



Composition of Soap and Sanitizer Products and Creation of Wound-Healing Ointment

*¹Sadhana Raut

*¹Department of Microbiology, Hindusthan College of Arts and Science, Coimbatore, Tamil Nadu, India.

Abstract

In order to manufacture bioactive molecules as pharmacological tools, isolate bioactive compounds for direct medication usage, or employ the entire plant or a portion of it as a herbal medicine, there are a variety of objectives associated with using herbal plants as sources of therapeutic agents. The best thing about using basic herbs for treatment is that they may be used by anyone of any age and provide great results without causing any adverse effects. Formulations containing two or more herbs are referred to as polyherbal formulations. Traditional plant medicines are helpful for mending wounds and treating a variety of skin-related issues. Aloe barbedensis, Curcuma aromatica, and Tridax procumbens have all been shown to have antibacterial properties. Different combinations of plant parts are used to make herbal medications, which are based on plants. For instance, roots, leaves, and flowers. Various medical applications can be made of each portion. It has been used to treat cutaneous wounds with Tridax procumbens, C. aromatica, and Aloe barbedensis. Minerals, fatty acids, phytosterols, alkaloids, steroids, carotenoids, and flavonoids (including bergenins, centaurein, and catechins) are abundant in this. Anticoagulant, antiseptic, antioxidant, and antibacterial properties are present.

Keywords: Formulations for soap, polyherbal ointment, tropical ointment, and aloe barbadensis

Introduction

A wound is a physical injury that consists of a ripped, sliced, or punctured skin. After being exposed to air, germs penetrate the incision, causing contamination and ultimately the emergence of infection [1]. Herbal remedies are plant-based medications prepared from various mixes of plant components. For instance, roots, flowers, and leaves. Every component has a variety of therapeutic applications. It has been used to treat cutaneous wounds using Tridax procumbens. This is abundant in minerals, fatty acids, phytosterols, alkaloids, steroids, carotenoids, and flavonoids (such as bergenins, centaurein, and catechins). Anticoagulant, antiseptic, antibacterial, and antioxidant properties are present in it.

Cuts, burns, insect stings, bruises, acne, pimples, poison ivy, welts, skin lesions, eczema, and sunburns have all been treated topically using aloe. Aloe vera gel can enhance wound healing by altering the composition of collagen, increasing collagen cross-linking, and increasing the amount of collagen in wounds.

There is substantial evidence that curcumin contains anti-inflammatory, anti-oxidant, anti-carcinogenic, anti-mutagenic, anti-coagulant, and anti-infective properties. Significant wound healing abilities of curcumin have also been demonstrated. It speeds up the healing process by acting on several stages of the natural wound healing process.

Irrespective of age, anyone can benefit from using basic herbs since they offer efficient cures without any negative effects. Polyherbal formulations are those that include two or more herbs in the recipe. Curcuma aromatica Family-Zingiberaceae-turmeric rhizomes have been the subject of numerous investigations combining them with a variety of other herbal medications.

Materials and Methods

• Gathering of Plant Resources

Tridax procumbens and Aloe barbadensis aerial pieces were gathered at Hindustan College of Arts and Science in Coimbatore. The aromatic Curcuma was bought in a Coimbatore store.

Making Plant Extract: To get rid of the soil particles and dirt entrapment, the plants were rinsed under running tap water. For three days, cleaned plants were shade-dried at room temperature. Using an electrical blender, the dried herbs were ground into a powder, which was then kept in glass bottles for later use. 90% ethanol was used to whip the skin of the aloe vera after it was cleaned with tap water. After being gathered, the inside gel was cleaned with tap water. Juice was collected and the gel was mixed. The juice was kept between 4 and 6°C.

Screening with Phytochemicals: T. procumbens, C. aromatica, and Aloe bbarbedensis preparations underwent

phytochemical examination, and analytical color variations were seen during the trials.

• Antimicrobial Intensity

The agar well diffusion method was used to test the antibacterial activity of *Tridax procumbens*, *Curcuma aromatica*, and *Aloe barbadensis*.

An Assortment of Microorganisms: The PSGIMR college in Coimbatore provided the bacterial strains used in the study, which included *Escherichia coli*, *Klebsiella pneumoniae*, *Staphylococcus aureus*, *Streptococcus pyogenes*, *Pseudomonas sp.*, and *Proteus sp.* The microorganisms that were gathered were kept in Nutrient Agar Broth and cultivated in Nutrient Agar medium.

The Medication's Preparation: Muller-Hinton agar was made and autoclave-sterilized for the Agar well diffusion procedure. 30 minutes were spent without interruption to allow the 20 milliliters of Muller hinton agar medium to solidify after being placed into sterilized petriplates.

The bacterial strains (Lawn culture) were swabbed (deposited onto the plates) following solidification. The well was cut into the plates with a sterile well-boarer. With the use of a micropipette, the plant extracts were applied to each well. The plates underwent a 24-hour incubation period at 37°C.

Function of Antioxidants: The DPPH radical-scavenging activity was used to assess the antioxidant activity of the *Tridax procumbens*, *Curcuma aromatica*, and *Aloe barbadensis* samples.

