IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

ISO 3297:2007 Certified ⁜ Impact Factor 8.066 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 10, Issue 4, April 2023

DOI: 10.17148/IARJSET.2023.10463

# Preparation of Herbal soap using Terminalia chebula

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**Research highlights:**

- Terminalia chebula has antibacterial activity.
- Terminalia chebula in cosmetic has invitro research showing it exerts a protective effect on skin exposed to daylight as well as helping to maintain skin supportive element.
- The fruit extract is used to improve the skin barrier function.

**Abstract:** The present study was aimed to investigate the antibacterial potential of dried seed extracts of *terminalia chebula* against *Escherichia coli, Pseudomanas aeruginosa, Staphycoccus aureus, Streptococcus aureus, Klebsiella pneumoniae*, etc. phytochemical extract of methal and acetone in *T.chebula* dried seed is done. It is then checked for the antibacterial susceptibility test using agar well diffusion method and the zone formation is calculated. After observing the result we decide *T.chebula* inhibits the bacteria and it is suitable for soap preparation.

**Keywords:** Terminalia chebula powder,Terminalia chebula powder extract, Antibaterial test, phytochemical test.

## 1.0 INTRODUCTION:

The soaps that are being used in our day-to-day life have a history going back for about six thousand years. The ancient Babylonians discovered that mixing animal fats with wood ash and water created a cleansing substance which was latterly known as “soap” [1]. The basic method of soap making is known as saponification. Medicinal soaps are a simple variation of the normal soaps where synthetic or natural bioactive ingredients are added into the basic soap medium to give a vast variety of biological activities to the final product. However, due to the undesirable side effects of synthetic substances, it is preferential to avoid the use [2]. However harmful synthetic chemicals from medicinal soap products. In recent years, the plant based natural products have become an attractive alternative to enhance the important biological characteristics of medicinal plant [3]. Substantial evidence of the use of herbal and medicinal plants in both western and eastern countries dates back to some 60,000 years, in which one of the plants recorded was *Terminalia chebula (T. chebula)* Retz, belonging to the family Combretaceae [4]. The plant exhibited various therapeutic uses due to the presence of various phytochemicals in different plant parts [5]. It is routinely used as traditional medicine by tribal of Tamil Nadu in India to cure several ailments such as fever, cough, diarrhea, skin diseases and wound infections.Very little studies have been done on the antibacterial activity of plant extracts of *Terminalia chebula [6]*. Keeping in view the importance of different types of infections caused by bacteria, the present study was designed to find out the antibacterial potentiality of seeds of *Terminalia chebula* against selected strains of bacteria and to see if it has the viable qualities to make a soap good for human use.[7]

## 2.0 MATERIALS AND MATERIALS:

### 2.1 Terminalia chebula soap requirements:

*T. chebula* seed is collected from Pioneer Agro Industry from Peelamedu, Coimbatore, Tamilnadu, India. Glycerine soap base, Fragrance oil, almond oil, media used is Muller Hinton Agar. Chemicals used are Methanol and Acetone which is borrowed from the Hindusthan College of Arts and Science microbiology laboratory.

### 2.2 Preparation of the T.chebula extract

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Extracts were prepared using soxhlet extraction method, in which solvents of increasing polarity index (methanol/acetone/water) were used. 40 g of dried fruit powder of *T. chebula* was used for the extraction procedure. The solvent-free dry extract (S1: methanol; S2: acetone) was obtained by evaporating the solvent using rota-evaporator and extracts were lyophilized. Dried extract was kept at 4∘ C until further use [8].

### 2.3 Phytochemical test

The crude extracts were analyzed for the presence of alkaloids, terpenoids, proteins, saponins, tannins, steroids, quinone and flavonoids [9].

**(i) Test for Alkaloids:**

**Dragendroff's reagents**

**Solution A:** 0.6g of Bismuth sulphate dissolved in 20ml of water.

**Solution B:** 6g of Potassium iodide was dissolved in 50ml of water.

Solution A and Solution B were mixed and allowed to strand for some time. The supernatant was decanted from potassium iodide and make up to 100ml.

**(ii) Test for Flavonoids:**

1ml of stock alcoholic solution with few drops of neutral $FeCl_3$ and 5ml of extract with 1ml of alcohol subjected to the Ferric chloride test.

**(iii) Test for Tannin:**

1ml of extract with minimum amount of $H_2O$. Filtered and to the filtrate add few drops of $FeCl_3$ solution.

**(iv) Test for Saponins:**

1ml of extract with 20ml of distilled water agitated vigorously for 15 minutes

**(v) Test for Quinine:**

1ml of extract with few drops of alcoholic KOH was added.

**(vi) Test for Proteins (Ninhydrin test):**

To about 1ml of extract, add 1ml of nitric acid.

**(vii) Test for Phenolic compounds:**

1ml of extract with 5ml of alcohol and few drops of neutral $FeCl_3$.

**(viii) Test for Terpenoids:**

1 ml of extract added 2 ml of chloroform and 1 ml of acetic acid then added 2 ml of sulphuric acid.

