



Research Article

Comparative anti-microbial study of Nimbadi churna and Manikya rasa w.s.r to *Candida albicans* and *Staphylococcus aureus*

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Abstract

Background: Ayurvedic medicine utilizes both mineral-based and herbal formulations to promote healing through synergistic mechanisms. *Manikya Rasa*, a mineral formulation, is known for its potent bioactive properties that penetrate deeper tissues for rapid therapeutic action. In contrast, *Nimbadi Churna*, herbal formulation, supports long-term immunity and systemic detoxification. Infections caused by *Candida albicans* and *Staphylococcus aureus* are increasingly difficult to manage due to rising antimicrobial resistance. Objective: To evaluate and compare the antimicrobial efficacy of *Manikya Rasa* and *Nimbadi Churna* against *Candida albicans* and *Staphylococcus aureus*, and to assess their potential as alternative therapies in the management of microbial infections. Methods: A comparative in vitro study was conducted to assess the inhibitory effects of the *Manikya Rasa* and the herbal formulation *Nimbadi Churna* on *Candida albicans* and *Staphylococcus aureus*. The formulations were tested for their antimicrobial properties to determine their individual and potential combined efficacy. Results: Both *Manikya Rasa* and *Nimbadi Churna* demonstrated notable antimicrobial activity. *Manikya Rasa* showed rapid and strong inhibition of microbial growth, while *Nimbadi Churna* provided a gentler, sustained antimicrobial effect. Together, they offer complementary therapeutic benefits. Conclusion: *Manikya Rasa* and *Nimbadi Churna* show promise as effective Ayurvedic alternatives for managing infections caused by *Candida albicans* and *Staphylococcus aureus*. Their combined use may offer enhanced outcomes by merging fast-acting mineral effects with the holistic benefits of herbal therapy. These findings highlight the relevance of traditional formulations in modern antimicrobial strategies.

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Introduction

Infectious diseases are disorders caused by pathogenic microorganisms such as bacteria, viruses, fungi, or parasites that invade and multiply within the host body. These diseases can be transmitted directly or indirectly and remain one of the leading causes of morbidity and mortality worldwide. The manifestation of infectious diseases ranges from mild symptoms to life-threatening complications, often affecting multiple systems of the body. In Ayurveda, such conditions are often classified under *Agantuka Vyadhis* (externally acquired diseases) or *Dhatugata Rogas*, with emphasis on *Dosha* vitiation, *Ama* (toxins) accumulation, and weakened *Ojas* (vital essence). The Ayurvedic approach to managing infections includes *Shodhana* (purification), *Shamana* (pacification), *Rasayana* (rejuvenation)

and the use of herbo-mineral formulations with antimicrobial, immunomodulatory, and detoxifying properties (1).

Manikya Rasa is a herbo mineral preparation where in the ingredients of the formulation are mainly *Rasadavyas* and the *bhavana dravyas* used are herbal *dravyas*. It is mentioned in the *Kusta rogaadhikara*. It is traditional used in management of all skin disorders. Apart from that it is also used in *Jwara*, *Amavata* and pruritis. It also acts as a rejuvenating tonic which improves strength, stamina and energy and is a good stimulant. This may be beneficial in treating poor erection resulting from nerve weakness and testicular dystrophy (2).

Manikya Rasa and *Nimbadi Churna* are two distinct yet complementary Ayurvedic formulations used in the treatment of skin disorders, among other systemic conditions. While they differ in composition—*Manikya Rasa* being a herbo-mineral formulation primarily composed of *Rasadavyas* (3) and *Nimbadi Churna* being a polyherbal formulation centered around *Azadirachta indica* (Nimba)—both share a common therapeutic goal the purification and restoration of skin health, along with broader systemic benefits (4).

Nimbadi Churna is a classical polyherbal Ayurvedic formulation primarily indicated in the management of skin disorders (*Kushta*),

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Prameha (diabetes), and inflammation. The formulation derives its name from its chief ingredient – *Nimba* (*Azadirachta indica* A. Juss.) – renowned for its *Tikta* (bitter), *Katu* (pungent), and *Kashaya* (astringent) tastes and potent antibacterial, blood-purifying, and anti-inflammatory properties. This *churna* is a well-known combination of detoxifying and *Pitta-Kapha* pacifying herbs, often prescribed for internal as well as external use in chronic dermatoses, abscesses, and metabolic disturbances. It promotes *Shodhana* (purification) and aids in balancing *Doshas* especially *Pitta* and *Kapha* (5).

