Original Research Article

Formulation and evaluation of polyherbal human health amiable hand sanitizer: A need to fight COVID 19

Sajid A Mulani1, Yogesh S Kolekar1, Firoj A Tamboli2,*, Harinath N More3, Pradnya K Mane4, Ashish A Misal4

1 Dept. of Pharmaceutical Quality Assurance, Bharati Vidyapeeth College of Pharmacy, Kolhapur, Maharashtra, India
2 Dept. of Pharmacognosy, Bharati Vidyapeeth College of Pharmacy, Kolhapur, Maharashtra, India
3 Bharati Vidyapeeth College of Pharmacy, Kolhapur, Maharashtra, India
4 Sataras College of Pharmacy, Sataras, Maharashtra, India

ABSTRACT

Hand hygiene is now creating more awareness in the people due to pandemic COVID-19. It plays an important role in the prevention, control and reduction of any acquired infection. This can stop the chain of transmission of microorganism and other bacteria from hand to different parts of our body. Herbal medicines have been extensively utilized as effectual remedies for the prevention and management of multiple health conditions. The present research was carried out to formulate and evaluate the poly herbal hand sanitizer using Vitex negundo extract and Clove oil. The formulation was evaluated for its physical parameters. It is sure that the combination of ingredients behaves as an effective hand sanitizer.

This is an Open Access (OA) journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprint@ipinnovative.com

1. Introduction

The emergence of the COVID-19 (Coronavirus Disease-2019) pandemic has risen to be a significant global public health concern and led to extensive use of hand disinfectants given its contagious nature. Effective Hand Hygiene is the single most important strategy in preventing healthcare associated infections. To keep the skin safe from harmful microorganisms and to prevent spreading of many infectious diseases, proper hand washing and hand sanitizing is absolutely an important precaution. Hand washing removes visible dirt from hands and reduce the number of harmful microorganisms. Harmful bacteria and viruses such as, E. coli and Salmonella can be carried by people, animals or equipment and transmitted to food. Hand sanitizer is nothing but the alcohol based type of disinfectant preferred to hand washing with soap and water in most situation in healthcare setting. It is generally more effective at killing microorganism and better tolerated than soap and water. The hand sanitizers are available in the form of Liquid, Gel and Foams.

In this study we used Vitex negundo extracts and Clove oil due to their individual benefits. By using some herbs like Vitex negundo, Clove oil, to formulate and evaluate herbal hand sanitizer comprise the combination of these herbal agents and their alcohol extract with the suitable excipients. These Vitex negundo & clove are largely found in India.

The aim of the present study was to prepare hand sanitizer using the extracts of Vitex negundo, Clove oil. Furthermore, to evaluate the stability and phycochemical parameters of the prepared formulations so that they can be further standardized and used commercially.

*Corresponding author.
E-mail address: firojtamboli143@gmail.com (F. A. Tamboli).
2. Materials and Methods

2.1. Plant material

Fresh leaves of *Vitex Negundo* were collected from Satara region and authenticated from Yashavantrao Chavan Institute of Science, Satara. The leaves were dried in sunlight for 4-5 days, these leaves were ground coarsely by using mechanical blender and passes through 40 mesh sieve. And the powder was extracted, by adding 100gm powder in dissolved in the 140ml of Ethanol and 60ml of Water in the conical flask, shake the conical flask within interval of 2 hours, keep it for 3 days to complete the cycle. After three days filter it and evaporate. The extract was collected. The commercial product of clove oil is purchased which is manufactured by Mangal pharmaceutical, Navi Mumbai.

2.2. Preparation of hand sanitize

2.3. Procedure

Carbopol was added to deionized water with constant stirring. After uniform mixing, Triethanolamine (TEA) was added with slow stirring to avoid formation of possible air bubbles in the product and kept aside for 24 hrs. Both the *Vitex negundo* extracts along with clove oil were added to denatured alcohol along with glycerine, polysorbate 20 was mixed with aqueous phase. Finally, 0.15gm Propyl Paraben was added as preservative and rose oil 0.15ml as perfume and mixed with slow stirring to obtain uniform product. Prepared product was stored in air tight containers.

2.4. Evaluation of physicochemical parameters of the prepared formulations

Various physicochemical parameters which are mentioned below were performed to establish quality of the prepared formulations.

2.5. Organoleptic evaluation

Clarity and color were checked by naked eyes against white background, the odor was smelled.

