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SHORT COMMUNICATION: FORMULATION OF HERBAL SANITIZER AND ITS ANTI BACTERIAL ACTIVITY AGAINST PATHOGENS

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ABSTRACT
The skin is the part of the body most exposed to environmental pollutants, sunlight as well as pathogens. Sanitizers are substances that acts as both cleaning and disinfecting agents. Hand sanitizer, also called hand antiseptic, or hand rub, agent applied to the hands for the purpose of removing common pathogens (disease-causing organisms). Alcohol-based products typically contain between 60 and 95 percent alcohol and at dose concentrations, alcohol immediately denatures proteins, effectively neutralizing certain types of microorganisms. Alcohol-based hand sanitizers, can effectively reduce populations of bacteria, fungi, and some enveloped viruses if rubbed thoroughly over finger and hand surfaces for a period of 30 seconds. The research was carried out to study the antibacterial properties of neem extracts (*Azadirachta indica*) and antibacterial study of lemon juice by Agar well diffusion method. Based upon these results hand sanitizer was prepared using neem extract, lemon juice, rose extract and glycerol, iso-propyl alcohol. The hand sanitizer developed was screened for its antibacterial activity against standard organism *S.aureus*. To conclude, it can be stated that neem leaves and lemon juice have natural antibacterial properties that can be exploited to eradicate the bacterial problems.

KEYWORDS: antibacterial, sanitizer, maceration, disinfectant.

INTRODUCTION
In maintenance of health the hygiene is defined as maintenance of cleanliness practices which carries utmost importance. Keeping bodily hygiene and usage of cleansers are requisites of healthy living. These concepts highlight the need of maintaining hygiene in prevention of diseases.[1] Hand sanitizers have been proven to be as effective as soap and water in reducing bacterial load from the hands even in the presence of physical dirt, soil or grease.[2] Natural sources like herbs, trees, essences and extracts are known to contain numerous bioactive products that shows antimicrobial, analgesic, anti-oxidative and anti-inflammatory effects.[3,4] Neem is known for its pesticidal and insecticidal properties, but people also use it in hair and dental products. *Azadirachta indica* is an antibacterial agent. It contains *Azardichitin*.[5] Citrus fruits are also known to contain bioactive compounds such as phenolics, flavonoids, vitamins, and essential oils which are believed to be responsible for a range of protective health benefits including antioxidative, anti-inflammatory, antitumor, and antimicrobial activities.[6,7]. IPA also is found in solvents, inks, drug preparations, beauty products, de-icing agents, and hand sanitizers.[8,9] Glycerol is a valuable by-product as it has a wide range of industrial applications. At present, glycerol has over two thousand different application especially in pharmaceuticals, personal care, foods and cosmetics.[10]

MATERIAL
Neem, Lemon and Rose water was obtained from local market Mumbai. The isopropyl alcohol and glycerol were taken of analytical grade.

METHOD
Neem leaves were dried in oven at 50°c and coarsely grinded to get a powder. For methanol extraction, four batches were prepared with four trials in each batch with 10g, 25g, 50g, 100g leaves powder and 90% methanol was added in 250ml flask and kept on shaker for 48 hours. After maceration, sample was filtered by whatman no.1 filter paper. This filtrate was placed in water bath at 60°c till thick sticky, dark coloured extract is obtained and lemon were washed, cut into half and squeeze to get a juice. This juice was stored at 4°C for further use. The neem extract obtained from four batches were 0.20 gm, 0.38gm, 0.48gm, 2.86gm. Further Antibacterial activity of extract against standard organism *S.aureus* was evaluated by agar well diffusion method at 37˚C for 24 hours. Phytochemical analysis for carbohydrates (Fehlings test), amino acid (Ninhydrin Test), phenols and tannins, Flavonoids, Saponins (Foam test), Terpenoids,

steroids and sterols (Salkowski's test) was performed. Antibacterial activity of lemon juice against standard organism *S.aureus* was evaluated by agar well diffusion method at 37˚C for 24 hours. Phytochemical analysis was also performed for lemon to find out various constituents. The 70% isopropyl alcohol was prepared. Neem-Lemon sanitizer was prepared by adding 19ml 70% Isopropyl alcohol in flask. In that add 2ml Glycerol and 4ml Rose water. Then add 12.5g of neem extract and 12.5ml lemon juice. For preparation of sanitizer four batches were prepared as shown in Table. 1.

Table. 1. Different batches of formulation of sanitizer.

Ingredients	F1	F2	F3	F4
Neem extract	3.5gm	8gm	7gm	6gm
Lemon juice	4.5gm	2gm	5gm	6gm
Isopropyl alcohol	70%	70%	70%	70%
Rose water	4ml	2.5ml	2.5ml	2gml
Glycerol	3ml	2.5ml	0.5ml	1ml

RESULT AND DISCUSSION

The result of extraction of all four batch was found to be 0.20 gm, 0.38gm, 0.48gm, 2.86gm. From this the final batch selected was fourth batch with four trials. The zone of inhibition for anti-bacterial activity was found to be 20mm of neem extract for the final batch. In phytochemical analysis of neem extract the saponins, tannins, phenol, flavonoids, terpenoids was found to be present. The zone of inhibition (mm) of lemon juice against S.aureus was found to be 13mm. In lemon juice phytochemical testing the tannins, phenols, flavonoids were present. In this the F4 batch was selected as final batch for formulation as it showed the best anti-bacterial activity against organism. The neem and lemon were more effective against and useful as herbal ingredients for sanitizer. It was found that the anti-bacterial activity of neem extract and lemon juice was potent to be used in sanitizer. Medicinal plants synthesise hundreds of chemical compounds against many insects, fungi, diseases, and herbivorous mammals. Various phytochemicals with potential biological activity have been identified. Even though the plant contains various phytochemicals, the use of whole plants is uncertain. As neem and lemon possesses bioactive molecules it can also be used to formulate cream for wound healing and also for treating other skin diseases. Neem (*Azadirachta indica*) plant have many parts which shows antimicrobial activity which can be identified by inhibitory effect. It has been observed that the risk of spreading gastrointestinal (stomach) and respiratory infection is decreased by using hand sanitizers. Commercially prepared hand sanitizers contain ingredients that help prevent skin drying. By using this product the various side effects like irritation or drying of hands is reduced. Hence it is concluded that neem and lemon are effective and the formulated sanitizer is effective against the pathogens.

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