

Formulation and Evaluation of Herbal Handwash Gel Containing Essential Oils

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Abstract: The majority of commercial soaps include chemicals that can be bad for the skin, therefore using natural herbal soap is a wonderful substitute. Natural herbs and components are used to make herbal soaps, which are better for the skin and less likely to have any negative effects. To provide the greatest skin care option for your skin, some natural soap producers additionally utilise aromatherapy and herbal remedies. Herbal soaps have been discovered to be quite helpful for the skin since they are made of rare herbs and other natural components. These soaps' herbal infusions contain medicinal and restorative properties that provide the skin with particular advantages including hydration, nourishment, strength, and healing. These soaps also include ingredients that are healthy for the skin and overall health, such as ultra fatty oils, neem oil, orange oil. Different skin issues can be effectively treated with herbal soaps. Glycerine, which is often not included in commercial soaps, is also included in these soaps. These soaps for dry skin disorders include glycerine, which aids in keeping moisture in the skin. This article includes the formulation and evaluation herbal handwash gel and tests its safety and effectiveness and analysis for the production at commercial scale.

Keywords: Herbal Handwash Gel, Herbal Skin Products, Neem Handwash Gel, Orange Oil Handwash Gel, Evaluation of Herbal Handwash.

I. INTRODUCTION

Herbal drug industry is now getting in trend because of its potential therapeutics and less side effects and hence the herbal preparations are getting in demand hence the herbal drug industry is getting on high nowadays. The formulated preparation of herbal hand wash gel is made up of basic ingredients i.e., neem oil and orange oil. these herbal drugs having antimicrobial and antifungal properties and hence with these ingredients this formulation is used as antimicrobial and germicidal hand wash. the objective behind this topic is to formulate and evaluate this preparation under various criteria and demonstrate its efficacy and therapeutic activity.

Neem oil



Neem

The Meliaceae family includes neem (*Azadirachta indica*), and its importance as a health-promoting agent is linked to its abundance in antioxidants. In the treatment and prevention of many ailments, it has been utilised extensively in

Chinese, Ayurvedic, and Unani remedies around the world, particularly in the Indian Subcontinent. Neem and its components have a function in the scavenging of free radical production and the prevention of disease pathogenesis, according to earlier findings. According to research using animal models, neem and its main components have a crucial role in the management of cancer by modulating a number of molecular pathways. It is regarded as a safe therapeutic herb that modifies a variety of biological processes without causing any harm. (1, 2, 3)

Through the improvement of antioxidant activity, suppression of bacterial growth, and modification of genetic pathways, plant products or natural products demonstrate an essential role in the prevention and treatment of illnesses. Due to their low side effects and accessible qualities, several plants are still being eagerly explored for their potential medicinal roles in the management of illnesses. It is common knowledge that allopathic medications cost a lot of money and have detrimental effects on healthy tissues and a variety of biological processes. It is well acknowledged that many pharmacologically effective medications are made from natural resources, such as medicinal plants. (2,3)

Plant Morphology

Scientific name: *Azadirachta Indica*.

Synonyme: margosa, neem, nimtree or Indian lilac

Family: Meliaceae.

Kingdom: Plantae

Phylum: Magnoliophyta

Family: Meliaceae

Genus: *Azadirachta*

Chemical Constituents: Research over the years has revealed that *Azadirachta indica* has a broad variety of chemicals, some of which have medicinal potential. Triterpenes are the most therapeutically useful of all of these chemicals. It has been demonstrated that the triterpene Nimbin possesses antipyretic, fungicidal, antihistamine, and antiseptic effects. Additionally, Nimbin has anti-inflammatory and antioxidant properties that limit the creation of reactive oxygen species and lessen damage. (5)

Flavonoids, which act as prostaglandin biosynthesis inhibitors, endoperoxides, and inflammatory enzymes such protein kinases and phosphodiesterase are also present in neem.

As previously indicated, oil extracts are the most widely utilised form of neem, and thorough phytochemical testing has proven the presence of triterpenes, flavonoids, and saponins in significant concentrations, while catechins and nimbins appear to be present in lesser concentrations. Other metabolites in neem extracts include gallic acid, limonoids, tannins, alkaloids, terpenoids, reducing sugar, and catechins. (3,5).

Medicinal Uses of Neem.

