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REVIEW PAPER

Effectiveness of Alcohol Based Hand Sanitizer against COVID-19: A Review

Nisha A Bhatt¹, Drishti Joshi¹, Rohan Sharma², Amandeep Singh^{3*}

¹Associate Professor, Dev Bhoomi Institute of Pharmacy & Research, Dehradun, Uttarakhand, India

²Research Scholar, Dev Bhoomi Institute of Pharmacy & Research, Dehradun, Uttarakhand, India

³Professor, Dev Bhoomi Institute of Pharmacy & Research, Dehradun, Uttarakhand, India

*Corresponding Author: **Prof. (Dr) Amandeep Singh**

ABSTRACT

Alcohol based hand sanitizer is a fluid, gel, or froth that contains ethanol or isopropanol used to clean hands. Hand cleanliness is a significant part of the U.S. reaction to the rise of SARS-CoV-2, the infection that causes Covid illness 2019 (Coronavirus). On the off chance that cleanser and water are not promptly accessible, Center for Disease Control (CDC) suggests the utilization of liquor based hand sanitizer items that contain basically 60% ethyl alcohol ethanol) or 70% isopropyl alcohol (isopropanol) in local area settings; in medical care settings, CDC proposals indicate that alcohol based hand sanitizer items ought to contain 60%-95% liquor ($\geq 60\%$ ethanol or $\geq 70\%$ isopropanol). As per the Food and Drug Administration (FDA), which directs alcohol based hand sanitizers as an over-the-counter medication, methanol (methyl alcohol) is certifiably not a satisfactory fixing. As COVID-19 has rapidly spread worldwide, panic buying of sanitizers over the coronavirus pandemic has led to stocking up of sanitizer sprays, gels, and so on. The aim of this study is to review that alcohol based sanitizer is effective against the Covid-19 which you can use for short time wherever water and soap is not available.

Keywords: - Covid-19, Alcohol, sanitizer, Center for Disease Control.

INTRODUCTION

Hand hygiene is however fundamental for eating food and it seems to be the most ideal approach to be healthy and to escape from different sicknesses it assumes a significant part in eliminating residue, microorganisms, and keeping up with great wellbeing in a correlation with hand sanitizer cleanser, water are more useful eliminate an organisms, pesticides and other compound buildup that require

*Corresponding Author:

Prof. (Dr) Amandeep Singh

Professor, Dev Bhoomi Institute of Pharmacy & Research, Dehradun, Uttarakhand, India

E.Mail: jd.pharmacy@dbgidoon.ac.in

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some investment close by maintaining hand cleanliness has been set up as vital for lessening the colonization and frequency of irresistible illnesses in human being.[1] Consistence with hand cleanliness suggestions is accepted to assume a significant part in decreasing the danger of gastrointestinal and respiratory diseases.[2] Severe hand cleanliness is significantly more significant for medical care as dirty

hands might support the transmission of microorganisms from patient to other individual prompting infection which might be cause health diseases.[1,6]

Many Countries including Nigeria focused on regular hand hygiene practice and use of alcohol- based hand sanitizer as a means of obstructive Coronavirus spread . This article focused on the use of alcohol based Hand sanitizers and its effectiveness in the anticipation of COVID-19 while also considering its effects on COVID-19 (Coronavirus Disease-2019) pandemic is a great concern to public health. The use of alcohol based hand Sanitizer is globally practiced in an effort to prevent rapid spread of the virus . The total number of coronavirus cases in the world has risen to over twenty three million (23Million) Due to the contagious nature of the virus, the use of disinfectants such as alcohol based hand sanitizer becomes apparent. COVID19 2019 is a infectious disease caused by the severe Acute respiratory syndrome coronavirus 2 (SARSCoV-2), which can persist And remain infectious on surfaces for up to 9-14 days.[11]

Various studies have reported that the spread of covid -19 is fast in some places and group of people with the presence of a infected host. The infectious virus or agent will remain in the air when an individual Sneezes or cough. The virus is wrapped in the droplet for several hours and get on surfaces for 24-48 hours . The need to break the course of transmission turns out to be more evident through early location, contact following, Isolation, utilization of nose mask or face safeguard, customary hand-washing practice and Use of alcohol based hand sanitizer has been made primus-between pares among other estimates set up to forestall COVID-19 spread. Nigeria Center for Disease Control (NCDC) supports Nigerian residents through every day text on the tips of forestalling the infection spread. The utilization of alcohol based hand sanitizer was tipped as successful hand sanitizers against the spread of the infection. Because of this turn of events; the interest for alcohol based hand sanitizers soar In business stores. Wellbeing organizations, for example, Ekiti State school of Health Sciences and Technology Ijero Nigeria delivered smaller than normal sanitizers graciousness of the Community Health division; there are additionally various brands of hand Sanitizer multiplied on the lookout. A portion of these sanitizers in spite of the Hike costs are insufficient as they are not alcohol based. The World Health Organization (WHO) suggests alcohol based hand sanitizer (ABHS) in Line with the demonstrated benefits of their quick activity and an expansive range of microbicide action to guarantee security against microorganisms and infections .However, the viability against nonwrapped infections is as yet easy to refute and quionatable Presently, as per World Health Organization, liquor based hand Sanitizers are the best plans because of its capacity to denaturalize Proteins of microorganisms and making infection inactive.[3] Though alcohol based Hand sanitizers are marginally combustible and could prompt skin poisonousness when Alcohol content is too high In this regard will conclude alcohol based hand sanitizers, their effectiveness and possible adverse effects.