These two formulations were selected because no previous antimicrobial studies have been conducted on them against the specific microorganisms mentioned above. Although both are traditionally indicated in the management of skin disorders, the absence of targeted antimicrobial research on these formulations created a scope to bridge this gap. Moreover, *Nimbadi Churna* is currently unavailable in the market, and *Manikya Rasa* is rarely accessible. Therefore, we prepared both formulations ourselves and conducted analytical studies, followed by an antimicrobial study. However, only the antimicrobial study has been presented in this article.

Aims and Objectives

To evaluate the Anti-Microbial activity of *Nimbadi churna* & *Manikya Rasa* against *Candida albicans* and *staphylococcus aureus*.

Materials and Methods

A) Pharmaceutical study:

The preparation of *Nimbadi churna* is as follows:

Table 1: Ingredients of Nimbadi churna

Ingredients	Botanical name	Part used	Quantity Taken
<i>Nimba</i>	<i>Azadirachta indica</i> A. Juss.	Leaf	48 gms
<i>Guduchi</i>	<i>Tinospora cordifolia</i> (Willd.) Miers	Paste	48 gms
<i>Haritaki</i>	<i>Terminalia chebula</i> Retz.	Fruit	48 gms
<i>Amalaki</i>	<i>Emblica officinalis</i> Gaertn.	Fruit	48 gms
<i>Bakuchi</i>	<i>Psoralea corylifolia</i> L.	Seed	48 gms
<i>Shunti</i>	<i>Zingiber officinale</i> Roscoe	Rhizome	10 gms
<i>Vidanga</i>	<i>Embelia ribes</i> Burm.f.	Fruit	10 gms
<i>Pippali</i>	<i>Piper longum</i> L.	Fruit	10 gms
<i>Yavani</i>	<i>Trachyspermum ammi</i> (L.) Sprague	Seed	10 gms
<i>Chakramarda</i>	<i>Cassia tora</i> L.	Seed	10 gms
<i>Vacha</i>	<i>Acorus calamus</i> L.	Rhizome	10 gms
<i>Shweta Jeeraka</i>	<i>Cuminum cyminum</i> L.	Seed	10 gms
<i>Katuka</i>	<i>Picrorhiza kurroa</i> Royle ex Benth.	Root	10 gms
<i>Khadira</i>	<i>Acacia catechu</i> Willd.	Heart wood	10 gms
<i>Saindhava Lavana</i>	Rock Salt	Mineral	10 gms
<i>Yava kshara</i>	Alkali of <i>Hordeum vulgare</i> L.	Extract	10 gms
<i>Haridra</i>	<i>Curcuma longa</i> L.	Rhizome	10 gms

<i>Daruharidra</i>	<i>Berberis aristata</i> DC.	Root	10 gms
<i>Musta</i>	<i>Cyperus rotundus</i> L.	Rhizome	10 gms
<i>Devadaru</i>	<i>Cedrus deodara</i> (Roxb. ex D.Don) G.Don	Heart wood	10 gms
<i>Kusta</i>	<i>Saussurea lappa</i> C.B.Clarke	Root	10 gms

Method of preparation: Above mentioned quantity of drugs is taken and pounded individually and sieved through a clean cloth to make *Sukshma Churna* (Fine powder), mixed homogenously and stored in container (6).

The preparation of *Manikya Rasa* is as follows:

