



# “Development And Assessment Of Herbal Soaps Utilizing Specific Medicinal Plant Extracts Of Lemongrass.”

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## Abstract:

This study delves into the development and evaluation of herbal soaps incorporating specific medicinal plant extracts, focusing on lemongrass as a key ingredient. The objectives include assessing the awareness of respondents regarding available herbal soaps in the market and evaluating the developed herbal soaps in Ayodhya district. A review of relevant literature provides insights into the properties and applications of medicinal plants in soap formulations.

The methodology involves selecting a sample size of 120 respondents from Ayodhya district, Uttar Pradesh, using purposive sampling. Variables for standardizing the soap production process include soap base, herbal extract, vitamin E, color, fragrance agent, and oil. Lemongrass is chosen as the medicinal plant for herbal extract preparation. The herbal soap is optimized and prepared using a specified method, followed by assessment by the selected respondents.

Statistical analysis of the data includes descriptive analysis using frequency and percentage. Results indicate that herbal soap is the most preferred option among respondents, with awareness primarily through advertisements and personal networks. Preferences for essential oils vary, with coconut oil being the most favored. The assessment of lemongrass soap reveals positive perceptions among respondents regarding its usage rate, availability, fragrance, foaming properties, moisturizing effects, and medicinal benefits.

In conclusion, the study underscores the popularity and potential benefits of herbal soaps, particularly those incorporating medicinal plant extracts like lemongrass. The findings contribute to understanding consumer preferences and perceptions regarding herbal soap formulations, offering insights for further research and product development in the field of natural skincare products.

**Introduction:**

Soap acts as a medium for the topical application of medicinal plants to address skin infections. In herbal soap, various therapeutic bioactive compounds from natural sources are integrated into a basic soap base. The primary components of herbal soap are natural herbs, offering a safer and more advantageous alternative to commercial soap. The preparation of herbal soap involves utilizing medicinal properties found in plant parts like leaves, stems, roots, and fruits, which contain antibacterial and antifungal agents. These natural ingredients are used for treating injuries or diseases and promoting good health (**Kareru, P et al., 2010**). In the vast majority of instances, the natural constituents of herbal medicine do not produce adverse effects on the human body. An herbal soap preparation, classified as a pharmaceutical or medication due to its antibacterial and antifungal properties, consists of plant components such as leaves, stems, roots, and fruits. Its primary purpose is to address injuries, illnesses, and to promote overall well-being (**Kumar , 2014**). For over 6,000 years, soap has played a vital role in daily hygiene practices, boasting a rich historical background. Ancient Babylonians pioneered a cleansing material, dubbed "soap," through a blend of animal fats, wood ash, and water. The fundamental process of soap production, termed saponification, involves the reaction between fats or oils and a base/lye. Soaps are categorized into two main types: solid, crafted with NaOH, and liquid, formulated with KOH.

Medicinal soaps distinguish themselves from standard varieties by incorporating synthetic or natural bioactive substances into the base soap, enhancing the final product with a broad spectrum of biological activities. Although the skin offers a degree of defense against the sun, pollution, and viruses, it remains the body's most susceptible area. Skin disorders such as eczema, warts, acne, rashes, psoriasis, and allergies are prevalent. Effective hand hygiene plays a crucial role in preventing the spread of infectious diseases by safeguarding the skin from microbial infections. This herbal soap or solution enhances the prevention of contagious illness transmission within healthcare environments (**G.Sucharita, 2020**). A natural soap can generally be categorized by its production method, which includes melt-and-pour, hot process, and cold process techniques. The hot process soap is often referred to as transparent or translucent soap. This type of soap is known for its effective cleansing properties, moisturizing effects, long-lasting fragrance, and reduced irritancy. Herbal soaps are created by incorporating various dried herbs, flowers, and stems into a soap base. Herbs, renowned for their medicinal value, affordability, and availability (**Solanki, 2011 & Saikia, 2006**) are utilized in soap formulations due to their effectiveness in treating various diseases and skin issues. Key attributes of herbal soaps include their gentle nature on the skin, ability to produce rich lather, protection against skin disorders like rashes and eczema, treatment of skin infections such as ringworm, and promotion of even skin tone and smoothness (**Getradeghana , 2000**).