Due to its numerous medical benefits, *Azadirachta indica*, often known as neem, has gained fame on a global scale recently. Neem has become popular in contemporary medicine due to its extensive usage in Ayurveda, Unani, and homoeopathic treatments. Neem produces a wide range of chemically varied and structurally complex physiologically active chemicals. From various neem plant components, more than 140 distinct chemicals have been discovered. The traditional usage of the neem tree's leaves, blossoms, seeds, fruits, roots, and bark for the treatment of inflammation, infections, fever, skin conditions, and dental problems includes all of these elements. Neem leaf's therapeutic benefits have been specifically discussed.

The immunomodulatory, anti-inflammatory, antihyperglycemic, antiulcer, antimalarial, antifungal, antibacterial, antiviral, antioxidant, antimutagenic, and anticarcinogenic activities of neem leaf and its components have been proven. (5,6)

- Immunomodulatory Action
- Antihyperglycemic Action.
- Antiulcer Action.
- Antimalarial Action.
- Antifungal Action.

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- Antibacterial Action.
- Antiviral Action.
- Antioxidant Action.
- Antimutagenic Action.
- Anticarcinogenic Action.

Orange Oil

Citrus sinensis (CS) (L.) Osbeck is a perennial species that thrives in warm climates all over the world. Fresh fruit, with a global production of about 6.7X10⁷ tonnes per year (TPY) in 2016, or processed derivatives like juice, marmalade, flavour, fragrance, and colouring additive, pectin, are primarily used as food.

An evergreen tree with scarce barbed branches and alternating, toothed blades that are formed variously, such as round or elliptical, and are attached to the stem by winged-petioles is known as CS. Its height ranges from 3 to 9 metres. Axillary blooms have up to 25 yellow-colored filaments and 5 white petals, and they can be found alone or in whorls of six. The pericarp of CS is spherical or oval in shape, measuring 6–10 cm in diameter, and turns yellow-orange as it ripens. The endocarp, which contains juice sac glands, is surrounded by a wrinkled epicarp, exocarp, or flavedo, which contains a large number of essential oil glands and is covered by a waxy epidermis. The albedo, also known as the mesocarp, is a white filamentous tissue made up of cells with a tubular shape that lies underneath the flavedo.(7)



Scientific name: Citrus sinensis L Osbeck.

Synonyme: Sweet orange

Family: Rutaceae

Kingdom: Plantae

Sub kingdom: Tracheobiontas

Genus: Citrus

Chemical Constituents:D-limonene, a monoterpene alkene, an oxygenated monoterpene that includes alcohol aldehydes and esters, sesquiterpenes, as well as linear alkanes and aldehydes, make up the majority of the mixture. These numerous biological activities including anthelmintic, anti-aflatoxigenic, antibacterial, antifungal, antioxidant, anti-tumor, anxiolytic, food preservative, hepatocarcinogenesis suppressant, insecticidal and larvicidal, pain relief and

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relaxant are explained by the CSP's rather complex blend. It might be suggested that the presence of the key ingredient Limonene, which shown a number of bioactivities when studied as a pure chemical, is what is primarily responsible for the effects. However, it is conceivable that the combination of limonene with other minor components may have synergistic effects.(7,8)

Medicinal Uses:

- Numerous Biological Activities Such As
- Anthelmintic,
- Anti-Aflatoxicogenic,
- Antibacterial,
- Antifungal,
- Antioxidant,
- Anti-Tumor,
- Anxiolytic,
- Food Preservative,
- Hepato carcinogenesis
- Suppressant,
- Insecticidal
- Larvicidal,
- Pain Relief
- Relaxant(7,8)

Formulation:

API: The marketed pharma grade oils of neem and orange are used for this formulation

Excipients:

- HPMC(Hydroxypropyl methyl cellulose): HPMC is used in formulation as thickening agent.
- SLS6: The SLS ware used as foaming agent in formulation.
- Glycerin: Glycerin was added to avoid dryness of skin after use and to moisturize the skin.
- Colorant: Amber color is used to improve appearance of preparation.
- Methyl Paraben: Methyl Paraben Is Used as Preservative I.E. To Prevent Any Type of Microbial Growth In Formulation.
- Distilled water: the distilled water used as vehicle and solvent for excipients.

