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Review on the importance of herbal hand sanitizers with the emergence of COVID-19

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ABSTRACT:
The arise of novel pathogen always forced the mankind to face the different healthchallenges. The most dangerous pathogen announced by World Health Organisation is Corona virus 2019 which is commonly known as COVID-19. In the early period of 2020, this disease was declared as global pandemic and now the infection was crossed over hundred million people globally [1]. All over the world, different countries took various preventive measures to fight this pandemic situation. World Health Organisation (WHO) directsto maintain the personal hygiene and social distancing. Hand washing is made essential to maintain personal hygiene. Most of the contact diseases are spread easily through hands.A simple and effective way of reducing transmission of COVID-19 virus could be done by taking care of hand hygiene. The usage of hand sanitizer had prevented the spreading of many infectious diseases. Hand sanitizers are available in the different forms such as liquid, gel etc. In this review, we have discussed about the herbal hand sanitizer which is light to skin but it is effective at destroying germs.An abundant source was obtained on the herbal and its antimicrobial properties with their potential application as hand sanitizers. Some herbs that are used to prepare herbal hand sanitizers are Ocimum sanctum (tulsi leaves), Azadirachataindica (neem), Eugenia caryophyllus (clove), Cymbopogon flexuous (lemon grass), Aloe baarbadensis (aloe), Menthaarvensis (mint), Eucalyptus globulus (eucalyptus). In the present time of COVID-19 pandemic outbreak, the applications of these sanitizers have become twice than before.

Keywords: COVID-19 virus, antimicrobial properties, herbal hand sanitizer, hand hygiene

I. INTRODUCTION

The disclosure of novel pathogens, bacterial or viral, raised infinite complications to public health around the globe. One of the present dangerous pathogens is “severe acuterespiratory syndrome coronavirus 2” or SARS-CoV-2, more commonly known for causingcoronavirus disease 2019 or COVID-19, which has been announced a global pandemic by theWorld Health Organization in early 2020. Since its first existence was in December 2019 in Wuhan, therehave been over three million confirmed cases worldwide by April 2020[1]. With casestremendously increasesaround the world, it has caused significant burden on all aspects ofsociety despite aggressive isolation methods to prevent the spread of the virus. Currently,remedies to deal with COVID-19 are only supportive, making prevention aimed atreducing transmission the best method.

One of many ways implemented to prevent the spread of this virus, as with previouscontagious pathogens, is frequent and effective hand-washing.Black et al. (1981) evidenced a study on diminish in diarrheal illnesses (due to Shigella, Giardia and rotavirus) in day care centers where employees were instructed to perform good hand washing procedures [2]. Hand washing cleared the visible dirt from hands and decline the presence of harmful microorganisms such as, E. coli and Salmonella which is opt to be carried by people, animals or equipment [3].

Hand hygiene includes:

1) hand-washing, i.e. using simple soap and water;
2) antiseptic hand-washing, i.e. using an antiseptic detergent and water; and
3) antiseptic hand sanitization, i.e., using antiseptic hand rubs, basically alcohol-based hand sanitizers [4].

In Europe, the terms “hand antiseptic” and “alcohol-based hand rub (ABHR)” are more commonly used than the term “hand sanitiser”[5].

According to the WHO, an ABHR is “an alcohol-containing preparation (liquid, gel or foam) designed for application to the hands to inactivate microorganisms and/or temporarily suppress their growth. Such preparations may contain one or

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more types of alcohol, other active ingredients with excipients, and humectants" [4]

In all the places such as home, malls, temples, healthcare, working centers and communitysettings, alcohol-based hand sanitizers have become a popular alternative to the traditionalhand-washing with soap and water. Sanitizer is a substance or fluid invented to destroy microorganisms on surface of skin and objects. During this global pandemic situation "COVID-19"alcohol based hand sanitizers have been utilized as aneffective alternative to hand-washing to prevent the spread of bacterial and viral infections,making it one of the essential protocols in decreasing healthcare burden[5-7].

Hand sanitizers usually available in the form of foam, gel or liquid form. A range of handsanitizers are available with various combinations of ingredients and modes of delivery. Giventhe popularity of hand sanitizers during this pandemic, it is important to understand which typesof hand sanitizers work best against this novel virus. In this review, we will discuss the role of various types of herbal based hand sanitizers in effective elimination of bacterial and viralpathogens with the focus on the effectiveness against enveloped viruses, such as SARS-CoV-2. (Andrew P. Golin et al, 2020) [8].

Non-alcoholic products are also available, but they are less preferred by the health organisations (Kampf and Kramer, 2004; Todd et al., 2010) [5,9] - including the Centers for Disease Control and Prevention (CDC) - for fighting CoVID- 19 (Howes, 2020) [10]. This is due to their poorer efficacy and narrower spectrum compared to the alcohol-based sanitisation products (CDC, 2019a) [11].

The most important factor in determining the efficacy of a hand sanitiser is indeed the alcoholic content. Nevertheless, there have been worrying reports of alcohol-free hand rubs being constantly sold during the CoVID-19 outbreak (Allen, Marshall Song, 2020)[12]. Consumers must become aware that such alcohol-free products are not recommended by the health organisations and should therefore be avoided.