Table 2: Ingredients of Manikya Rasa

Ingredients	Botanical name/ Chemical name	Part used	Quantity Taken
<i>Shudha Haratala</i>	Arsenic trisulphide (As_2S_3)	-	60 gms
<i>Shudha Gandhaka</i>	Sulphur (S_8)	-	60 gms
<i>Shudha Manashila</i>	Arsenic disulphide (As_2S_2)	-	25 gms
<i>Shudha Parada</i>	Mercury (Hg)	-	10 gms
<i>Shudha Naga</i>	Lead (Pb)	-	10 gms
<i>Tamra Bhasma</i>	Calx of Copper (Cu)	-	10 gms
<i>Abhraka Bhasma</i>	Calx of Mica (mainly $KAl_2(AlSi_3O_{10})(OH)_2$)	-	10 gms
<i>Loha Bhasma</i>	Calx of Iron (Fe)	-	10 gms
<i>Vata ksheera</i>	<i>Ficus benghalensis</i> L.	Latex	15 ml
<i>Nimba kwatha</i>	<i>Azadirachta indica</i> A. Juss.	Leaf decoction	15 ml
<i>Guduchi</i>	<i>Tinospora cordifolia</i> (Willd.) Miers	Stem	5 gms
<i>Neelini</i>	<i>Indigofera tinctoria</i> L.	Leaf	5 gms
<i>Tagara</i>	<i>Valeriana wallichii</i> DC.	Rhizome/Root	5 gms
<i>Shobhanjana</i>	<i>Moringa oleifera</i> Lam.	Leaf	5 gms
<i>Jeeraka</i>	<i>Cuminum cyminum</i> L.	Seed	5 gms
<i>Nirgundi</i>	<i>Vitex negundo</i> L.	Leaf	5 gms
<i>Karaveera</i>	<i>Nerium indicum</i> Mill. (syn. <i>Nerium oleander</i> L.)	Leaf/Root	5 gms

Method of preparation: *Shudda Parada* & *Shudda Naga* taken together and *Kajjali* is prepared. To this *Shudda Haratala*, *Shudda Gandhaka*, *Shudda Manashila*, *Tamra bhasma*, *Abhraka bhasma*, *Loha bhasma* are added and *Mardana* is done with *Vata Ksheera* and *Nimba Kwatha* for 3 days. Then powders of *Guduchi*, *Tagara*, *Nilini*, *Shobhanjana*, *Jeeraka*, *Nirgundi* and *Karaveera* are added, mixed well and *Sharava Samputa* is done and subjected for *Puti*. After *Swangasheeti* material is collected which is having *Manikya Varna* (7).

B) Anti-Microbial Study

Agar well diffusion method

Methodology

a) Well-Diffusion method was performed with standard assessment parameters.

b) The stock was prepared with a stock concentration of 250 mg/ml. Seven volumes were employed from the stock vial, i.e., 10 μ L, 25 μ L, 50 μ L, 75 μ L, 100 μ L, 150 μ L and 200 μ L along with the stock concentrations and a blank solution on *S. aureus*, and *C. albicans* respectively.

c) The plates were incubated at 37°C for 24 hours and the zone of inhibition were studied.

Antimicrobial Screening

Agar well diffusion method has been used to determine the antimicrobial activities of sample against Gram-positive bacteria (*S. aureus*), Dimorphic fungus (*C. albicans*) at a viable count of 0.5 Standard McFarland solution.

Procurement of the microorganisms and their authentication was carried out at Karyome Private limited Research institute kergalli Road, Bhogadi, Mysuru.

Procedure

0.1ml of fresh bacterial and fungal culture were pipetted on molten-cooled Muller Hinton Agar and Sabouraud's Dextrose media respectively. Upon solidification, wells were made using a sterile cork borer (6 mm in diameter) into agar plates containing inoculum. Then, seven volumes were employed from the stock vial, i.e., 10 μ L, 25 μ L, 50 μ L, 75 μ L, 100 μ L, 150 μ L and 200 μ L along with the stock concentration and a blank solution was added to respective wells of each plate. The plates were let sit for 30 mins for the extracts to diffuse into the well. The plates were incubated at 37°C for 24 hrs. Antimicrobial activity was detected by measuring the zone of inhibition (including the wells diameter) appeared after the incubation period. Karyome Private Limited (8).