Formulation 01

Sr. No	Ingredient	Formulation 01 (Concentration In %)	Use Of Ingredient
01.	Neem Oil	0.1	API(Antibacterial, Antimicrobial Etc.)
02.	Orange Oil	0.2	API(Antibacterial, Antimicrobial Etc.)
03.	HPMC	6	Thickening Agent/ Surfactant
04.	SLS6	6	Foaming Agent
05.	Glycerin	1.5	Moisturizer

06.	Colorant	QS	Colorant
07.	Methyl Parabem	QS	Preservative
08.	Distilled Water	QS	Vehicle

Formulation 02

Sr. No	Ingredient	Formulation 02 (Concentration In %)	Use Of Ingredient
01.	Neem Oil	0.1	API(Antibacterial, Antimicrobial Etc.)
02.	Orange Oil	0.2	API(Antibacterial, Antimicrobial Etc.)
03.	HPMC	8	Thickening Agent
04.	SLS6	6	Foaming Agent
05.	Glycerin	1.5	Moisturizer
06.	Colorant	QS	Colorant
07.	Methyl Parabem	QS	Preservative
08.	Distilled Water	QS	Vehicle

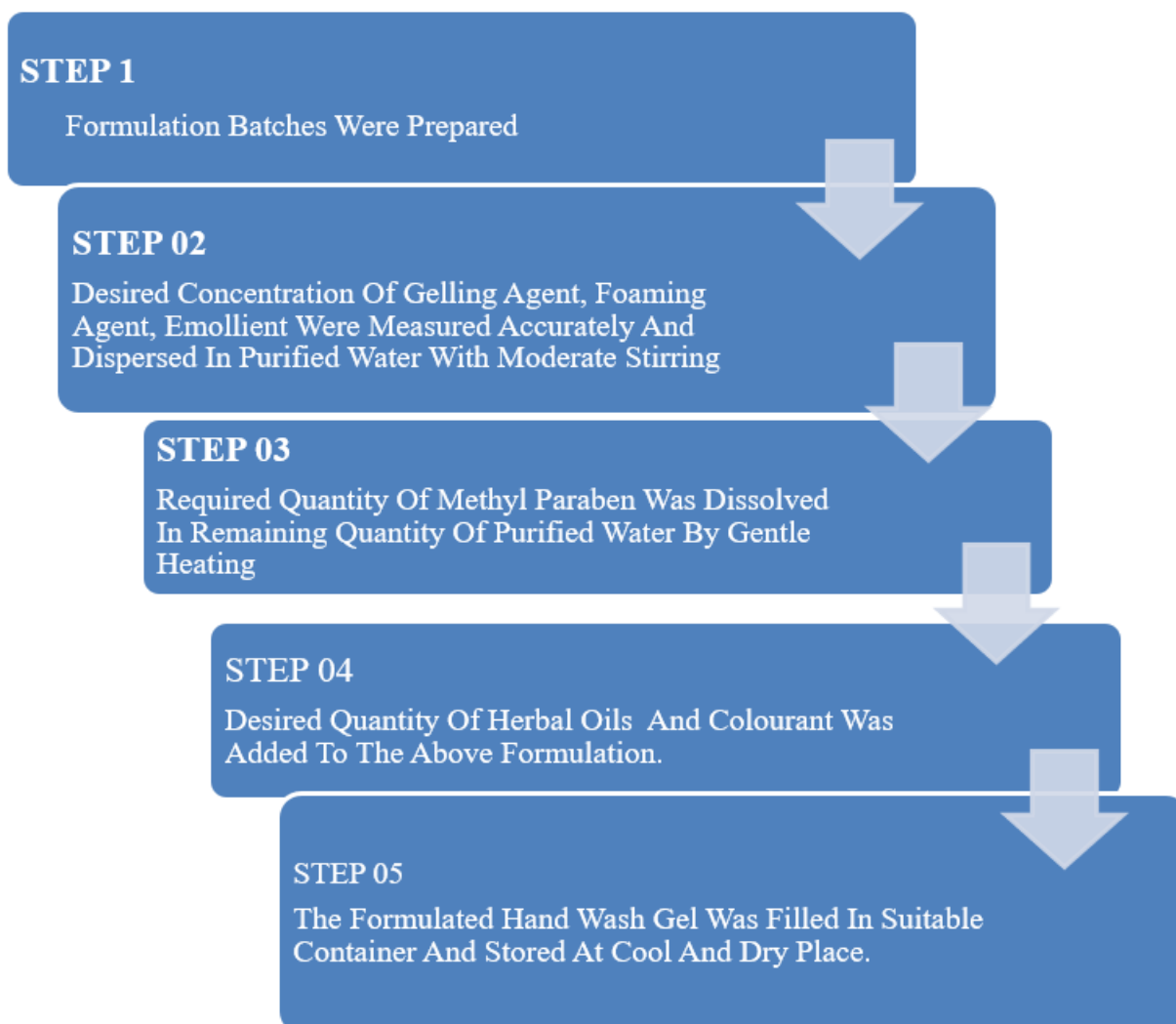
Formulation 03

Sr. No	Ingredient	Formulation 03 (Concentration In %)	Use Of Ingredient
01.	Neem Oil	0.1	API(Antibacterial, Antimicrobial Etc.)
02.	Orange Oil	0.2	API(Antibacterial, Antimicrobial Etc.)
03.	HPMC	10	Thickening Agent
04.	SLS6	6	Foaming Agent
05.	Glycerin	1.5	Moisturizer
06.	Colorant	QS	Colorant
07.	Methyl Paraben	QS	Preservative
08.	Distilled Water	QS	Vehicle

II. METHOD OD PRE-PARATION

Herbal hand wash gel formulation batches were prepared as mentioned in desired concentration of gelling agent, foaming agent, emollient was measured accurately and dispersed in purified water with moderate stirrer speed. The

required quantity of methyl paraben was dissolved in remaining quantity of purified water by gentle heating. Desired quantity of herbal oils, colorant was added to the above formulation. The formulated hand wash gel was filled in suitable container and stored at cool and dry place.



Evaluation

The evaluation is based on various physicochemical parameters and antimicrobial activity of the formulations such as,

- Odor
- Appearance
- Size
- Shape
- Color
- PH
- Percentage Of Solids Content
- Foaming Capacity
- Foam Stability
- Emolliency
- Alcohol Insoluble Matter

- Microbiological Study

III. RESULT AND DISCUSSION

Physicochemical Tests