Plants possessing medicinal properties have been utilized in traditional medicine since ancient times. Extracts derived from the leaves, stems, and roots of various medicinal plants have long served as natural remedies for treating a wide array of ailments and diseases. Despite the substitution of many plant-based products with synthetic chemicals, Ayurvedic products stand out for their established safety and efficacy standards. The active constituents responsible for these medicinal properties are incorporated into topical formulations such as creams, soaps, oils, and ointments to address skin-related conditions like acne, wounds, eczema, and ringworm, serving both antimicrobial and cosmetic purposes (**Kandasamy R, 2014**).

**Objectives:**

1. To study the awareness of respondents regarding available herbal soaps in the market.
2. To assess the developed herbal soaps by the selected respondent in Ayodhya district.

**Review of literature:**

The current study focused on the research theme titled "**Development and Evaluation of Herbal Soaps Incorporating Specific Medicinal Plant Extracts.**" Researchers worldwide have conducted investigations on herbal soap formulations using diverse natural herbs and varying conditions, both domestically and internationally.

**Mustapha et al. (2018)** conducted a study focusing on extracting essential oils from lemongrass and basil leaves. Lemongrass and basil leaves were sourced from Ugbomoro community, Uwie Local Government, Delta State, Nigeria. The samples underwent air drying at room temperature for approximately three weeks to reduce moisture content. Subsequently, the dried leaf samples were blended and subjected to extraction processes. Soxhlet extraction method yielded 2.5% and 1.89% from 500g of lemongrass and basil samples, respectively. The extracted oils were characterized for acid value (lemongrass oil: 4.09 MgKOH/g, basil oil: 3.95 MgKOH/g), boiling point (lemongrass oil: 299°C, basil oil: 215°C), saponification value (lemongrass oil: 143 MgKOH/g, basil oil: 195 MgKOH/g), peroxide value (lemongrass oil: 6.0 MeqO<sub>2</sub>/kg oil, basil oil: 8.0 MeqO<sub>2</sub>/kg oil), color (lemongrass oil: dark yellow, basil oil: greenish yellow), specific gravity (lemongrass oil: 0.896, basil oil: 0.957), and refractive index (lemongrass oil: n<sub>20</sub>/D 2.487, basil oil: n<sub>20</sub>/D 1.516). Both extracted oils were insoluble in water and exhibited favorable characteristics for biofuel production.

**Wifek et al. (2016)** Conducted a study on Lemongrass: a review on its botany, properties, applications and active components and studied that lemongrass (*Cymbopogon citratus*), a member of the Poaceae family, possesses medicinal properties attributed to compounds that combat pathogens and enhance herbal resistance against diseases. It finds extensive application in herbal teas, non-alcoholic beverages, baked goods, and confections. The essential oil derived from lemongrass serves as a fragrance in perfumes and cosmetics, including creams and soaps. Rich in citral, lemongrass essential oil serves as a source for producing beta carotene and vitamin A. The diverse chemical constituents present in lemongrass oil render it valuable in pharmaceutical industries for its antidepressant, analgesic, antipyretic, bactericidal, antiseptic, carminative, and astringent properties.

**Ezejiyor et al. (2011)** conducted a study to investigate the composition of orange peels and assess their potential as raw materials. Orange peels, chopped into small pieces, underwent steam distillation to extract essential oil, which was then subjected to various chemical characterization procedures to identify its components. The ultraviolet-visible spectrophotometric scan of the extract revealed a prominent peak at a wavelength of 300 nm, consistent with the single major band separation observed in paper chromatography. Further analysis via infrared spectroscopy indicated the presence of three main identifiable peaks corresponding to structural, functional, and group/bond positions: C=C, C-H, and =C-H at 1640 to 1680 cm<sup>-1</sup>, 2850 to 2960 cm<sup>-1</sup>, and 3100 cm<sup>-1</sup> bond positions, respectively. These findings closely matched the structure of limonene, confirming it as a dominant component of the orange peel, alongside other constituents present in smaller quantities.

