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Formulation and Evaluation of Polyherbal Antimicrobial Handwash

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Abstract: *The aim of present work was to prepare formulations of poyherbal handwash from the metholonic extracts of leaves of Mimosa pudica(touch me not), Azadirachta indica (Neem) and lemon juice. Two formulations of hand wash were prepared and the formulations were evaluated for physical properties like appearance, pH and viscosity. The antimicrobial activity of prepared formulations of hand wash was checked against skin pathogens Staphylococcus aureus by agar diffusion method. The results revealed that prepared herbal hand wash formulations showed significant zone of inhibition compared with standard antibiotic drug (Amoxicillin). So these plant materials can be used in the preparation of herbal hand wash on commercially scale.*

Keywords: Herbal toothpaste, marketed herbal toothpaste, Antimicrobial activity, comparison and evaluation

I. INTRODUCTION

Skin being the most exposed part of our body requires protection from skin pathogens. The hands of Health Care workers (HCWs) are the primary routes of transmission of multidrug resistant pathogens and infection to the patients. Hence, it brings up the use of antiseptic for hand wash purpose. Many of the chemical antiseptics are now available in market as alcohol based sanitizers, chlorhexidine products etc. These soaps or solutions help to reduce health care associated transmission of contagious diseases more effectively but they have some shortcomings or adverse effects. Their frequent use can lead to skin irritation and also resistant among pathogens. Organisms such as Staphylococcus aureus, Pseudomonas spp., Klebsiella pneumonia & Proteus vulgaris are some of the skin pathogens[1]. Hand washing is an important way to help fight the spread of disease. Hand washing removes visible dirt from hands and reduce the number of harmful microorganisms. Harmful bacteria and viruses such as, E. coli and Salmonella can be carried by people, animals or equipment and transmitted to food[2].

Antimicrobial properties of certain Indian medicinal plants were reported based on folklore information and only few reports are available on inhibitory activity against certain pathogenic bacteria and fungi. Use of plants as source of medicine has been inherited and is an important component of the health care system in India. In these systems of Indian medicine, most practitioners formulate and dispense their own recipes; hence this requires proper documentation and research[3]. Mimosa pudica L. (Mimosaceae) also referred to as touch me not, live and die, shame plant and humble plant is a prostrate or semi-erect subshrub of tropical America and Australia, also found in India heavily armed with recurved thorns and having sensitive soft grey green leaflets that fold and droop at night or when touched and cooled. It majorly possesses antibacterial, antivenom, antifertility, anticonvulsant, antidepressant, aphrodisiac, and various other pharmacological activities. The herb has been used traditionally for ages, in the treatment of urogenital disorders, piles, dysentery, sinus, and also applied on wounds[4]. Azadirachta indica A. Juss, (Neem tree), from the Meliaceae family, also known as Margosa or Indian lilac. Various parts of the Neem tree have been used as traditional Ayurvedic medicine in India. Neem oil, the bark and leaf extracts have been therapeutically used asfolk medicine to control leprosy, intestinal helminthiasis, respiratory disorders and constipation and also as a general health promoter. Neem leaves possesses a wide spectrum of antibacterial action against gram-negative and gram-positive microorganisms[5]. Lemon juice which is obtained from fruits of Citrus limon L. belonging to the family Rutaceae is traditionally used for the purpose of cleaning due to its disinfectant properties. Lemon juice is also used as a short-term preservative in some food preparations. Lemon juice is used in Indian medicinal systems because of the anti-microbial properties of lemon. It is also used to add taste to many food preparations[5, 6]

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II. MATERIALS & METHODS

1. **Collection of plant materials:** The plants Mimosa pudica L and Azadirachta indica A were collected from the garden area of NGSMIPS Campus, Deralaktte, Mangalore.
2. **Preparation of herbal leaf extracts:** The collected plants Mimosa pudica L and Azadirachta indica A leaves are taken and coarsely powdered. 10 grams of coarsely powdered leaves of both plants were soaked in 200 ml of methanol and kept for maceration for about 3-4 days. After maceration the extract is filtered and the filtrate was collected and used for making hand wash.
3. **Preparations of herbal hand wash formulations:**
   a. **Formulation 1 (F-1):** In this formulation the hand wash was prepared using 20 ml of mehonolic extract filtrate. To this filtrate 6g of SLS ,glycerin 40 ml , 0.3 g of methyl paraben, 5ml of peppermint oil is added and the volume is made up to 100ml with purified water.
   b. **Formulation 2 (F-2):** This formulation was prepared by adding 20 ml of lemon juice to 20 ml of methonolic extract filtrate of Mimosa pudica L and Azadirachta indica A leaves. The remaining ingredients include all the same as mentioned above in formulation 1.

