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# Antimicrobial Polyherbal Hand Wash Formulation

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***Abstract:*** The aim of present work was to prepare formulations of poyherbal handwash from the metholonic extracts of leaves of Tridax procumbens, Azadirachta indica 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 Bacilus subtilus, Staphylococcus aureus, Psuedomonas aeruginosa and Escherichia coli 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

***Index Terms*** **- Ployherbal handwash, Antimicrobial activity, Tridax procumbens and Azadirachta indica.**

## I. INTRODUCTION

Skin pathogens must be protected because it is the most exposed region of our body. The principal routes of transmission of multidrug resistant bacteria and infection to patients are through the hands of health care workers (HCWs). As a consequence, the use of antiseptic for hand washing becomes a concern. Many chemical antiseptics are also available on the market, including alcohol-based sanitizers and chlorhexidine treatments While they have certain risks or side effects, these soaps or solutions are most effective at minimising health-care-associated spread of infectious diseases. Their use on a regular basis can cause skin irritation and infection resistance. Staphylococcus aureus, Pseudomonas spp., Klebsiella pneumoniae, and Proteus vulgaris are some of the skin pathogens. Hand washing is an essential part of avoiding the transmission of disease. Hand washing extracts clear dirt and bacteria from the hands while still reducing the amount of harmful bacteria on them. Human-harming bacteria and viruses, such as E. coli. E. coli. E can be carried by people, livestock, and vehicles. Salmonella and E. coli .

Only a few reports on inhibitory action against specific pathogenic bacteria and fungi are available and antimicrobial capabilities of several Indian medicinal herbs have been described based on folklore information. The use of plants as a source of medicine has been passed down through the generations and is an essential part of India's health-care system. Most practitioners in these Indian medical systems design and deliver their own recipes, which necessitates thorough documentation and research[3].

Tridax procumbens a common weed found in India and many countries all over the world, growing primarily during raining season, is also one such plant. Tridax procumbens plant has been considered as a gregarious weed, distributed throughout the tropics and sub tropics. It has been extensively used in Indian traditional medicine as anticoagulant, antifungal and insect repellent; in bronchial catarrh, diarrhoea and dysentery. The leaf juice possesses antiseptic, insecticidal and antiparasitic properties. It is also used to check hemorrhage from cuts, bruises and wounds. An aqueous extract of the plant produced reflex tachycardia and showed a transient hypotensive effect on the normal blood pressure of dogs; it had also a marked depressant action on the respiration (Ali Rawinder and Ramachamdram, 2001). Tridax procumbens is known for several potential therapeutic activities like antiviral, anti oxidant healing activity, insecticidal and antiinflammatory activity.

Some reports from tribal areas in India state that the leaf juice can be used to cure fresh wounds, to stop bleeding and as a hair tonic. Tridax procumbens is traditionally used in the treatment of fever, typhoid fever, cough, asthma, epilepsy and diarrhoea (Nino *et al*…2006)[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 as folk 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 is made from the fruits of the Citrus lemon L. Because of its disinfectant qualities, members of the Rutaceae family have historically been used for washing. In certain food preparations, lemon juice is often used as a short-term preservative. Lemon juice is used in Indian herbal medicine because of its antimicrobial effects. It's also used to flavour a variety of foods.[5,6]

## MATERIALS AND METHODS

**Collection of plant materials:**

The plants Tridax procumbens and Azadirachta indica A were collected from the garden area or Campus, Sangali.

**Preparation of herbal leaf extracts:**

The collected plants Tridax procumbens 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.

**Preparations of herbal hand wash formulations**

**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 rose merry oil is added and the volume is made up to 100ml with purified water.

**Formulation 2 (F-2):**

This formulation was prepared by adding 20 ml of lemon juice to 20 ml of methonolic extract filtrate of Tridax procumbens and Azadirachta indica A leaves. The remaining ingredients include all the same as mentioned above in formulation 1.
The formulations of both F1 and F2 is shown in below table

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

| Ingredient | Quantity |
|---|---|
| Methanolic extract of Tridax procumbens and Azadirachta indica A | 20ml |
| Sodium laury sulphate | 6gm |
| Glycerin | 40 ml |
| Methyl paraben | 0.3gms |
| Rosemerry oil | 5 ml |
| Purified water q.s | 100ml |

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

| Ingredient | Quantity |
|---|---|
| Methonolic extract of Tridax procumbens and Azadirachta indica | 20ml |
| Lemon water | 20 ml |
| Sodium lauryl sulphate (SLS) | 6 gms |
| Glycerin | 40 ml |
| Methyl paraben | 0.3gms |
| Rosemerry oil | 5 ml |
| Purified water q.s | 100ml |

**Evaluation of antimicrobial activity :**

The screening of anti-microbial efficacy of the formulated poly herbal hand wash was performed on various micro organisms 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, Bacillus subtillis, Staphylococcus aereus, Pseudomonas aeruginosa and Escherchia coli. 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 inhibition the anti microbial activity of formulation is estimated[7].