Observations and Results

Table 3. Quantitative Observations of *Nimbadi churna* and *Manikya Rasa*

Sl. No.	Preparation	Initial Weight of the product	Final Weight of the product	Loss
1	<i>Nimbadi Churna</i>	400 gms	380 gms	20 gms
2	<i>Manikya Rasa</i>	265 gms	243 gms	22 gms

Table 4. Antimicrobial assay by well diffusion method of *Manikya Rasa*

Test organisms	Inhibition zone in mm by <i>Manikya Rasa</i> sample	Remarks
<i>S. aureus</i>	Blank = NIL 10 μ L = NIL 25 μ L = 1 mm (0.1 cm) 50 μ L = 3 mm (0.3 cm) 75 μ L = 5 mm (0.5 cm) 100 μ L = 8 mm (0.8 cm) 150 μ L = 10 mm (1.0 cm) 200 μ L = 13 mm (1.3 cm)	Good inhibition
<i>C. albicans</i>	Blank = NIL 10 μ L = NIL 25 μ L = 2 mm (0.2 cm) 50 μ L = 4 mm (0.4 cm) 75 μ L = 8 mm (0.8 cm) 100 μ L = 12 mm (1.2 cm) 150 μ L = 16 mm (1.6 cm) 200 μ L = 18 mm (1.8 cm)	Good inhibition

Fig 1 & 2 Resultant inhibition zones obtained at different concentrations on *S.aureus* inoculated plate of *Manikya Rasa*

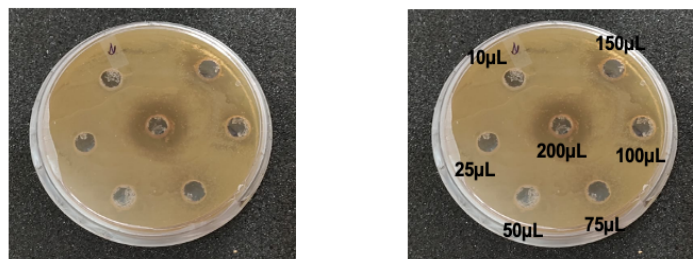


Fig 3 & 4 Resultant inhibition zones obtained at different concentrations on *C.albicans* inoculated plate of *Manikya Rasa*

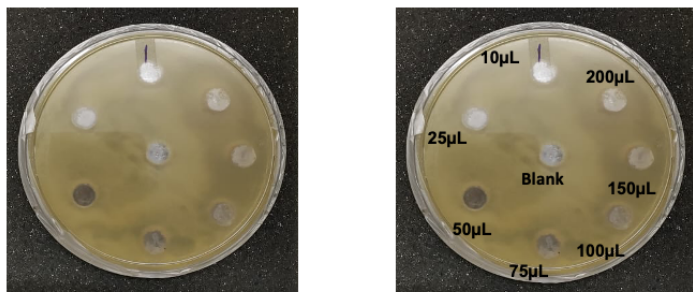


Table 5: Antimicrobial assay by well diffusion method of *Nimbadi churna*

Test organisms	Inhibition zone in mm by <i>Nimbadi Churna</i>	Remarks
<i>S. aureus</i>	Blank = NIL 10 μ L = NIL 25 μ L = 1 mm (0.1 cm) 50 μ L = 2 mm (0.2 cm) 75 μ L = 3 mm (0.3 cm) 100 μ L = 6 mm (0.6 cm) 150 μ L = 8 mm (0.8 cm) 200 μ L = 10 mm (1.0 cm)	Good inhibition
<i>C. albicans</i>	Blank = NIL 10 μ L = NIL 25 μ L = 1 mm (0.1 cm) 50 μ L = 3 mm (0.3 cm) 75 μ L = 5 mm (0.5 cm) 100 μ L = 6 mm (0.6 cm) 150 μ L = 7 mm (0.7 cm) 200 μ L = 8 mm (0.8 cm)	Good inhibition

Fig 5 & 6 Resultant inhibition zones obtained at different concentrations on *S.aureus* inoculated plate of *Nimbadi Churna*

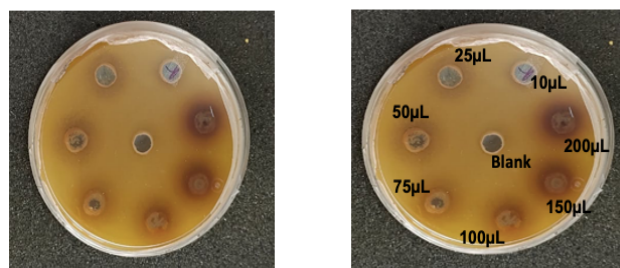
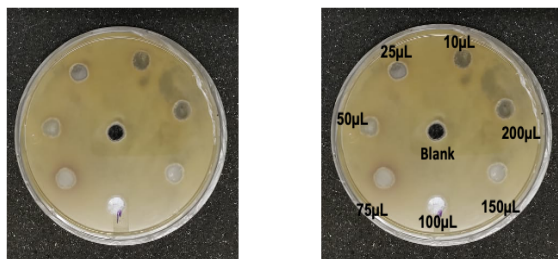