Alcohol/ Acohol-free based herbal hand sanitizers

In 2013, NandkishorS et al formulated and evaluated the herbal sanitizer from the Tulsi leaves extract and niglris leave extract which showed significant anti-microbial effect on the specifiedmicroorganisms except Ps. aeruginosa and S.cerevisiae.

One such important work done by Balakrishna et al., (2018)[13] to evaluate the antibacterial efficacy of various herbal oils such as Cinnamon oil, Eucalyptus oil, menthol oil and lavender oil and found that cinnamon oil showed better antibacterial activity. They also formulated and evaluated poly-herbal hand wash gel containing Azadirachtaindica, Ocimum sanctum and Citrus lemon extracts.

The anti-microbial activity of the formulated herbal hand wash gel was tested against Escherichia coli, Staphylococcus aureus and Salmonella by spread plate techniques and the results obtained were compared with commercial antibacterial standards and found to be very effective and supported the use of herbs in the formulations of hand sanitizers to give a better effect1. Another relevant study involves the preparation of herbal hand sanitizer using leaves extracts of Ocimum sanctum, Eugeniacaryophyllus and Cymbopogon flexuous by Thombare et al., (2015)[14].

The prepared herbal hand sanitizer gave better results than the commercially available synthetic hand sanitizer against Staphylococcus aureus and Pseudomonas aeruginosa. It also showed better efficacy in reducing higher number of microorganisms from the hands as compared to commercial synthetic hand sanitizer. Thus, the study supported the use of herbal extracts in the preparation of herbal hand sanitizers on commercial scale.

In a study done by Yousaf Ali (2015)[15], the effectiveness of both Alcohol/ non-alcohol based hand sanitizers were tested against the standard Staphylococcus aureus and E. coli. The evaluation of the hand sanitizer is done by Kirby-Bauer technique. In the study, the non-alcoholic sanitizer viz. Alemlaq (Alkyl Dimethyl Benzyl Ammonium chloride) was found to be more effective than other alcoholic sanitizer against Staphylococcus aureus. Similarly Lux (Sodium laurate) was found to be more effective than other alcoholic sanitizer against E. coli. Thus, the various

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studies done to prepare herbal hand sanitizer incorporating the leaves extracts of various selected plants with multidimensional activities with their respective antimicrobial efficacy and efficiency supported the use of herbs for the formulation of hand sanitizer. These were evaluated against specified microorganisms like (Bacteria- E. coli, Pseudomonas aeuroginosa, Staphylococcus aureus, Bacillus subtilis and Fungi- Sacchromycescerevisiae and Candida albicans) by culture sensitivity test. The significance was found to be more in comparison to the standard reference.

ZeeshanAfsar et a were reported the activity of bark and leaves ofMilletiapinnata, Ficusreligiosaand Cassia fistula They were extracted by taking four different solvents of increased polarity and the extracts were screened for antimicrobial activity. Results show that most of the extractsdisclose good antimicrobial effect. The microbial activity of bark extracts of Cassia fistula and Ficusreligiosa and methanolic bark extracts of and Milletiapinnata and Cassia fistula reveals maximum activity with zones of inhibition ranging from 14 to 18 mm.
Extracts which showed maximum activity were opted and with that combinations soap and hand sanitizer are formulated by ZeeshanAfsar et al, 2016. The obtained formulations when examined for the antimicrobial activity reveal the zones of inhibition ranging from 18 to 26 mm. The raise in antimicrobial properties may be due to the synergistic effect or total sum of effects produced by the combinations of extracts. Therefore, the prepared soap and hand sanitizer formulations were equalize by evaluating various physicochemical properties such as pH, appearance, spreadability, extrudability, high temperature stability, in which they marked satisfactory characters. But thoseformultions are not standardized as good antiseptics and disinfectants. (ZeeshanAfsar et al, 2016) [16]

Fatima Grace et al 2015 [17],formulate an herbal hand wash by using some extracts of commonly available plants like ginger, lemon juice and Andrographispaniculata. The combination was evaluated for its physical parameters. It was repoterd that it can show a remarkable behavior over hand sanitizer with those ingredients and it can be used as effective hand sanitizer. But there is no evidence shown for antimicrobial properties.

A recent study was found to prepare the cheap hand sanitizer with herbal ingredients was reported by A Chakraborty et al [18]. Using aloe vera pulp and guava leaf extract, alcohol based herbal hand sanitizer was made and the efficiency was not taken by microbial studies. Instead of that, two test were performed. They were tissue paper test based on paper chromatography and wheat dough test. A new way of preparing hebal hand sanitizer were evaluated.

II. CONCLUSIONS

As of from 2019 to till now, the COVID-19 affected cases were increased tremendously. In India, vaccination have been started but we should not regret the steps need to be taken at this pandemic. Sanitizing is very much important at all the time. The best approach of making effective, affordable, alcohol/ alcohol free based hand Sanitizer reduce the transmission of Corona Virus. Various research papers are taken from different sources and also reviewed about the efficiency of herbal hand Sanitizers. The herbal hand sanitizer is also found to be effective from the results obtained the various investigators. Thus, it aids the replacement of alcohol/alcohol free hand sanitizer which affects our body.

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