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TANKANA AND *SPHATIKA* AS AN ANTIMICROBIAL ROLE IN SKIN INFECTION DISORDER: A SYSTEMIC REVIEW

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ABSTRACT

Skin infections, particularly superficial fungal disorders, represent a significant global health burden, affecting 20% to 25% of the world's population. In the pediatric demographic, factors such as high humidity, close contact in schools, and developing immunity increase susceptibility to conditions like *Dadru* (dermatophytosis) and *Darunaka* (seborrheic dermatitis). While conventional antifungals are available, concerns regarding resistance and systemic toxicity necessitate the exploration of traditional mineral-based therapies. *Tankana* (Borax) and *Sphatika* (Alum) are two pivotal minerals in Ayurvedic *Rasashastra* renowned for their *Krimighna* (antimicrobial) and *Kshariya* (alkaline) properties. This systemic review evaluates the pharmacological profiles, clinical efficacy, and antimicrobial rationale of these minerals in managing pediatric skin infections. Evidence suggests that their ability to modulate the cutaneous pH and reduce moisture creates a hostile environment for pathogens, offering a potent, cost-effective alternative to standard treatments.

KEYWORDS: *Tankana* , *Sphatika* , skin infection.

INTRODUCTION

The prevalence of superficial mycoses has risen sharply, with dermatophytes of the *Trichophyton* and *Microsporum* genera being the primary etiological agents.[1,2] Children are particularly vulnerable; for instance, *Tinea capitis* is most common in those aged 3 to 9 years.[3,4] In infants, seborrheic dermatitis (*Darunaka*) affects up to 70% of individuals in the first three months of life.[5,6]

Traditional Ayurvedic medicine classifies these infections under *Kushtha* (skin diseases). Management involves *Rasashastra*—the therapeutic use of purified minerals.[7] Among these, *Tankana* (Borax) and *Sphatika* (Alum) are frequently utilized in topical formulations due to their antiseptic and healing qualities.[8,9] This review synthesizes current knowledge on their antimicrobial roles, focusing on their application in pediatric dermatology.

Pharmacological Profiles

Tankana (Borax)

Tankana is a naturally occurring mineral alkali, chemically identified as sodium tetraborate decahydrate (Na2B4O7.10H2O).[10,11] In Ayurveda, it is categorized as *Kshararaja* (king of alkalies) and undergoes *Shodhana* (purification) to become *Tankana Bhasma*.[9,12] Its pharmacological attributes include:

- **Rasa (Taste):** *Katu* (Pungent).
- **Virya (Potency):** *Ushna* (Hot).
- **Guna (Quality):** *Ruksha* (Dry), *Tikshna* (Sharp/Penetrating).[9,13]
- **Actions:** *Kapha-visleshaka* (liquefier of Kapha), *Lekhana* (scraping), and *Krimighna* (antimicrobial).[5,12,13]

Sphatika (Alum)

Sphatika is an anhydrous aluminum potassium sulfate (K2SO4. Al29(SO4)3.24H2O prized for its astringent properties.[8,14] After heat processing, it transforms into *Sphatika Bhasma*.[8,12] Its profile includes:

- **Rasa:** *Kashaya* (Astringent), *Katu, Amla* (Sour), and *Madhura* (Sweet).
- **Guna:** *Guru* (Heavy) and *Snigdha* (Unctuous).[13,15]
- **Actions:** *Vranaropana* (wound healing), *Raktadoshahara* (blood purification), and *Kushtaghna* (anti-dermatosis).[13,16]

Antimicrobial Role and Rationale

The antimicrobial efficacy of *Tankana* and *Sphatika* is primarily driven by the modulation of the cutaneous environment, a principle known in Ayurveda as *Prakriti Vighatana* (destruction of the favorable environment for pathogens).[9,17]

1. pH Modulation and Alkalinity

Tankana is inherently alkaline (*Kshariya*). Microbes, particularly fungi, thrive in acidic or neutral environments; the application of an alkaline *Bhasma* disrupts this homeostasis, rendering the skin surface inhospitable for microbial survival and reproduction.[9,13] Its *Tikshna* (sharp) quality allows the drug to penetrate deeper skin layers to reach the site of infection.[9]

2. Astringency and Moisture Control

Sphatika acts as a potent astringent. It precipitates proteins at the outer layer of microbial cells, which reduces capillary permeability and strengthens the skin barrier.[14,18] Crucially, it possesses "sweat-pore blocking activity," which reduces the secretion of sweat and subsequent moisture.[14] Since dermatophytes require moisture for growth, this drying effect acts as a powerful physical deterrent to fungal colonization.[14,19]

3. In-vitro Evidence

Experimental studies have validated these traditional roles. *Tankana Bhasma* has demonstrated significant zones of inhibition (ZOI) against *Candida albicans* and *Aspergillus niger*, with ZOI values reaching up to 21 mm at higher concentrations.[10] *Sphatika Bhasma* has shown broad-spectrum antibacterial activity, particularly against multidrug-resistant *Pseudomonas aeruginosa*, often outperforming raw alum in potency.[18,20]