**RESULTS AND DISCUSSION**

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

**Appearance**

The prepared two formulations of hand wash appear as greenish and greenish yellow colour.

**pH**

The pH of formulations was measured by digital pH meter. The pH of two formulations was found to be 6.36 and 6.22.

**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 56 and 64 CPS.

**ANTIMICROBIAL ACTIVITY**

The Anti-microbial efficacy of the formulations of Polyhedral Hand Wash was tested on Staphylococcus aureus, Pseudomonas aeruginosa, Bacillus subtillis and Escherichia coli by 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 zone of inhibition for different organisms is shown in below figure

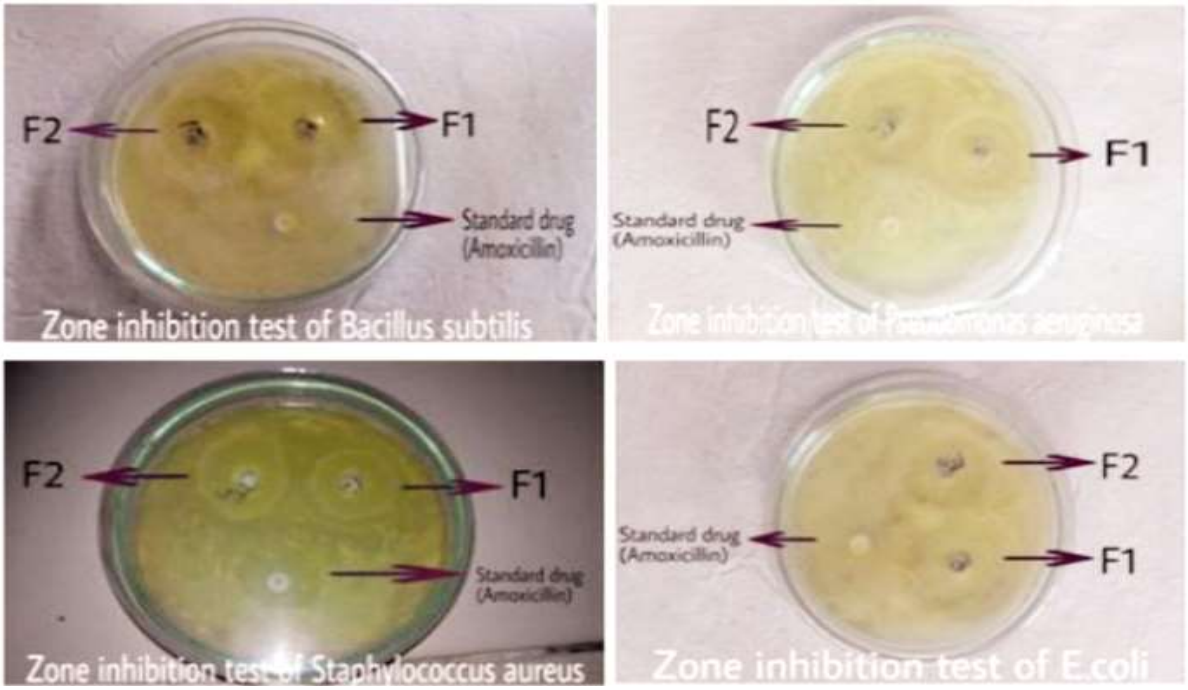


**Fig. 1: Plates showing zone of inhibition for different organisms**

The data of zone of inhibition of formulations is shown in below table:

**Table 3: Antimicrobial activities of Polyherbal hand wash formulations**

| Organism | Zone of inhibition in Cms | | |
|---|---|---|---|
| | **Std Drug** | **F-1** | **F-2** |
| Bacilus subtilus | 1.2 | 3.4 | 3.6 |
| Staphylococcus aureus | 2.9 | 3.4 | 4.2 |
| Psuedomonas aeruginosa | 2.7 | 3.8 | 4.4 |
| Escherichia coli | 1.9 | 3.2 | 3.8 |

## CONCLUSION

The results suggest that methanolic extract of Tridax procumbens or Azadiracta indica 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 handwash and use of these compounds in making antiseptic lotions or soaps in place of chemicals.

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