• Ointment Preparation

To apply the medication to the wound, the ointment base served as a carrier. To make ointment, a sufficient base should be required. The extracts that are going to be added to the base have to work well together.

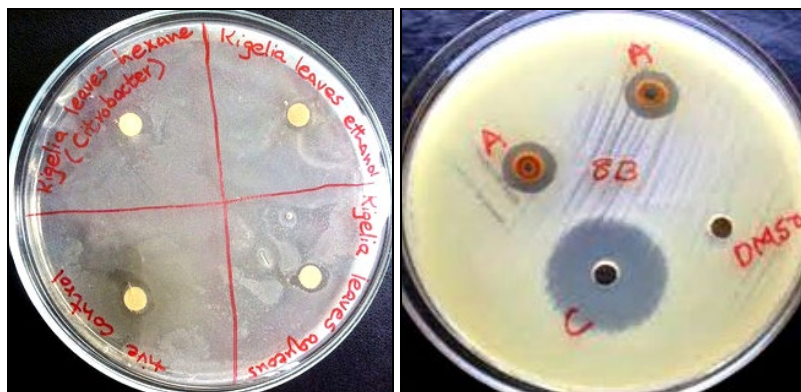
Base Composition of Ointment

- i). PEG 200-4ml
- ii). White paraffin wax-2.5gm
- iii). Propyl paraben-0.015gm
- iv). White petroleum.-12.5gm
- v). White paraffin wax-12.5gm
- vi). Cetostearyl alcohol-12.5gm
- vii). Methyl paraben-0.025gm

• Formulation of Soap

Activity of Antioxidants

Tridax Procumbens's Antioxidant Activity



(a) Before incubation

(b) After incubation

Fig 1(a & b): Before incubation & After incubation

Herbs from plants that soothe skin are used in the aloe vera soap recipe to help protect and heal skin after hand washing. Aloe's pH level is quite similar to ours. Twenty milliliters of liquid castile soap and one hundred grams of melted glycerine soap base were combined with five grams of turmeric powder and one hundred milliliters of aloe vera extract. The mixture was thoroughly mixed. Poured into the soap mold, 10 drops each of lavender and lime essential oils were added for scent.

Formulation of Sanitizer: Rather than using synthetic agents, which are hazardous by nature, aloe vera extract can be employed as an antibacterial agent in the formulation of antimicrobial hand sanitizer and other related goods. 150 milliliters of aloe vera extract were added to make the 250 milliliter aloe vera hand sanitizer. In addition, 90ml of isopropyl alcohol was added. Next, add 5 milliliters of hydrogen peroxide as a ripening and anti-infective agent. To prevent dermatitis and dryness of the hand skin, add 5ml of glycerine. Lastly, mix thoroughly after adding a few drops of lime essential oil for fragrance. Moreover, keep the sanitizer in its original bottle.

Antimicrobial Intensity: The agar well diffusion method was used to test the antibacterial properties of polyherbal ointment, bath soap, and disinfectant. They have the ability to combat specific strains of *Streptococcus*, *Staphylococcus*, *Pseudomonas*, *Bacillus*, *Klebsiella*, *E. Coli*, and *Proteus*.

Test for Skin Irritation: The skin irritancy test establishes whether an allergic reaction or skin irritation is the outcome of using a certain substance. Chemicals, preservatives, cosmetics, and other things can all result in a skin reaction. Applying a little amount of a sample to the skin, covering it with gauze, and waiting 24 hours to observe if a reaction occurs is known as the "skin irritancy test."

Result and Discussion

Analysis of Hydrochemistry: The tests' analytical color changes and the phytochemical analyses of the *Tridax procumbens* extracts (methanol, ethanol, acetone, chloroform, and ethyl acetate)

Chromatography Thin Layer

- i). Beta-sitosterol is present, as indicated by *Tridax procumbens*' Rf value of 0.50.
- ii). *Curcuma aromatica*'s Rf score of 0.79 suggests that curcuma is present.
- iii). *Aloe barbadensis* has an Rf value of 0.91, indicating the presence of flavanoids.