Sr.No	Test	Formulation 1	Formulation 2	Formulation 3	Observation	Results
01.	Odour	Fragrant	Fragrant	Fragrant	Fragrant	Complies
02.	Appearance	Amber Colour	Amber Colour	Amber Colour	Amber coloured gel	Complies
03.	Shape	N/A	Liquid	Liquid	liquid	Complies
04.	Color	Amber	Amber	Amber	Amber color	Complies
05.	PH	7.5	7.9	7.9	Neutral	Complies
06.	% solid content	23	22	22	Within a limit	Complies
07.	Foaming capacity	15 Cm	18 Cm	14 cm	Within a limit	Complies
08.	Foaming stability	4 min	5 Min	5 Min 20 Sec	Within a limit	Complies
09.	Test for irritancy	No irritation	No irritation	No irritation	Within a limit	Complies

Antimicrobial Activity

Sr.No.	Organism	Control sample	Formulation 1 (1% concentration)	Formulation 2 (1% concentration)	Formulation 3 (1% concentration)
01.	Staphakococcus aureus	No Inhibition observed	Inhibition of growth observed	Inhibition of growth observed	Inhibition of growth observed
02.	Pseudomonas aeruginosa	No Inhibition observed	Inhibition of growth observed	Inhibition of growth observed	Inhibition of growth observed

IV. USES

- An efficient and secure method to maintain clean, fresh hands.
- Free of soap, made of an herbal and fragrant oil gel
- Non-toxic and safe for the environment.
- Gel hand soap that is ready to use and does not dry or strain the skin as soap does.
- Defends against germs and fungi. Effective in eliminating odours and oils 100% natural
- A unique combination of herbal oils and plant extracts.
- Without chemicals.
- Eco-friendly, and without adverse effects.
- Vegan and free from cruelty.

V. RESULT

The formulation and evaluation of herbal hand wash gel wash was prepared and evaluated under various criteria and here we can conclude its safety efficacy and it has no side effects observed.

VI. CONCLUSION

From above results here we can conclude that the preparation is safe and has excellent antimicrobial activity with minimal side effects also from above preparation's the formulation 03 has better activity and fragrance than formulation 02 and formulation 01.

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