The rise of novel microbes, bacterial or viral, has consistently presented genuine difficulties to general wellbeing all throughout the world. One of these perilous pathogen is "severe acute respiratory syndrome coronavirus 2" or SARS-CoV-2, more commonly known for causing coronavirus disease 2019 or COVID19 which has been pronounced a worldwide pandemic by the World Health Organization in mid 2020. Since its revelation in December 2019 in Wuhan, there have been more than 3,000,000 affirmed cases worldwide by April 2020.

Type of Hand sanitizer

Hand sanitizers can be classified as alcohol-based or alcohol-free.

Alcohol-based sanitizers comprise between 60 and 95 percent alcohol in the form of ethanol isopropanol, or n- propanol. Alcohol have tendency to spread proteins and prevent certain micro-organisms at this concentration.

Alcohol-free products have a property of disinfectants, such as benzalkonium chloride (BAC) or on a antimicrobial agents, such as Cloxifenolum which is immediate and purposeful. Several sanitizers comprise moisturizing (e.g., glycerin) that pacify the skin, thickening agents, and provides aroma. [5]

Mechanism of action of alcohol based sanitizer against Corona virus

The alcohol based sanitizer are envelop viral which is present from host lipid envelop, the protein capsid, which produce and protect genetic material, these material are essential for the life span for viral and for the capacity to transmit to other host ,so if the altering the structure any of these component which makes the virus inactive.

It is known that the ethanol have wide spectrum aginst virus infection propanol,it have been shown thath the higher concentration of ethanol most effective against envelop viruses and it is also notice that if the acid are added to ethanol sanitizer it will increase its efficacy against viruses.In this regard, the alcohol based sanitizer disrupt the membrane lipid bilayer thus it affect it is physical and biochemical properties and protein function is disrupt results in the solubilization lipid bilayer component and make the virus inactive host.[6]

Advantages

The advantages of hand sanitizers are that it is more convenient, portable, easy to use and not time consuming The families who apply the sanitizer have lower risk of spreading gastrointestinal (stomach) and respiratory system infection.

Hand sanitizers are now available in the passages of nursing homes, emergency clinics and in numerous public washrooms. We all know the significance of legitimate hand-washing in decreasing unsafe germ transmission. In any case, there are times when there is no access to cleanser and water or insufficient time to wash completely.

A. Cleanliness

This ought not come as a shock. One of the head advantages of hand sanitizer is only that: it cleans. It is expected to dispense with germs, and take cares of that business. When utilized properly, hand sanitizer can get freed 99.9% of the germs on your hands. The CDC recommends washing your hands at whatever point you are around food (making it or eating it), creatures, waste, and those are just a hint of something larger. [7]

B. Transportability

It is difficult to take a sink with you all over the place. In certain conditions where you need to wash your hands, cleanser and water are not continually going to be open. A little holder of hand sanitizer can go into your glove compartment, a sack, or even your pocket. It is additionally ideal for when you are getting a snack at a game or have as of late left a public space, like the market.

C. Decreases Risk of Illness

Especially during influenza season, restricting your openness to others' germs is basic for your prosperity. Each time you stop for during the day, you reduce your chances of turning out to be sick. Undoubtedly, even a fast trip to a friend's home or the store can open you to germs that could cause a cool, influenza, or various illnesses, so keeping your hands as spotless as possible is significant

Limitations

The alcohol content of sanitizer should not be less than 60 percent. The proportion of alcohol should be in between 60 and 95 percent when in use. The ingredient should be in the form of ethyl alcohol, isopropanol or ethanol, which are acceptable. Every sanitizer is not manufactured equally; hence, it should be checked before purchasing Some cheaper versions are available which may contain toxic chemicals to give you a pleasant fragrance. [8]

For the efficacy or proper effectiveness of the sanitizer, it should be used on hands, which are free from soil, dirt, blood, or lubrication.

Hand sanitizers are not an alternative to hand washing; rather, it is a harmonizing habit which is far more effective when used in conjunction with soap and water

Benzalkonium Chloride is the main compound which is commonly found in hand sanitizers. It eliminate the germs by rupturing the outer covering of the cell membranes of virus and bacteria. But this compound is equally harmful to human cells as it irritates the mucosal lining of the cell membranes and induces an allergic reaction in some people. [6,9]

Through several literature review has been performed by three unique data sets, PubMed, Scopus, and Google Scholar, for articles distributed from 2010 to 2021" After the applicable articles were tracked down, the basic evaluation was made to choose those that were appropriate for the orderly review. Any gathering abstracts, case reports, and unpublished information were barred from this investigation Formulation: [3,7,10]

Through literature review, the WHO recommended the following two formulations during the COVID-19 pandemic