**Munshi et al. (2020)** conducted a study on fenugreek (*Trigonella foenum-graecum*), The research aimed to systematically determine the fatty acid composition of fenugreek seed oil, evaluate various solvents (ethanol, petroleum ether, acetone, and hexane) for oil extraction, and assess the oil's susceptibility to oxidation. Analysis of acid value, peroxide value, saponification value, iodine value, color value, and refractive index of the seed oil was conducted. Results indicated that hexane extraction yielded oil of superior quality and higher yield.

**Uzwatania et al. (2020)** conducted a study aiming to develop a liquid hand soap infused with neem oil and lemongrass essential oil for their natural antibacterial properties. Three concentrations of neem oil (5%, 10%, and 15%) and three concentrations of lemongrass essential oil (0.2%, 0.4%, 0.6%) were incorporated into liquid soap formulations using coconut oil, castor oil, and neem oil as base ingredients. The natural liquid soap was created through the saponification reaction between oils and potassium hydroxide. The soap underwent evaluation for pH value, density, foam stability, insoluble alcohol content, free fatty acid content, and antibacterial activity. Results indicated that the liquid soap appeared transparent with a yellowish hue and emitted a distinct aroma of neem oil.

### Methodology:

**1. Locale of sample:** The present study will be carried out in Ayodhya districts of State Uttar Pradesh because. The area of study is selected on the basis of availability of respondents and reach.

**2. Selection of Sample Size:** The total sample size of **120** will be selected by purposive for the present study. 60 respondents are male and 60 are female selected for study.

**3. Variables for standardization of soap:** Soap base, herbal extract, Vitamin E, colour, fragrance agent, and oil will be the variables used in the soap producing process, with the soap base, herbal extract, and oil being optimized and the other factors remaining constant. The variable will be finalized based on statistical data analysis and soap assessment. The soap will be developed utilizing an optimized process.

### 4. Selection of medicinal plants:

- Lemongrass

**5. Preparation of herbal extract:** Collect fresh leaves of lemongrass plant. Extract the lemongrass juice from leaves using mixer or mortar and pestle.

S.No	Ingredient for soap	Amount		
		Sample A	Sample B	Sample C
1.	Soap base (in gm).	150gm	100gm	75gm
		75ml	50ml	25ml
2.	Plant extract (in ml).	2.5ml	2ml	1.5ml
3.	Oil (in ml)			

## 6. Optimization & Preparation of herbal soap.

### Preparation of soap:

- **Method:** Melt the soap base using gas stove or any medium mix the extracted juice ten to fifteen minutes. With the soap base evenly and add desired colour and essential oil for better appearance and fragrance. After mixing all the materials, pour the mixture into mould for setting. Demould the soap after proper setting.

**7. Assessment of Prepared herbal soap.** The assessment of developed soap will be done by the selected respondents.

### 8. Product Development using best selected method .

- The final product will be developed using the best optimal approach, and the product will be priced using the standard way.

**Statistical Analysis of data:** The data will be tabulated and analyzed with the help of descriptive (frequency, percentage).

### Result and Discussion:

#### Distribution of respondents according to type of soap they prefer (N=120):

The data present in table shows that majority 39.1% of respondents prefer herbal soap, out of which 36.6% girls and 41.6% boys followed by 37.5% of respondents prefer medicated soap, out of which 40% girls and 35% boys. Homeopathic soap is preferred by 14.1% of respondents, with a slightly higher preference among girls (16.6%) compared to boys (11.6%). Only 11.6% boys prefer other types of soap. Overall, the data highlighting herbal soap as the most favored option, followed by medicated and homeopathic soap.

