Research Article

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FORMULATION, EVALUATION AND PHYSICAL PROPERTIES OF HERBAL GREEN HAND WASH PREPARED FROM METHANOLIC EXTRACT OF *DELONIX REGIA* LEAVES

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ABSTRACT

Microbes can be easily transferred through the hands in to the body. Washing of hands is most important in healthcare, in homes and as well as in day to day care. The aim of present work was to prepare formulations of green hand wash from the ethanolic extracts of leaves of *Delonix regia*. Two formulations of hand wash were prepared and the formulations were evaluated for physical properties like appearance, pH, surface tension and viscosity. The green hand wash was analysed by UV-Visible spectrophotometer. Results shows that, the plant materials can be used in the preparation of herbal hand wash on commercially scale.

Keywords: *Delonix regia*, Herbal and green hand wash, ethanolic extract, formulation

INTRODUCTION

Now a day world's scientist focused on the green chemistry methods for the synthesis and preparation of chemicals and other reagents. Hand wash which is prepared from the plant extract is called as green hand wash¹. Now the whole world facing the problem of Corona virus and most of the countries are suffering from it. As far as the precaution consider, the first step is washing your hands with hand wash after every 3-4 hours as per the guideline of Indian Medical Association, Maharashtra State, India. Now a day's hand wash become a daily need for everyone. Hand washing is the act of cleaning hands with the purpose of removing soil, dirt, pathogenic microorganisms and avoid transmitting of transient microorganism². Hand hygiene is therefore the most important measure to avoid the transmission of harmful germs and prevent the nosocomial infections³. The concept of cleansing hands with an antiseptic agent probably emerged in the early 19th century. Many chemical antiseptics available in the market are alcohol based sanitizer⁴. Since ancient time in India, herbal medicines have been the basis of treatment and cure for various diseases⁵. Many Plants which occurs in India are rich in a wide variety of secondary metabolites such as Phenolic compounds, tannin, terpenoids, and alkaloids etc which have been found to have an antimicrobial properties⁶. The preparation of herbal and green hand wash proves an alternative method as compared with the chemical methods. This technique is easy, eco-friendly, non-hazardous and follows the 12 principles of green chemistry. The *Delonix regia* is known by the name gulmohar in India. The plant has many medicinal properties like Anti-diabetic activity, Anti-bacterial activity, Anti-diarrheal property, Hepatoprotective/Cytotoxic property, Anti-microbial activity, Anti-Inflammatory activity⁷. It belongs from family Leguminosae. Phytochemically Gulmohar contain sterols, Phenolic compounds, triterpenoids, and flavonoids.

MATERIAL AND METHODS

Collection of plant material

The plant *Delonix regia* selected from the Warud tehsil of Amravati district, Maharashtra state, India and a voucher specimen (voucher specimen number - Vaishu 9200) was deposited in the herbarium of the Department of Botany, Mahatma Fule Art's, Commerce and Sitaramji Chaudhari Science College, Warud. The leaves of the plant were cut by using scissor. The collected leaves were washed with deionised water to removes dust and suspended particles and then sun dried for 48 hours. The dried leaves were grind by using mixer machine and kept the sample for further study.

Preparation of herbal leaf extracts

The leaves of *Delonix regia* are taken and coarsely powdered. 10 grams of coarsely powdered leaves and 200 ml of methanol were taken in round bottom flask and reflux at 80°C for 2 Hours then cool and filter by using Whatmann filter paper number 41. The obtained filtrate was store and used for the preparation of green hand wash.

Preparations of herbal hand wash formulations 1 and 2

The formulation 1 was prepared by using 20 ml of methanolic extract of *Delonix regia* leaves, 6 g of sodium lauryl sulphate, 40 ml of coconut oil, 20 ml rose water, 80 ml deionised water. Formulation 2 was prepared by adding 20 ml of methanolic extract of *Delonix regia* leaves, 10 g of sodium lauryl sulphate, 40 ml of glycerine, 20 ml rose water, 50 ml deionised water. Both the formulations are shown in Table 1.

Table 1: Formulation of Green hand wash

S. No.	Ingredients	Quantity
Formulation 1		
1	Methanolic extract of <i>Delonix regia</i> leaves	20 ml
2	Sodium lauryl sulphate	6 g
3	Coconut oil	40 ml
4	Rose water + Deionised water	20 ml + 80 ml
Formulation 2		
1	Methanolic extract of <i>Delonix regia</i> leaves	20 ml
2	Sodium lauryl sulphate	10 g
3	Glycerine	40 ml
4	Rose water + Deionised water	20 ml + 50 ml

RESULTS AND DISCUSSION

The prepared herbal green hand wash were subjected for the physical study parameters like pH, surface tension, viscosity and discuss as follows.

pH

The pH of formulations 1 and 2 was measured by digital pH meter model number EQ 610. The formulation 1 was found to be 7.15 and for formulation 2 was found to be 7.42

Viscosity

The viscosity of Formulation 1 and Formulation 2 was found to be 1.012 and 0.0137 Nm⁻²S. The relative viscosity is calculated by using following formula.

$$\frac{\eta_2}{\eta_1} = \frac{W_2 \times t_2}{W_1 \times t_1}$$

Surface Tension

Figure 1: UV Spectra of Formulation 1

Figure 2: UV Spectra of Formulation 2

Table 2: Physical parameter results

Formulation	Colour	pH	Viscosity (Nm ⁻² S)	Surface Tension (dynes/cm)	Max. Absorbance at
1	Brown	7.15	1.012	1403.7	400 – 500 nm
2	Light Brown	7.42	0.0137	15.95	400 – 450 nm

CONCLUSION

The pH of the both formulation was found to be nearer to neutral. Physical appearance of formulation 1 is brown while for formulation 2 light brown. Soil and other particles can be removed by adding surfactants in to the hand soap or hand wash by mixing with aqueous solution. Cleaning ability can be increase by increasing viscosity of the hand wash. It is easy to use hand wash having high viscosity than that of low viscosity hand wash. Formulation 1 has higher surface tension than formulation 2, so the surface is "stronger" and can hold together a larger drop in formulation 1. Formulation 1 shows maximum absorbance between the range 400-500 nm while formulation 2 shows in between 400-450.

The surface tension was measured by the drop shape method, the dependence of surface tension *versus* time was observed. The surface tension of Formulation 1 and Formulation 2 was found to be 1403.7 and 15.95 dynes/cm. The surface tension is calculated by using following formula.

$$\gamma_2 = \frac{n_1 \times W_2}{n_2 \times W_1} \times \gamma_1$$

Appearance

The prepared formulation 1 is in brown colour and formulation 2 is in light brown colour.

UV-Visible study

Formulation 1 and 2 samples were analysed by using UV-Visible spectrophotometer model number 117. Formulation 1 shows maximum absorption from 400 to 500 nm then lower down and formulation 2 shows maximum absorption from 400 to 450 nm.

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