Antioxidant Activity of *Curcuma Longa*



Fig 3: Before incubation

Activity of Radical Scavenging in DPPH

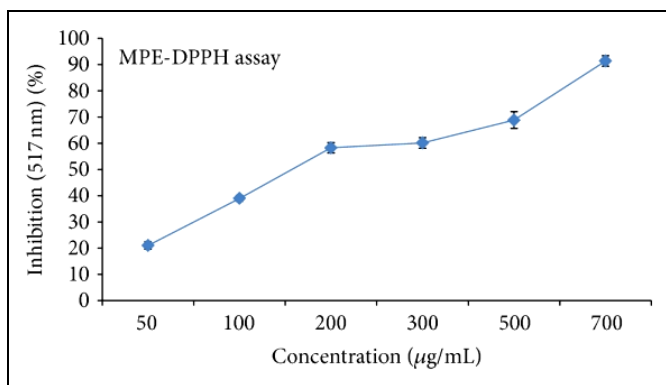


Fig 4: Trapping potential for DPPH radicals scavenging activity

Combination Effects of a Poly-Herbal Lotion



Fig 5: *Staphylococcus sp.*



Fig 6: Bathing soap

Conclusion

The majority of herbal products in Indian medicine are created with crude plants or plant parts and their extracts. For the current investigation, leaf extracts from *Tridax procumbens*, *Curcuma aromatica*, and *Aloe barbadensis* were obtained, and the tropical ointment and its characteristics were developed. In terms of homogeneity, pH, viscosity, and antibacterial activity, the ointment made from *Tridax procumbens*, *Curcuma longa*, and *Aloe barbadensis* leaf extract was shown to have good ointment, soap, and sanitizer properties. Utilizing white paraffin wax and white petroleum as the ointment foundation, an ointment formulation incorporating leaf extract of *Tridax procumbens*, *Curcuma longa*, and *Aloe barbadensis* was successfully created. When compared to the individual, the combination of Polyherbal

When compared to the individual, the Polyherbal ointment's synergistic efficacy demonstrates stronger antibacterial activity. It follows that the combination is synergistic.

Zone size (A+B) combined equals A+B /2.

Pomegranate Ointment's Antibacterial Properties

Using the agar well diffusion method, the antibacterial activity of the polyherbal ointment is assessed. The antibacterial efficacy of the ointment is evaluated using the following bacteria: *E. Coli*, *Streptococcus aureus*, *Pseudomonas aureus*, *Klebsiella aureus*, *Proteus aureus*, *Bacillus aureus*, The diameter of the sample's zone is measured.

Table 2: (Antimicrobial Properties of Herbal Ointment)

S. No.	Organism	60µL	20µL	100µL
1	<i>E. coli</i>	1.7cm	1.3cm	2.3cm
2	<i>Streptococcus sp</i>	1.7cm	1.5cm	2.1cm
3	<i>Staphylococcus sp</i>	1.6cm	1.5cm	1.8cm
4	<i>Proteus sp</i>	1.8cm	1.6cm	2cm
5	<i>Bacillus sp</i>	1.9cm	1.5cm	2.3cm
6	<i>Pseudomonas sp</i>	1.8cm	1.4cm	2cm
7	<i>Klebsiella sp</i>	1.7cm	15cm	2.3cm

The Antimicrobial Properties of Bath Soap

Gram positive *Staphylococcus sp.* is susceptible to the antibacterial action of bath soap; the diameter of the zone of inhibition is indicative of this activity. A larger zone size of approximately 2.6 cm is seen at 100µl concentration.

ointment exhibits stronger antibacterial action. It is therefore possible to conclude that there is a growing demand for herbal formulations in the global market and that they are an invaluable gift from nature. The results of various chemical and physical tests of the ointment, bath soap, and sanitizer showed that the formation could be used tropically to protect skin against damage caused by *Staphylococcus sp.* Bath soap, sanitizer, and polyherbal ointment did not produce any allergies, according to the skin irritancy test.

References

1. Godbole MD, Mahapatra DK, Khode PD. Fabrication and characterization of edible jelly formulation of stevioside: a nutraceutical or OTC

- aid for the diabetic patients. *Inventi Nutraceut.* 2017; 2017(2):1-9.
2. Mahajan UN, Mahapatra DK, Mahajan NM, Kazi FS, Baghel N. Exploring the role of Mahua oil as potent emulsifier in cream formulations. *Int J Herb Med.* 2017; 5(3):93-7.
 3. Mahaparale, S., Gaikwad, A. Formulation and evaluation of a novel non-steroidal anti-inflammatory zaltoprofen gel. *World J Pharm Pharm Sci*, 2016; 5(7): 1327-1335.
 4. Shivhare RS, Kamble MA, Mahapatra DK, Ingole AR, Baheti JR. Development of mosquito repellent gel formulations from various natural volatile oils: comparative study with the marketed formulation odomos®. *Journal of Drug Delivery and Therapeutics.* 2018; 8(6):106-10.
 5. Sonkusre N, Dhabarde DM, Mahapatra DK. Formulation and development of mirtazapine self-emulsifying drug delivery system (SEDDS) for enhancement of dissolution profile. *Inventi NDDS.* 2016; 3:1-9.
 6. Mahajan UN, Mahapatra DK, Mahajan NM, Kazi FS, Baghel N. Mahua Oil, an Ayurvedic Product Demonstrated Permeation Enhancing Attribute in Topical Gel Formulations. *J. Nat. Prod. Plant Resour.* 2017; 7(3):8-14.
 7. Kumar L, Verma R. In vitro evaluation of topical gel prepared using natural polymer. *International journal of drug delivery.* 2010; 2(1).
 8. Mahajan UN, Mahapatra DK, Mahajan NM, Kazi FS, Baghel N. Mahua oil containing suppository base exhibited higher drug release as compared to cocoa butter base. *J Nat Prod Plant Resour.* 2017; 7(3):8-14.
 9. Singh, M. P., Sarangdevot, Y. S., Sisodia, S. S. Wound healing activity of the whole plant of momordica charantia linn. In rats. *Indian Drugs,* 2018; 55(11):11-18.