Soap preference	Girls	Boys	Total
	f (%)	f (%)	f (%)
Herbal	22 (36.6%)	25 (41.6%)	47 (39.1%)
Medicated	24 (40%)	21 (35%)	45 (37.5%)
Homeopathic	10 (16.6%)	7 (11.6%)	17 (14.1%)
Other		7 (11.6%)	7 (9.1%)



### Distribution of respondents according to source of awareness of herbal soap:

The data from Table illustrates that the more than fifty percent (56.6%) respondents are aware about herbal soap through advertisement followed by 40.8% through family and friends and only 2.5% are through recommendations by users. Overall, the data underscores that awareness of herbal soap is prevalent among both girls and boys, primarily through advertisements and personal networks.

Awareness of herbal soap	Girls	Boys	Total
	f (%)	f (%)	f (%)
Advertisement	34 (56.6%)	34 (56.6%)	68 (56.6%)
Family & friends	24 (40%)	25 (41.6%)	49 (40.8%)
Others (recommendations by users )	2 (3.3%)	1 (1.6%)	3 (2.5%)

### Distribution of respondents according to their preference of essential oil in soap:

The data present in table 4.9 illustrates that the preference for essential oils in soap among girls and boys. Overall, 23.3% of the total respondents prefer coconut oil, followed by 13.3% prefer olive oil and 18.3% prefer neem oil because neem has anti-bacterial properties and 25.8% prefer almond oil. While **Selvamani et al (2022)** in his study studied that the neem oil has anti-bacterial properties and added 1.5 ml neem oil in soap making and Almond oil has antioxidant. only 6.6% prefer tea tree oil followed by 12.5% prefer other options like rosemary and lavender respectively. This suggests varied preferences among respondents regarding the type of essential oil they prefer in their soap formulations.

Preference of essential oil in soap	Girls	Boys	Total
	f (%)	f (%)	f (%)
Coconut	14 (23.3%)	14 (23.3%)	28 (23.3%)
Neem	8 (13.3%)	14 (23.3%)	22 (18.3%)
Tea tree	3 (5%)	5 (8.3%)	8 (6.6%)
Other (rosemary, lavender)	6 (10%)	9 (15%)	15 (12.5%)

### Distribution of respondents according to their soap preference among lemongrass soap:

Soap preference among lemongrass soap.	Girls	Boys	Total
1 (extremely unlike)	3 (5%)	1 (1.6%)	4 (3.3%)
2 (unlike)	11 (18.3%)	14 (23.3%)	25 (20.8%)
3 (neutral)	12 (20%)	8 (13.3%)	20 (16.6%)
4 (like)	21 (35%)	9 (15%)	30 (25%)
5 (extremely like)	13 (21.6%)	28 (46.6%)	41 (34.1%)

**Distribution of respondents according to their preference of features in Lemongrass soap:****For sample A:**

Usage rate: 58.3% of respondents find the soap's usage rate to be excellent followed by 33.3%, 8.3% very good, good, respectively.