Table 1: Formulation of Poly herbal hand wash F-1

Ingredients	Quantity
Methonolic extract of *Mimosa pudica* L and *Azadirachta indica*	20 ml
Sodium lauryl sulphate (SLS)	6 gm
Glycerin	40 ml
Methyl paraben	0.3gms
Peppermint oil	5 ml
Purified water q.s	100 ml

Table 2: Formulation of Poly herbal hand wash F-2

Ingredients	Quantity
Methonolic extract of *Mimosa pudica* L and *Azadirachta indica*	20 ml
Lemon Juice	20 ml
Sodium lauryl sulphate (SLS)	6 gm
Glycerin	40 ml
Methyl paraben	0.3gms
Purified water q.s	100

III. EVALUATION OF HERBAL HANDWASH

The screening of anti-microbial efficacy of the formulated poly herbal hand wash was performed on various microorganisms by using agar plate method as per standard procedure. Four sterile petri plates were taken for testing the anti-microbial activity against four different microorganisms, Staphylococcus aereus,. The plates were filled with nutrient agar solution and allowed for solidification. After solidification the microorganisms from the subculture were inoculated into the nutrient agar media and three cavities were made in it. The first cavity is filled with standard antibiotic amoxicillin, second one with herbal hand wash without lime water (F-1) and third cavity is filled with herbal hand wash with lime water (F-2). It was taken care that sample should be placed at the level of cavity. The plates are placed in incubator at 37°C to test the activity. After 24 hours the plates were observed for the formation of zone of inhibition. From the zone of inhibition the anti-microbial activity of formulation is estimated[7].

IV. RESULT & DISCUSSION

The prepared formulations of polyherbal handwash were subjected for physical evaluation and antimicrobial efficacy.

- **Appearance:** The prepared two formulations of hand wash appear as greenish brown and greenish yellow colour.
- **pH:** The pH of formulations was measured by digital pH meter. The pH of two formulations was found to be 6.31 and 6.24

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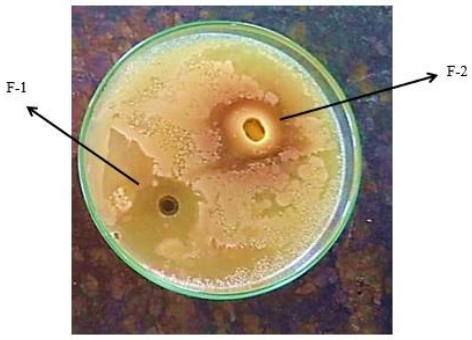
- **Viscosity:** The viscosity of hand wash was determined by using Brookfield viscometer. 50ml of herbal hand wash is taken into 100ml of beaker and the tip of viscometer was dipped into the beaker containing hand wash formulation and its viscosity was measured. The viscosity of F-1 and F-2 was found to be 54 and 62 CPS.
- **Antimicrobial activity:** The Anti-microbial efficacy of the formulations of Polyhedral Hand Wash was tested on Staphylococcus aureusby agar plate technique. The results of zone of inhibition showed that the hand wash prepared from methanol extract of the combined plant materials shown significant antimicrobial activity. The hand wash prepared with lemon juice (F-2) showed little higher activity than the formulation prepared without lemon juice (F-1).
- The data of zone of inhibition of formulations is shown in below table

Sr. No.	Bacteria	Zone of inhibition (in cms)	
1	*Staphylococcus aureus*	**F-1**	**F-2**
		3.8	4.3



V. CONCLUSION

The results suggest that methanolic extract of Azadiracta indica, Mimosa pudica and their combinations with lemon water are capable of giving superior zone of inhibition to protect against the skin pathogens. This might be rational basis for use of herbs in preparation of hand wash and use of these compounds in making antiseptic lotions or soaps in place of chemicals.

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