### 2.4 Antibacterial susceptibility test

The antibacterial test was carried out against gram positive and gram-negative bacteria. The antibacterial activity of seed extracts was tested against bacteria by well diffusion method. 25µl, 50µl, 75µl and 100µl extract is added in the well [10]. The inoculated and treated plates were incubated at 37ºC for 24 hours. After the incubation, the diameter of zone was measured. The respective control was also run simultaneously using different solvents to compare the effect of seed extracts [11]. After overnight incubation, the diameter of each zone of inhibition was measured. In all measurements, the zones of inhibition are measured from the edges of the last visible colony-forming growth [12]. The results are recorded in millimetres(mm) and interpretation of susceptibility is obtained by comparing the results to the standard zone sizes [13].

### 2.5 Preparation of soap

The results from the above initial experimentations proves to us that *Terminalia chebula* inhibits a lot of micro-organisms which are present in the skin and has proven that it is suitable for soap preparation. The method of soap preparation utilized is the double boiling method of soap preparation as it is easy to use and laboratory-friendly to perform [14].

- Take a heat resistant pot or any available suitable utensil and place it in a stove in the laboratory
- Add water into the utensil and turn on the stove and let the water boil.
- Begin adding the soap base into a heat resistant bowl which is kept on the utensil.
- After the soap base melts, add a few drops of fragrance oil into the bowl.
- Mix the fragrance oil thoroughly in the bowl so that it gets rid of the solid soap base lumps.
- After this, add a few drops of almond oil and give a thorough stirring once again.
- Add the product extraction, in our case, *T. chebula*, to the melted soap base.
- Mix this thoroughly for another 10 minutes.
- While mixing, be sure to have shape molds to pour the melted soap mixture. Do note that the shape of the soap mold does not matter and is quite flexible, i.e., any shape can be used.
- Pour the melted soap mixture to the shaping mold.

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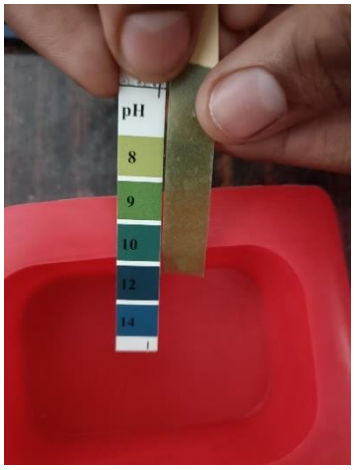
- Leave the mold undisturbed for about 30 minutes to allow the soap to solidify.
- The soap formed can later be packed accordingly and can be sold or can be used for personal hygiene

**Extraction added to melted soap base**

**The mixed extraction with soap is Poured in the mold**




**The ph of the soap is found to be 8**


**Chebula soao**

### 3.0 Result and discussion:

**TABLE-1:** OBSERVATION OF PHYTOCHEMICAL TEST

| TEST | ACETONE | METHANOL |
|---|---|---|
| ALKALOIDS | + | + |
| TERPENOIDS | + | + |
| CARBOHYDRATES | + | + |
| SAPONINS | - | + |
| TANNIN | + | + |
| FLAVANOIDS | + | + |
| QUININE | - | + |
| PROTEINS | + | + |

**TABLE-2:** ZONE OF INHIBITION OF CHEBULA EXTRACT

| CONC OF EXTRACT | TEST ORGANISM | METHANOL ZONE | ACETONE ZONE |
|---|---|---|---|
| 25% | S. aureus<br>E. coli<br>P. aeruginosa | 8mm<br>10mm<br>6mm | 4mm<br>10mm<br>8mm |

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| | | | |
|---|---|---|---|
| 50% | S. aureus<br>E. coli<br>P. aeruginosa | 12mm<br>14mm<br>10mm | 10mm<br>14mm<br>6mm |
| 75% | S. aureus<br>E. coli<br>P. aeruginosa | 17mm<br>16mm<br>12mm | 14mm<br>16mm<br>11mm |
| 100% | S. aureus<br>E. coli<br>P. aeruginosa | 19mm<br>18mm<br>15mm | 17mm<br>19mm<br>12mm |
| Control | S. aureus<br>E. coli<br>P. aeruginosa | Nil<br>Nil<br>Nil | Nil<br>Nil<br>Nil |

The extracts were treated for the presence of alkaloids, terpenoids, proteins, saponins, tannins, steroids, quinone and flavonoids and results are as reported in Table-1 and Table-2 shows the results of zones of inhibition [15].
The zones of inhibition of solvent control were nil the zone of inhibition for *S. aureus, E. Coli and P. aeruginosa* were observed. The maximum activity was observed at 100% concentration of different extracts of dried seed powder. Thus, the growth of both *S. aureus, E. Coli and P.aeruginosa* were inhibited by all the two extracts of *Terminalia chebula* fruit. It is also observed that *Terminalia chebula* effectively inhibits the growth of other few micro-organisms such as *S. aureus, E. coli and P.aeruginosa [16].*

## 5.0 SUMMARY AND CONCLUSION

The soap which was prepared as a part of the research has been made by the double boiling method of soap preparation in a laboratory after confirming that the *T. chebula* extract contains all the necessary qualities for making a soap. The soap was found to be perfectly molded into the shape of the mold and did not show any technical or shape deformities. The soap was also tested for pH value and it exhibited a pH value of 9 which is perfectly safe for human use and is said to be ideal pH for soap making. The foam produced by the soap is also good enough for a body soap. Overall, the soap made by the research shows that it is fit for human use and does not lead to any skin complications, i.e., it is perfectly free from any possible side effects which affects our side effects which affects our skin. In conclusion, this model of *T. chebula* soap can be used by human beings as a medicinal soap and can be safely produced and sold in the market place as well.

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