2.6. Spreadability

Spreadability of the formulations was determined by measuring the spreading diameter of 5g of sample between two horizontal glass plates (10 cm × 20 cm) after one minute. The standard weight applied to the upper plate was 100g.

Length of the glass slide (L): 20cm
Weight of the sample (gms): 5gm
Weight applied (M): 100gm
Time taken (T) : 16 sec.
Formula for spreadability:

\[ S = \frac{100 \times 20}{16} = 125 \text{ g/cm/s} \]

2.7. PH

The pH of all the prepared formulations was determined by using Digital pH Meter. The formulations were dissolved in 100 ml of distilled water and stored for two hours. The measurement of pH of formulation was done in previously calibrated pH meter.

2.8. Determination of percentage free alkali

About 5 gm of sample was taken in a conical flask and added to it into 50 ml of neutralized alcohol. It was boiled under reflux on a water bath for 30 minutes, cooled and 1 ml of phenolphthalein solution was added. It was then titrated immediately with 0.1N HCL.

2.9. Foam height

0.5gm of sample of soap was taken, dispersed in 25 ml distilled water. Then, transferred it into 100 ml measuring cylinder; volume was make up to 50 ml with water. 25 strokes were given and stand till aqueous volume measured upto50 ml and measured the foam height, above the aqueous volume.

2.10. Foam retention

25 ml of the 1% soap solution was taken into a 100ml graduated measuring cylinder. The cylinder was covered with hand and shaken 10 times. The volume of foam at 1-minute intervals for 4 minutes was recorded.

2.11. High temperature stability

Liquid soap was allowed to stand at 50ºC for one week. The stability of liquid soap was observed during this period. The sample which was homogeneous and stable liquid after standing was indicated as stable and the sample in which the crystals were roughened and the sample in which precipitation was caused; then liquid was said to be as unstable.

3. Results

The physicochemical parameters of the prepared soap and hand sanitizer were determined. Parameters such as color, odour, appearance, pH were tested. The formulations exhibited good appearance characteristics as well as the pH was found in the range of 6.5 to 7.0 which is the desired pH. Other parameters such as percentage free alkali, foam height, foam retention, and high temperature stability were determined; the results are tabulated in Table 2.
Table 1: Hand sanitizer formula

| S. No. | Ingredients                     | Quantity taken (gms/ml) | Uses            |
|--------|---------------------------------|-------------------------|-----------------|
| 1.     | Deionized water                 | 9.0                     | Vehicle         |
| 2.     | Alcohol denaturated             | 18.6                    | Antibacterial   |
| 3.     | Vitex Negundo extract           | 0.75                    | Antibacterial   |
| 4.     | Clove oil                       | 0.15                    | Gelling agent   |
| 5.     | Carbol                           | 0.15                    | Emollient       |
| 6.     | Tri Ethanol amine               | 0.21                    | pH adjuster     |
| 7.     | Glycerine                       | 0.69                    | Preservative    |
| 8.     | Polysorbate 20                  | 0.15                    | Perfume         |
| 9.     | Propyl paraben                  | 0.15                    |                 |

Table 2: Physicochemical parameters of hand sanitizer

| Color        | Odour         | Appearance | pH | Spreadability | % free alkali | Foamheight (cm) | Foamretention (min) | High temperature stability |
|--------------|---------------|------------|----|---------------|---------------|------------------|----------------------|--------------------------|
| Pale green   | Characteristics Translucent gel | 7 | 125 g/cm/s | 0.15 | 10 | 2.5 | Good |

4. Conclusion

In this research work herbal hand sanitizer was formulated successfully. This formulation was prepared by using Vitex Negundo leaves extract and clove oil. The pH, spreadability, irritancy, evaporation, stability test were observed. Natural herbal hand sanitizers are effective, environment friendly and biodegradable, inexpensive. It was found that the formulation were pale green colour with liquid consistency and smooth texture. In prepared formulation the alcohol is used along with Clove oil to get better result. Clove has significant antimicrobial activity, so we had chosen Vitex negundo and clove oil in combination to enhance the antimicrobial effect of Polyherbal hand sanitizer.

5. Source of Funding

None.

6. Conflict of Interest

The authors declare that there is no conflict of interest.

