

How to Cite:

Chakkaravarthi, M. A., & Balasubramanian, P. L. (2022). Formulation and evaluation of anti-fungal and anti-bacterial novel herbal cream using Senna alata, Wrightia tinctoria and Datura metel: Traditional Siddha herbs. *International Journal of Health Sciences*, 6(S4), 5256–5260. <https://doi.org/10.53730/ijhs.v6nS4.10073>

Formulation and evaluation of anti-fungal and anti-bacterial novel herbal cream using Senna alata, Wrightia tinctoria and Datura metel: Traditional Siddha herbs

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Abstract---The main intention of these studies was to formulate and evaluate a novel herbal cream which includes Senna alata, Wrightia tinctoria and Datura metel for the treatment of secondary skin infections. The most suitable route for skin infection is topical. The development of topical drug transport systems designed to have systemic results appears to be useful for a number of drugs as a result of the numerous advantages over traditional routes of drug administration. In this study a novel herbal cream formulation consisting of Senna alata, Wrightia tinctoria and Datura metel was prepared. This study was subjected to in-vitro diffusion method. Microbiological studies were carried out the safety of materials used inside the formulation. The formulated cream was found to be safe and effective for the treatment of skin infection.

Keywords---Senna alata, Wrightia tinctoria, Datura metel, antibacterial cream, anti fungal cream.

Introduction

India has Several familiar ways of medicines. One of the more importantly well-liked amongst them in Siddha medicine. These medicines are composed out of diverse kinds of poly herbal formulations which is utilized for curing several diseases. Siddha medicines become well-liked nowadays due to Several out brakes of Chronic diseases like several types of Skin diseases etc. Skin is the more importantly sensitive organ in the human body. Infection of the skin caused by several pathogens such as bacteria, fungi and virus. Amongst the pathogens,

fungi and bacteria are the more importantly causative organism causing skin infection. An anti-fungal and anti-bacterial agent is a drug that selectively eliminates fungal pathogens from a host with a minimal toxicity to the host. Plant based are of interest in this contest because they include safer or more efficient substitutes for synthetically generated anti-fungal and anti-bacterial agents. *Senna alata*, *Wrightia tinctoria* and *Datura metel* are the best medicinal plants against bacteria, fungi, virus and parasites. These above-mentioned medicinal plants have got some utilizes adding skin infections caused by bacteria, fungi etc. The microemulsion is prepared by using above said plants which is applied externally more than the impacted areas and its extremely excellent remedy against skin infection largely fungal infection without skin irritation. *Wrightia tinctoria* wrightial, a triterpenoid chemical, along with cycloartenone, cycloeucalenol, β -amyrin, and β -sitosterol isolated from the methanol extract of the immature seed pods. *Datura metel* leaves and seeds of *Datura* species were rich in alkaloids, including atropine, scopolamine and hyoscyamine. The phytoconstituents such as flavonoids, phenols, tannins, saponins, aminoacids and sterols are found in *Datura metel*. *Senna alata* leaves contains phenolics (rhein, chrysaphanol, kaempferol, aloemodin, and glycosides), anthraquinones (alatinone and alatonal), fatty acids (oleic, palmitic, and linoleic acids), steroids, and terpenoids (sitosterol, stigmasterol, and campesterol)

Materials and Methods

Senna alata, *Wrightia tinctoria* and *Datura metel* was collected from herbal garden of Tamil University, Thanjavur. Leaves of *Senna alata*, *Wrightia tinctoria* and *Datura metel* authenticated by Dr.Nagarajan botanist from Tamil University, Thanjavur. Triethanolamine, propyl paraben, methyl paraben, liquid paraffin, stearic acid, Propylene glycol, bees wax, stearyl alcohol, cetyl alcohol was purchased from Golden Scientific Industries, Thnjavur.

Methodology

Preparation of extract

The fresh leaves of *Wrightia tinctoria* (1kg) was infused in coconut oil (1lit) and exposed in sunlight for three days then the crude infused oil was filtered through linen cloths. The fresh leaves of *Senna alata* and *Datura metel* (each 1kg) collected and grind it to got 2 lit. of the extract juice. Add 1 lit, of coconut oil with 2lit of extracted juice and boiled it till the water was evaporated and the filtered through linen cloths then mixed with both oils. This prepared extracted oil was used for formulation of cream.