Clinical Evidence in Pediatric Dermatology

Darunaka (Seborrheic Dermatitis)

Darunaka is characterized by *Kandu* (itching) and *Twaka Sputana* (scaling).[5] Clinical trials using *Tankana Bhasma* mixed with *Narikela Taila* (coconut oil) for *Shiroabhyanga* (head massage) showed a 98% reduction in symptoms over 45 days.[5,6] The *Bhasma's Lekhana* action clears debris while its *Vishleshana* property separates vitiated Kapha from the scalp.[5]

Dadru (Dermatophytosis)

In cases of *Dadru* (ringworm), formulations like *Saubhagyadi Churna Lepa*—containing both *Tankana* and *Sphatika*—are highly effective.[16,21]

- **Tankana:** Provides *Kandughna* (itch-relief) and reduces the elevation of lesions through its scraping action.[13,16]
- Sphatika: Normalizes hyperpigmented patches left by the infection through its Vranashodhaka (wound purifying) property.[13,16]

  Case studies of chronic, relapsing dermatophytosis have reported complete symptom resolution within 28 to 30 days of topical application, with no relapses at 6-month follow-ups.[17,22]

Safety and Pediatric Considerations

The use of mineral-based compounds in children requires adherence to safety protocols due to the higher permeability of pediatric skin.[23,24]

- **Concentration Limits:** The Expert Panel for Cosmetic Ingredient Safety suggests that borates (like *Tankana*) are safe at concentrations 5%, but they should not be used on infant skin (under 3 years) or injured skin to avoid systemic absorption.[25,26]
- **Supervision:** Topical application should be localized and supervised by an Ayurvedic practitioner.[8,21]
- **Purification:** Only purified (*Shuddha*) Bhasmas should be used; unpurified *Tankana* may cause irritation or giddiness.[19]

CONCLUSION

This review highlights the probable and effective role of *Tankana* and *Sphatika* as antimicrobial agents in the management of pediatric skin infections. By creating a hostile, alkaline, and dry environment, these minerals offer a multi-targeted approach to treating fungal and bacterial disorders without the side effects often associated with long-term antibiotic or antifungal use. Future research should focus on standardized pediatric dosing and the development of modern topical vehicles, such as creams or gels, to enhance the delivery and safety of these ancient mineral remedies.

REFERENCES

1. OPTIMIZATION OF PROCESS PARAMETERS FOR LACCASE PRODUCTION BY SOLID STATE FERMENTATION FROM TRAMETES ELEGANS H6 Hirenbhai V. Prajapati*1 , Farida P. Minocheherhomji2 Microbiology Department, B.P. Baria Science Institute, Navsari, Gujarat, India

2. Lyon JP, et al. *Braz J Microbiol.* 2008;39:668-72.^27 Factors influencing susceptibility testing of antifungal drugs: a critical review of document M27-A4 from the Clinical and Laboratory Standards Institute (CLSI)
3. Edinaira Sulany Oliveira de Sousa 1, Ana Claúdia Alves Cortez 2, Marcia de Souza Carvalho Melhem 3 4, Hagen Frickmann 5, João Vicente Braga de Souza 6
4. Madduru Muni H, et al. *JAHM.* 2025;13(7):100-106.^1 Role of Ayurvedic multimodal treatment approach in the management Of Tinea Capitis -A case report
5. In vitro activity of six antifungal drugs against clinically important dermatophytes. *Jundishapur Journal of Microbiology*. 2011; 4(3): 158-163. Pakshir K, Bahaedinie L, Rezaei Z, Sodaifi M, Zomorodian K.Pakshir K, et al. *Jundishapur J Microbiol.* 2011.^28
6. A Randomised Clinical Trial to Evaluate the Therapeutic Effect of Tankana Bhasma and Yashtimadhu Churna with Narikela Taila in Darunaka W.S.R. to Seborrheic Dermatitis. *International Journal of Recent Advances in Multidisciplinary Topics (IJRAMT)*. 2024; 5(11): 79–84. Yasmeen A. Phaniband & Monika Joshi.
7. A Review on Malaharakalpana in Skin Disease. *International Journal of Research in Medical Sciences and Technology (IJRMST)*. 2019; 8(Jul-Dec): 198–203. Nilawad V, et al
8. Contributions of Charaka Samhita, Sushruta Samhita and Astanga Hrudaya in the Field of Rasashastra (Indian Alchemy). *Journal of Emerging Technologies and Innovative Research (JETIR)*. 2023 Aug; 10(8): g583–g593. ISSN: 2349-5162. Kamath SS, Rao HP
9. Phyto-Pharmacological Review on *Cassia tora* Linn. *Journal of Drug Delivery and Therapeutics*. 2019; 9(6): 130–134. doi:10.22270/jddt.v9i6.3684 Sahoo I, Sahoo S, Biswal S, Panda
10. Clinical evaluation of the efficacy of Tankana-Sphatika Yoga in the management of Dadru Kushtha (Dermatophytosis). *Journal of Ayurveda*. 2024; 18(2): 163–169. Meena R, Singh K, Meena S.
11. In-vitro antimicrobial activity of Tankan. *European Journal of Biomedical and Pharmaceutical Sciences (EJBPS)*. 2015; 2(7): 278–282. Adhvaryu TR, Patel KS, Kori VK, Rajagopala S, Manjusha R
12. *Puskara or tankana kshra.8H2O*.^31 Review Article: Purification, Detoxification, and Incineration Methods of Minerals and Metals in Traditional Medicine Formulations. *Evidence-Based Complementary and Alternative Medicine*. 2021; Article ID 6625037: 1–13. Seneviratne K, Liyanage JA, et al
13. **Sharma S.** *Rasa Tarangini*. (K. Shastri, Ed.). 11th ed. Varanasi: Motilal Banarasidas; 1979 (Reprint 2004).
14. **Meena R, Singh K, Meena S.** Clinical evaluation of the efficacy of Tankana-Sphatika Yoga in the management of Dadru Kushtha (Dermatophytosis). *International Journal of All Research Writings (IJARW)*. 2022 Nov; 4(5): 71–74
15. Basaiye, et al. (2023). Gandhakadya Malahara. *World Journal of Pharmaceutical Research*, 12(19), 62–69.