Fig 7 & 8 Resultant inhibition zones obtained at different concentrations on C.albicans inoculated plate of Nimbadi Churna



Discussion

The current study was undertaken to evaluate and compare the antimicrobial activity of two classical Ayurvedic formulations *Manikya Rasa*, a mineral-based preparation, and *Nimbadi Churna*, a purely herbal formulation against *Candida albicans* and *Staphylococcus aureus*. Prior to this, both formulations underwent analytical evaluation, including parameters such as ash value, soluble extractives, heavy metal content, and pesticidal residues, all of which were found to be within acceptable limits, indicating good quality and safety. Based on traditional Ayurvedic texts, Rasa preparations like *Manikya Rasa* are believed to be highly potent, fast-acting, and effective even in minimal doses (9) and were therefore hypothesized to show superior antimicrobial activity. The agar well diffusion method was selected for antimicrobial testing due to its simplicity, reproducibility, and suitability for comparative analysis.

As expected, the results indicated that *Manikya Rasa* exhibited better antimicrobial activity compared to *Nimbadi Churna*. However, it is noteworthy that despite being a purely herbal formulation, *Nimbadi Churna* demonstrated antimicrobial activity that was relatively close to that of *Manikya Rasa*. This suggests that herbal drugs like *Nimbadi Churna* can also offer substantial antimicrobial effects, supporting their classical indications in skin disorders and infections. This finding is significant in the context of growing interest in herbal alternatives, especially where mineral-based drugs may be contraindicated or unavailable.

A key strength of this study lies in its comparative approach and the fact that both formulations were freshly prepared in-house, as they are either unavailable (*Nimbadi Churna*) or rarely found (*Manikya Rasa*) in the market. However, the study is not without limitations. The antimicrobial evaluation was limited to in vitro conditions and to only two microorganisms. Broader studies involving multiple pathogens and in vivo models are needed to establish comprehensive efficacy and clinical relevance. While the results are promising, generalization should be approached with caution until further studies are undertaken. Nevertheless, this study provides valuable preliminary data and opens avenues for future research on both mineral and herbal Ayurvedic formulations in antimicrobial therapy.

Conclusion

The present study establishes that both *Manikya Rasa* and *Nimbadi Churna* exhibit significant antimicrobial activity against *Staphylococcus aureus* and *Candida albicans*, two common pathogens involved in skin infections. Analytical evaluations confirmed that both formulations met permissible quality standards, ensuring their safety and reliability. The use of the agar

well diffusion method proved to be a practical and effective technique for preliminary screening of antimicrobial properties (10).

Although *Manikya Rasa* demonstrated comparatively greater antimicrobial efficacy, *Nimbadi Churna* also showed promising results, highlighting the potential of herbal formulations as effective alternatives in antimicrobial therapy. Both samples were found to be sparingly soluble in the tested solvents and media, and the minimum inhibitory concentration (MIC) was observed at 25 µg/mL for both pathogens.

These findings not only validate classical Ayurvedic claims regarding the therapeutic use of these formulations in skin disorders but also encourage further exploration through in vivo studies and clinical trials to establish their broader pharmacological and therapeutic potential.

Analytical studies of both formulations with mentioned parameters were within the permissible limits. The present study demonstrated that both *Manikya Rasa* and *Nimbadi Churna* possess significant Anti-microbial activity against *Candida albicans* and *Staphylococcus aureus*. The use of the agar well diffusion method proved to be a practical and reliable approach for preliminary antimicrobial screening. The *Manikya Rasa* and *Nimbadi Churna* samples are found to be sparingly soluble in the tested solvent and medium. The sample is effective against *S. aureus* and *C.albicans*. The Minimum Inhibitory Concentration shown against *S. aureus* and *C.albicans* were found to be at 25 µg/mL concentration.

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