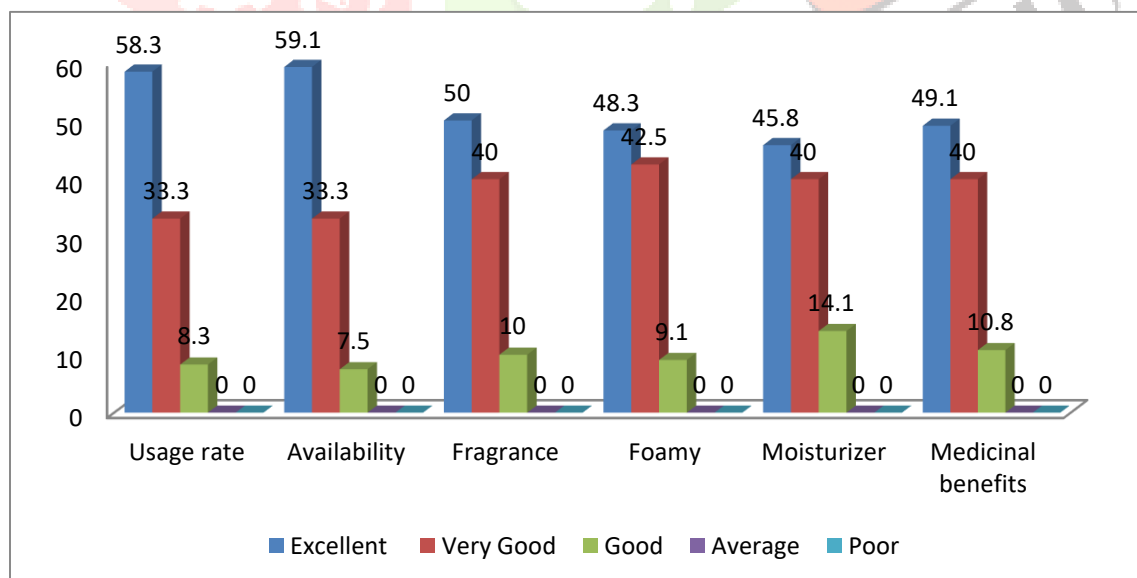
Availability: 59.1% of respondents rate the soap as having excellent availability followed by 33.3%, 7.5% very good, good, respectively.

Fragrance: 50% of respondents consider the fragrance of the soap to be excellent followed by 40%, 10% very good, good, respectively.

Foamy: 48.3% of respondents find the soap to be excellent in producing foam followed by 42.5%, 9.1% very good, good, respectively.

Moisturizer: 45.8% of respondent's rate the soap as excellent in moisturizing the skin followed by 40%, 14.1% very good, good, respectively. While **Saurav et al. (2022)** in study revealed that moisturizer in soap help the skin to become soft.

Medicinal benefits: 49.1% of respondents perceive the soap as having excellent medicinal benefits followed by 40%, 10.8% very good, good, respectively.



**For Sample B:**

S.No	Features	Usage rate	Availability	Fragrance	Foamy	Moisturizer	Medicinal benefits
		f (%)	f (%)	f (%)	f (%)	f (%)	f (%)
1.	<b>Excellent</b>	10 (8.3%)	10 (8.3%)	26 (21.6%)	3 (2.5%)	43 (35.8%)	65 (54.1%)
2.	<b>Very Good</b>	12 (10%)	14 (11.6%)	35 (29.1%)	15 (12.5%)	46 (38.3%)	43 (35.8%)
3.	<b>Good</b>	51 (42.5%)	44 (36.6%)	41 (34.1%)	50 (41.6%)	23 (19.1%)	12 (10%)
4.	<b>Average</b>	39 (32.5%)	42 (35%)	14 (11.6%)	47 (39.1%)	8 (6.6%)	0 (0%)
5.	<b>Poor</b>	8 (6.6%)	10 (8.3%)	4 (3.3%)	5 (4.1%)	0 (0%)	0 (0%)

Usage rate: 8.3% of respondents find the soap's usage rate to be excellent followed by 10%, 42.5%, 32.5% and 6.6% very good, good, average and poor respectively.

Availability: 8.3% of respondents rate the soap as having excellent availability followed by 11.6%, 36.6%, 35% and 8.3% very good, good, average and poor respectively.

Fragrance: 21.6% of respondents consider the fragrance of the soap to be excellent followed by 29.1%, 34.1%, 11.6% and 3.3% very good, good, average and poor respectively.

Foamy: 2.5% of respondents find the soap to be excellent in producing foam followed by 12.5%, 41.6%, 39.1% and 4.1% very good, good, average and poor respectively.

