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IP Indian Journal of Anatomy and Surgery of Head, Neck and Brain

Journal homepage: https://www.ijashnb.org/

Original Research Article

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

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ARTICLE INFO

Article history:
Received 29-05-2021
Accepted 07-07-2021
Available online 09-08-2021

Keywords:
Vitex Negundo
Clove oil
Hand hygiene
pH
Hand sanitizer

ABSTRACT

Hand hygiene is now creating more awareness in the people due to pandemic COVID -19. It plays 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.

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.[1] Effective Hand Hygiene is the single most important strategy in preventing health care 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.[2] 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.[3]

In this study we used *Vitex negundo* extracts and Clove oil due to their individual benefits.[4–13] 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.

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https://doi.org/10.18231/j.ijashnb.2021.010

2. Materials and Methods

2.1. Plant material

Fresh leaves of *Vitex Negundo* was collected from Satararegion 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[14–17]

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[18–20]

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:

$$S = \frac{M * L}{T}$$

$$= \frac{100 * 20}{16}$$

= 125 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 temperaturestability 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	Antibacterial
5.	Carbopol	0.15	Gelling agent
6.	Tri Ethanol amine	0.21	pH adjuster
7.	Glycerine	0.69	Emollient
8.	Polysorbate 20	0.15	Emulsifier
7.	Propyl paraben	0.15	Preservative
9.	Rose oil	0.15	Perfume

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.

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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.