatory symptoms associated with yeast and fungal infections. ⁴⁰⁻⁴³

Putikadi Lepa can be used to treat *tinea* infection due to its antifungal, antioxidant, and anti-inflammatory qualities.

CONCLUSION

Fungal infections are prevalent in both higher and lower social classes as a result of industrialization and lifestyle modifications, such as eating unclean and unsuitable food. Antifungal medications rarely cause negative effects, although excessive use can lead to resistance. Thus, a different safe and efficient herbal formulation is required. Studies revealed that the ingredients of *Putikadi Lepa* have antifungal, antimicrobial, antibacterial, antioxidant, and immunomodulating qualities. The application of *Putikadi Lepa* involves the use of cow urine, which is rich in

phytochemical compounds that hydrate the skin and enhance *Lepa* action. demonstrating *Putikadi Lepa's* efficacy as a powerful medication of choice for the treatment of *Dadru*.

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