Moisturizer: 35.8% of respondents rate the soap as excellent in moisturizing the skin followed by 38.3%, 19.1% and 6.6% very good, good, average and respectively. While **Saurav et al. (2022)** in study revealed that moisturizer in soap help the skin to become soft.

Medicinal benefits: 54.1% of respondents perceive the soap as having excellent medicinal benefits followed by 35.8%, 10% very good, good respectively.

**For Sample C**

S.No	Features	Usage rate	Availability	Fragrance	Foamy	Moisturizer	Medicinal benefits
		f (%)	f (%)	f (%)	f (%)	f (%)	f (%)
1.	<b>Excellent</b>	9 (7.5%)	9 (7.5%)	29 (24.1%)	0 (0%)	32 (26.6%)	71 (59.1%)
2.	<b>Very Good</b>	8 (6.6%)	9 (7.5%)	33 (27.5%)	9 (7.5%)	39 (32.5%)	39 (32.5%)
3.	<b>Good</b>	47 (39.1%)	40 (33.3%)	44 (36.6%)	52 (43.3%)	38 (31.6%)	10 (8.3%)
4.	<b>Average</b>	45 (37.5%)	48 (40%)	14 (11.6%)	52 (43.3%)	11 (9.1%)	0 (0%)
5.	<b>Poor</b>	11 (9.1%)	14 (11.6%)	0 (0%)	7 (5.8%)	0 (0%)	0 (0%)

Usage rate: 7.5% of respondents find the soap's usage rate to be excellent followed by 6.6%, 39.1%, 37.5% and 9.1% very good, good, average and poor respectively.



Availability: 7.5% of respondents rate the soap as having excellent availability followed by 7.5%, 33.3%, 40% and 11.6% very good, good, average and poor respectively.

Fragrance: 24.1% of respondents consider the fragrance of the soap to be excellent followed by 27.5%, 36.6%, 11.6% very good, good, average respectively.

Foamy: 7.5% of respondents find the soap to be very good in producing foam followed by 43.3%, 43.3% and 5.8% good, average and poor respectively.

Moisturizer: 26.6% of respondents rate the soap as excellent in moisturizing the skin followed by 32.5%, 31.6%, 9.1% very good, good, average respectively. While **Saurav et al. (2022)** in study revealed that moisturizer in soap help the skin to become soft.

Medicinal benefits: 59.1% of respondents perceive the soap as having excellent medicinal benefits followed by 32.5%, 8.3% very good, good respectively.

### **Summary and Conclusion:**

The study focused on the development and evaluation of herbal soaps incorporating specific medicinal plant extracts, particularly lemongrass, in Ayodhya district, Uttar Pradesh. Various factors were considered, including soap preferences, awareness of herbal soaps, preference for essential oils, and the assessment of lemongrass soap samples. The methodology involved selecting a sample size of 120 respondents, optimizing soap variables, preparing herbal extracts, and assessing the developed soap based on respondent feedback. Statistical analysis was conducted, and results were tabulated to determine soap preferences and features of lemongrass soap samples.

### **Key Findings:**

- Herbal soap was the most preferred type among respondents, followed by medicated and homeopathic soap.
- Awareness of herbal soap was primarily through advertisements and personal networks.
- Preferences for essential oils varied, with coconut oil being the most favored, followed by neem, olive, and tea tree oil.

- Lemongrass soap received positive feedback, particularly regarding its usage rate, availability, fragrance, foaming ability, moisturizing properties, and medicinal benefits.

### Conclusion:

The study highlights the growing preference for herbal soaps among consumers in Ayodhya district. It emphasizes the importance of awareness campaigns and personal networks in promoting herbal soap products. Preferences for essential oils suggest a need for diverse formulations to cater to varying consumer preferences. The positive feedback on lemongrass soap underscores its potential as a natural, effective, and beneficial skincare product. Overall, the findings support the development and promotion of herbal soap formulations incorporating medicinal plant extracts to meet consumer demand for safe and effective skincare solutions.

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