References

1. COVID-19 Coronavirus 2019-nCov Statistics Update (Live): 4,122,912 Cases and 280,337 Deaths. Available from: https://virusncov.com.
2. Jyothi MJ, Kumar AVP, Mohanalakshmi S, Prathyushas S. Formulation and evaluation of poly herbal hand wash. Int J Pharm. 2012;2(2):39–43.
3. Minakshi GJ, Kamat DV, Kamat SD. Evaluation of herbal handwash formulation. Nat Prod Radiance. 2008;7(5):413–5.
4. Aswar PB, Khadadabi SS, Kuchekar BS, Rajurkar RM, Saboo SS, Javarkar RD. In vitro evaluation of anti-bacterial and anti-fungal activity of Vitex negundo (Verbenaceae). Ethnobotanical Leaflets. 2009;13:962–7.
5. Dharmasiri MG, Jayakody J, Galhena G, Liyanage SSP, Ratnasooriya WD. Anti-inflammatory and analgesic activities of mature fresh leaves of Vitex negundo. J Ethnopharmacol. 2003;87(2-3):199–206.
6. Khokra SL, Prakash O, Jain S, Aneja KR, Dhingra Y. Essential oil composition and antibacterial studies of Vitex negundolinn. extracts. Indian J Pharm Sci. 2008;70(4):522–6. DOI:10.4103/0250-4378.39011.
7. Abdullah BH, Hatem SF, Jumaa W. A comparative study of the antibacterial activity of clove and rosemary essential oils on multidrug resistant bacteria. UK J Pharm Biosci. 2015;3(1):18–22.
8. Venkateshwari G, Ragananith E, Swapna K, Santhosh A, Santhosh CH. Vitex trifolia -An Important Medicinal Plant: A Review of Its Folklore Medicine and Traditional Uses. Asian J Pharm Res. 2014;4(2):70–1.
9. Malathi R, Cholarajan A, Karapagam K, Jaya KR, Muthukumaran P. Antimicrobial Studies on Selected Medicinal Plants (Coleus amboinicus, Phylla nodiflora and Vitex negundo). Asian J Pharm Tech. 2011;1(2):53–5.
10. Rastogi T, Bhutda V, Moon K, Aswar PB, Khadabadi SS. Comparative Studies on Anthelmintic Activity of Moringa Oleifera and Vitex Negundo. Asian J Res Chem. 2009;2(2):181–2.
11. Ladda PL, Naikwade NS, Magdum CS. Antimycobacterial and Antimicrobial Activity of Leaf Extracts of Vitex negundo Linn. Res J Pharmacognosy Phytochem. 2010;2(2):166–8.
12. Meena AK, Nirajan US, Yadav AK, Singh B, Nagaria AK, Gaurav A, et al. Vitex negundo Linn; a Review on Its Ethnobotany, Phytochemical and Pharmacological Profile. Res J Pharmacognosy Phytochem. 2010;2(2):122–8.
13. Nethravathi V, Vijaitha V. Effectiveness of Clove oil massage on Lower Back Pain among Post Natal Mothers at Selected Hospitals, Bangalore. Asian J Nurs Edu Res. 2015;5(4):467–70.
14. Neha VN, Devayani PR, Ravindra SB. Microwave Assisted Extraction of Phytoconstituents used in Herbal Cosmetics. Res J Top Cosmet Sci. 2013;4(2):54–8.
15. Trupti VK, Sneha SW, Darekar AB, Saudagar RB. An overview: Aloe vera. Res J Top Cosmet Sci. 2014;5(2):62–7.
16. Rajbhar K, Dawda H, Mukundan U. UshaMukundan. Tea Polyphenols for Skin Care. Res J Top Cosmet Sci. 2015;6(1):1–6.
17. Gatkine TM, Shete VS, Mahajan NM, Mahajan UN. Potential of phyto-constituents as a skin tanning agents. Res J Top Cosmet Sci. 2019;10(1):34–8. DOI:10.5958/2349-2996.2019.00008.6.
18. Sati P, Dhiyani P, Bhatt ID, Pandey A. Ginkgo biloba flavonoids glycosidein antimicrobial perspective with reference to extraction method. J Tradit Complement Med. 2018;9(1):15–23.
Author biography

Sajid A Mulani, PG Student

Yogesh S Kolekar, PG Student

Firoj A Tamboli, HOD  

Harinath N More, Principal

Pradnya K Mane, Assistant Professor

Ashish A Misal, Student

Cite this article: Mulani SA, Kolekar YS, Tamboli FA, More HN, Mane PK, Misal AA. Formulation and evaluation of polyherbal human health amiable hand sanitizer: A need to fight COVID 19. *IP Indian J Anat Surg Head, Neck Brain* 2021;7(2):47-50.