Formulation 1: Ethanol Antiseptic 80% Topical Solution

Ethanol 96%	8333 mL
Hydrogen Peroxide 3%	417 mL
Glycerol 98%	145 mL
Water,	a sufficient quantity to make 10000 mL

Formulation 2: Isopropyl Alcohol Antiseptic 75% Topical Solution

Isopropyl Alcohol 99%	7576 mL
Hydrogen Peroxide 3%	417 mL
Glycerol 98%	75 mL
Water,	a sufficient quantity to make 10000 mL

Formulation 3: Isopropyl Alcohol Antiseptic 75% Topical Solution

Isopropyl Alcohol 91%	8242 mL
Hydrogen Peroxide 3%	417 mL
Glycerol 98%	75 mL
Water,	a sufficient quantity to make 10000 mL

EFFECTIVENESS OF HAND SANITIZER

Alcohol based hand sanitizer is a first line infection of measure prevention:-

According to the WHO, an ABHR is “a liquor containing planning (fluid, gel or froth) intended for application to the hands to inactivate microorganisms or potentially briefly smother their development. Such arrangements might contain at least one kinds of liquor, other dynamic fixings with excipients, and humectants. Non-alcoholic items are likewise accessible, yet they are less liked by the wellbeing associations [6] – including the Centers for Disease Control and Prevention (CDC) – for battling CoViD-19 [3]. This is because of their less fortunate adequacy and small range contrasted with the liquor based sterilization items (CDC, 2019a). The main factor in deciding the adequacy of a hand sanitizer is in fact the alcoholic substance. By and by, there have been stressing reports of liquor free hand rubs being continually sold during the CoViD-19 episode. Buyers should become mindful that such liquor free items are not suggested by the wellbeing associations and ought to thusly be stayed away from. A larger part of the respondents (in all the three Waves) believe that the likelihood to get infected with the Coronavirus is low (Points 1, 2 and 3 on the 7-point scale, with Point 1 denoting “Very Low”, and Point 7 denoting “Very High”). It is notable that this perception of the respondents is further reinforced (44.9% of the respondents in the First Wave, and 50% in the Second Wave) in the Third Wave with 55.1%. The likelihood is high for 27% of the First Wave respondents, for 21.9% of

the Second Wave respondents and for 18.2% of the Third Wave the respondents) The opinions of the respondents are divergent as to how severe contracting the novel coronavirus Will be for them. The positive stance increased in the third Wave: 29.5% of the respondents in the First Wave believed that they would cope with the Coronavirus easily, and around the infection. In the Second Wave this ratio changes for recovering from it easily (32.9% chose the Response “Very minor”, and 25.9% chose the response “Very severe”), while in the Third Wave the Perception of coping with the infection easily, increases further (37.5% chose the response “Very Minor”, and 23.3% chose the response “Very severe In all the Three Waves more respondents consider that they are not susceptible to the Coronavirus. [4]

The efficacy attribute depending on the application, target microorganisms and delivery mode, there are diverse standard test methods used to determine product efficacy. Efficacy testing is generally performed using tests that measure the number of microorganisms before and after treatment with ABHS. Test results are typically expressed in terms of log₁₀ reduction factors. The key factors influencing ABHS efficacy are the level and the type of alcohol used. However, added ingredients can also have significant influence on efficacy. For example, recent studies have shown that while the current WHO formulations do not meet the requirements for EN(European Norms) 1500 (hygienic hand rub) or EN 12,791 (surgical hand preparation), using higher alcohol levels (i.e., 80% ethanol or 75% isopropanol on a weight instead of the current volume basis) and lowering the glycerol level to 0.5% (v/v) enables these modified formulations to meet both EN test criteria efficacy performance [8]

Conclusion

In our study evaluated that an alcohol-based sanitizer, if used correctly and in appropriate volume, can disperse certain type of micro-organisms. Hand washing is as essential as eating food. It can be use to keep healthy and to stay away from various diseases .Hand sanitizers are more effective in hospitals when hands are in contact with germs, but not dirt or greasy. Other studies also reveal that hand sanitizers might be effective on lubricated hands with certain microbes According to WHO alcohol based sanitizer are the method recommended for ensuring hand hygiene to control to spread the covid -19 pandemic due to superior efficacy and convince Alcohol based sanitizer need to be carefully designed and formulated with a desired quality and efficacy. AHBS products are minimum risk such as flammability and exposure by ingestion. According to the Center for Disease Control (CDC), hand hygiene surround the cleansing of hands by using soap and water, antiseptic hand washes, antiseptic hand rubs such as alcohol-based hand sanitizers (ABHS), foams or gels, or surgical hand germicidal aseptic .Hand sanitizers as a disinfectant are in more use today because of its ease of availability, lack of water and time, and their proven efficacy in lowering microbial load. As COVID-19 has rapidly spread worldwide, panic buying of sanitizers over the coronavirus pandemic has led to stocking up of

sanitizer sprays, gels, and so on. The aim of this study is to evaluate that alcohol based sanitizer is effective against the Covid-19 which you can use for short time wherever water and soap is not available.

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