Preparation of oil phase

White Bees Wax, stearic acid, stearyl alcohol, cetyl alcohol have been melted in a chrome steel vessel. To this aggregate Liquid paraffin had been introduced and allowed to melt. The temperature of oil section maintained among sixty five – 70°C

Preparation of Aqueous phase

Water was heated to 65 – 70°C. In this weighed propylene glycol, triethanolamine, methyl paraben and propyl paraben were added the temperature of the phase was maintained at 65 – 70°C.

Development of Cream formulation

Oil component changed into then slowly incorporated into the aqueous segment at sixty five-70°C and blended for 10 to 15Minutes. While the water and oil section have been at the equal temperature, the aqueous section became slowly delivered to the oil section with mild agitation and was saved stirred until the temperature dropped to 40°C. And prepared extracted oil was added to it. The emulsion turned into cooled to room temperature to shape a semisolid cream base. PH of cream kept among 4 – 6.

Evaluation parameters

Take about 1 gram of cream in a clean Petri dish and observe visually

Physical examination

The colour, homogeneity, consistency, spreadability, and phase separation of the prepared topical creams were all visually checked. Each cream's pH was determined using a pH metre that had been calibrated with standard buffer solutions at pH 4, 7, and 9 before each use. At room temperature, the electrode was put into the sample 10 minutes before the reading was taken. The pH of a topical medication should be between 4.5 and 6.5, which corresponds to the pH of the skin.

Viscosity

Brook field Viscometer LVD was used to measure the viscosity of prepared creams using spindle S 94 at various speeds and shear rates. The measurements were made in 60 seconds between two successive speeds as equilibration with shear rates ranging from 0.20 s⁻¹ to 1.0 s⁻¹ over a speed range of 0.10, 0.20, 0.30, 0.40, and 0.50 rpm. The viscosity tests were carried out at room temperature.

Microbiological studies

Topical formulations with broad, non-resistant activity against staphylococci, streptococci, dermatophytes, yeast, or moulds can be very useful in dermatological preparations where infections are frequently combined. It is expected that a formulation incorporating antimicrobial drugs as an active moiety will guard against microbial growth. To determine the activity of the formulation, the prepared formulation was studied using a conventional method called disc diffusion, and the inhibition zone diameters were determined using a zone reader.

Results

Physical Evaluation

The cream has a white look and a smooth texture, and it was all homogeneous with no symptoms of phase separation.

pH measurement

The cream's pH was found to be 6.1. If the pH is too acidic, it might cause skin irritation, and if it's too alkaline, it can produce scaly skin.

Viscosity measurement

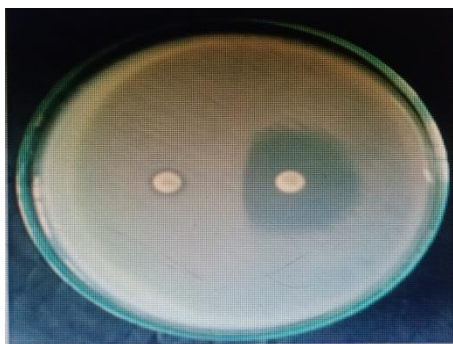
Viscosity was measured by Brookfield viscometer and it was found to be 67540 cps

Microbiological studies

The cream showed good effects on microbial growth, according to the microbiological investigation, and the zone of inhibition was measured using a zone reader. *Candida albicans* had a zone of inhibition of 40.32 mm, while *E.coli* had a zone of inhibition of 32.16 mm.



Against *E.coli*



Against *candida albicans*

Discussion

The study clearly reveals that the formulation has good in-vitro antifungal efficacy against *E.coli* and *Candida albicans* based on the above collated data.

Conclusion

The extracted oil using *Senna alata*, *Wrightia tinctoria* and *Datura metel* in the formulation of antimicrobial agents resulted in a higher rate of diffusion and antibacterial activity. The results of various chemical and physical testing on the cream revealed that it might be used topically to guard against fungal or bacteria-caused skin illnesses.

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