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Formulation and evaluation of antibacterial Garlic Soap

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Abstract: The present work reports preparation and evaluation of antibacterial garlic soap. The soap was prepared by using garlic extract and orange oil. Then, the soap was evaluated for organoleptic characteristics, pH, foam height and retention, skin irritation and high temperature stability. Prepared antibacterial Garlic soap showed good appearance, characteristic off- white color, smooth texture as well as pH compatible to skin and good foam height. In addition, the soap was found to be non- irritant on human skin. In conclusion, the prepared soap was found better cleansing and foaming effect and doesn't have any side effects on human skin.

Keywords: Antibacterial, Garlic soap, *Allium sativum*, evaluation of soap

INTRODUCTION

Now a day, skin disorders are one of the most serious public health issues as they affects any body system because of germs and bacteria. Also, due to COVID-19 infection, hand sanitization and cleanness is must everywhere. In addition, due to the increased use of skin care products, chemicals and preservatives there in, the prevalence of certain skin illnesses is on the rise.[9]

The body's most exposed organ, the skin, is susceptible to many external substances that can cause a various conditions related to the skin. Therefore, maintaining adequate hygiene and cleanliness for the body part that is most exposed to the environment is necessary to protect the skin from various ailments. This will also stop the spread of pervasive microorganisms in the environment. Using soaps is the more effective and efficient technique to get rid of all the dirt and foreign objects. Along with having anti-microbial characteristics, soap is used to clean the skin. Having a solid, liquid, semi-solid, or powdered

composition, soaps are cleaning agents that aid in removing dust, filth, microorganisms, stains, and for maintaining health and attractiveness.[1,2] Being a significant surfactant, it is chemically alkaline metal salt of long-chain fatty acids. Animal tallow, coconut oil, palm oil, kernel oil, and linseed oil are the most often utilized fats or oils for making soap by saponification processes. Similar to sodium and potassium hydroxides, caustic alkalies are frequently utilized for this purpose. [6]

Herbal soap is a medicine or drugs that contain antibacterial and antifungal agents from natural origin. The herbal soap mainly uses the parts of plants like leaves, stem, roots and fruits to treat an injury or disease or to achieve good health. These preparations are administered topically and available to apply in various forms like cream, lotion, gel, soap, or ointment. The variety of herbal soaps have been used to treat various skin disorders.[7] Examples are, Margo neem soap for antifungal or skin infection, Psorolin soap for psoriasis, allergic skin disorders, tetmosal soap for skin infection like itching, redness etc.

Allium sativum, commonly known as Garlic, found wide range of medicinal properties such as antibiotic, activity, antiseptic, antitoxic, antiviral, bactericide, carminative, diuretic, expectorant, fungicide, hypoglycemic, hypotensive, and stomachic.[3] Many civilizations have utilised garlic for ages to fight infectious diseases. Garlic has been shown to be effective against an extensive range of gram-positive, gram-negative, and acid-fast bacteria, usually, Salmonella and Escherichia coli according to various research findings.[4], [8]

The purpose of this study was to develop antibacterial garlic bath soap using extracts of *Allium sativum* and to evaluate the prepared soap, for organoleptic properties and the physicochemical properties for standardization and commercialization.

MATERIALS AND METHODS

Materials

Orange essential oil (Elemensis Naturals) and Garlic (*Allium sativum*) were purchased from local traditional folk medicine shop. Soap pure glycerin base (Khadi Ayurdaily) was purchased from Amazon.

Methods

Extraction of the Garlic

About 25 grams of garlic was segregated and washed with distilled water. This was peeled using a clean sterile knife and coarsely grounded using the electric juicer to extract the juice. To separate the solid from liquid extract, the crushed garlic was filtered, first with the use of cheesecloth, and then with a series of filter papers until a clean filtrate was obtained. The extract was then placed in a sterilized bottle with cover and was opened only during the preparation of antibacterial soap.[3]

Soap preparation

About 100g of soap base was taken and cut into pieces and melted in oven until it turns into liquid base. To it, 20 ml of garlic aqueous extract was added. Few drops of Orange oil were also added. The mixture was then poured in a cast and allowed to dry.[5]

Evaluation of prepared soap

Evaluations done by various parameters like organoleptic, pH, foam height, form retention, high temperature stability and irritancy test.[8, 9]

Organoleptic evaluation

Organoleptic evaluation was done by the sensory and visual inspection for color, texture and clarity.

Determination of pH

The pH of the prepared formulation was determined by using digital calibrated pH meter. The formulation was dissolved in 100 ml of distilled water and collected after two hours. The pH measurement was done.

Foam height

0.5 grams of sample of soap was taken and dispersed in 25 ml distilled water, then, transferred it in to 100 ml measuring cylinder; volume made up to 50 ml with water. 25 strokes were provided and allow standing till aqueous volume estimated up to 50 ml and determined the foam height, above the aqueous volume.

Form retention

25 ml of the 1% soap solution was taken in to a 100 ml graduated measuring cylinder. The cylinder was hooded with hand and off shaken for 10 times. For four minutes, the foam volume was measured at intervals of one minute.

High temperature stability

The soap was allowed to stand at 50ºC for 1 week. During this time, soap stability was noticed. The sample which was homogeneous and stable after standing was indicated as stable and the sample in which the crystals were roughened and the sample in which precipitation was caused; then the sample was said to be as unstable.

Irritancy Test

The soap solution is prepared and applied on the specific body area. This area is then kept under observation for 24 hrs to conduct irritancy test.

RESULTS AND DISCUSSION

The organoleptic parameters of antibacterial Garlic soap such as colour, order, appearance as well as pH were performed. The formulation possesses off white colour, pungent odour as well as good and uniform appearance. Now the pH was found to be 7.4 which are desired pH and compatible to skin. Other parameters like foam height, foam retention and irritancy test were also successfully performed.[8, 9]

Table 1: Physicochemical properties of antibacterial Garlic Soap formulation

r. No	Parameters	Result
1.	Formulation	Soap
2.	Colour	off white
3.	Odour	Pungent
4.	Appearance	Good
5.	pH	7.4
6.	Foam height (cm)	2.8 cm
7.	Foam retention (cm per min)	1 cm/min
8.	High temperature stability	45˚C
9.	Irritancy test	Nil

CONCLUSION

The antibacterial Garlic soap was prepared by Garlic extract and then evaluated by various parameters. The prepared soap showed good appearance, better cleansing and foaming effect and does not have any side effects on human skin.

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