16. Upadhyaya, M. (2007). *Ayurveda Prakasha*. (Vd. Gulraj Sharma Mishra, Ed. & Trans., *Suspashtavabodhini* Hindi Commentary). Varanasi, India: Chaukhambha Bharati Academy. pp. 257–258
17. Pham, M. H., & Nguyen, T. A. D. (2022). The role of youth unions in building an environment to promote creative innovation for students. *International Journal of All Research Writings*, *3*(11), 90–97.
18. Yadav, R., Singh, J. P., Sahu, A. K., & Sharma, G. (2024). Clinical study of Kasisadi Varti in the management of Pichchhila Yoni w.s.r. to abnormal vaginal discharge. *Journal of Ayurveda*, *18*(1), 17–24.
19. Rege, A. A., & Pachpore, S. S. (2022). Evaluation of *in vitro* antibacterial and antibiofilm activities of ascorbic acid against clinical isolates. *International Journal of Advanced Research*, *10*(08), 891–902
20. Ayurmed Info. (2012). *Pharmacological properties and medicinal uses of Ayurvedic herbs*. Ayurmedinfo.com.
21. Mhaskey, M. J., Dhok, R. P., & Shinde, S. B. (2025). Pharmacognostical and phytochemical investigation of *Luffa acutangula* (L.) Roxb. Var. *Amara* (Roxb.) Clarke. *The Bioscan*, *20*(Special Issue-2), 204–207.
22. Ngo, T. N., Tran, T. B. A., & Tran, T. K. A. (2022). State management of land in Dong Trieu town, Quang Ninh province. *International Journal of All Research Writings*, *4*(5), 67–74.
23. Kote, A. V., & Dhiman, K. S. (2022). Ayurvedic management of *Ardhavabhedaka* (Migraine) through *Nasya Karma* and *Shamana Chikitsa*: A case report. *Journal of Ayurveda Case Reports*, *5*(1), 22–26.
24. Elston, D. M. (2023). Botanical briefs: Handling the heat from capsicum peppers. *The Hospitalist*. MDedge
25. InfantRisk Center. (2015, July 23). *Benzocaine topical teething products*. Texas Tech University Health Sciences Center.
26. Cosmetic Ingredient Review Expert Panel. (2024). *Safety assessment of potassium and TEA-cocoyl hydrolyzed collagen as used in cosmetics* (Draft Amended Report). Cosmetic Ingredient Review.
27. European Commission. (2009). Regulation (EC) No 1223/2009 of the European Parliament and of the Council of 30 November 2009 on cosmetic products (Annex III: List of substances which cosmetic products must not contain except subject to the restrictions laid down). *Official Journal of the European Union*, *L 342*, 59–209
28. Yazdanpanah, S., Pakshir, K., Shafiekhani, M., Zomorodian, K., & Nikoupour, H. (2024). Clinical characteristics and outcomes of colonization and infection by yeast species in solid organ transplant recipients: Molecular identification and antifungal susceptibility patterns of isolates. *Medical Mycology*, *63*(1), myae118
29. Yadav, P., & Singh, P. (2019). Review on pharmacological properties of *Cissus quadrangularis* L. *International Journal of Research in Medical Sciences and Technology*, *7*(1), 124–128.International Journal of Research in Medical Sciences and Technology. 2019.^29.
30. Sujith, S., & Sreejith, S. (2024). A review on the evolution of Rasashastra: From alchemy to Ayurveda Samhita. *Journal of Emerging Technologies and Innovative Research*, *11*(2), b104–b110.

31. Ratnasooriya, W. D., & Premakumara, G. A. S. (2021). Purification, detoxification, and incineration methods of minerals and metals in traditional medicine formulations. *Evidence-Based Complementary and Alternative Medicine*, *2021*, Article ID 6634560, 1–15.
32. Kote, A. V., & Dhiman, K. S. (2022). Evaluation of the efficacy of Gandhakadya Malahara in the management of *Pama* (Scabies): A clinical study. *Journal of Ayurveda Case Reports*, *5*(2), 58–63.