

## Hand Sanitizer: A Review on the Actives and forms for skincare

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### ABSTRACT

Current outbreak of Covid 19 has created an awareness of using hand sanitizers everywhere. The hand hygiene is now being so important among the public. Compliance with hand hygiene recommendations is critical to reducing colonization and infection of the hands of all people. The use of hand sanitizers decrease the transmission of microorganisms to patients, ultimately reducing morbidity, mortality, and costs associated with healthcare-associated infections (HCAI). The global burden of HCAI is enormous and there is ample evidence that hand antisepsis reduces the transmission of healthcare-associated pathogens and the incidence of HCAI.

According to the Center for Disease Control (CDC) hand hygiene encompasses the cleansing of your hands by using antiseptic hand rubs such as alcohol-based hand sanitizers (ABHS), foams or gels, or surgical hand antisepsis. For many reasons, alcohol hand sanitizers are increasingly being used as disinfectants over hand washing with soap and water. Their ease of availability, no need for water or plumbing, and their proven effectiveness in reducing microbial load are just a few. However, it is important to keep in mind that alcohol hand sanitizer efficacy is dependent upon which and how much product is used, proper technique, and consistency of use. This review paper is an study on the actives used in hand sanitizer and different forms of hand sanitizers in market.

To review the actives used in hand sanitizers along with their forms formulated and tested efficacy against antimicrobials especially efficacy against bacteria and viruses as well as non-irritating and non-sensitizing skincare.

Hand sanitizing actives such as Alcohols, Quaternary ammonium compounds, Triclosan, Natural antimicrobials activities were considered in the study for its efficacy and side effects.

### 1. Alcohol

Alcohol is considered as the number one active ingredient as it has tested and proven results against microorganisms. The US CDC also lists alcohol as hand hygiene actives against the spread of health care acquired infections (HAI) and, as noted, recommends alcohol-based hand sanitizers for hands that are not visibly soiled. These and other global endorsements are based on the superior broad-spectrum anti-microbial activity of alcohols, compared with other actives.

### 2. Quaternary Ammonium compounds

Several marketed hand sanitizers contain either benzalkonium chloride or benzethonium chloride as the active ingredients. QAC-based hand sanitizers often are positioned as non-flammable alternatives to alcohol-based hand sanitizers, or as alternatives where accidental or intentional consumption is a potential concern. While these are positive attributes, the efficacy profile of QACs and their potential for resistance and skin irritation or sensitization (allergy) are significant risks that warrant further scientific assessment.

### 3. Triclosan

Triclosan has a broad range of anti-microbial activity but demonstrates weak activity against certain Gram-negative bacteria, particularly *P. aeruginosa*. Triclosan recently has been scrutinized due to concerns for environmental accumulation and potential health risks associated with its use thus FDA has banned the use of Triclosan on non-rinse formulations.

### 4. Natural antimicrobials

Along with the trend for more environmentally conscious products, demand has grown for natural antimicrobials. Several existing hand sanitizers are

based on natural ingredients such as thymol; however, no data has been published to date on their in vivo efficacy. After the study on actives different formulation forms were considered for the study such as gels, foams, liquids, wipes, sprays and rubs to select the effective way of providing complete results. The alcohol was the main ingredient used in the Hand sanitizer formulation as the antimicrobial activity of alcohols can be attributed to their ability to denature and coagulate proteins. Alcohol solutions containing 60% to 95% alcohol are proven to be most effective. The highest antimicrobial efficacy can be achieved with ethanol (60% to 85%), isopropanol (60% to 80%), and n-propanol (60% to 80%). The activity is broad and immediate. Ethanol, the most common alcohol ingredient, appears to be the most effective against viruses; whereas, the propanols have better bactericidal activity than ethanol. None of the alcohols has shown a potential for acquired bacterial resistance. The combination of alcohols may have a synergistic effect. The concentration of alcohol does change the efficacy with one study showing a hand rub with 85% ethanol being significantly better at reducing bacterial populations compared to concentrations of 60% to 62%. ABHS also often contain humectants, like glycerin, which help prevent skin dryness, and emollients or moisturizers, like aloe vera, which help replace some of the water that is stripped by the alcohol.

Despite the clear benefits of alcohol-based hand sanitizers, they do have limitations. Most notably, hand sanitizers do not remove dirt or other soil from the hands. Many patented technologies exist that claim to provide a means of waterless cleaning with hand sanitizing but none have been reduced to marketable, consumer accepted products. Most current alcohol-based hand sanitizers claim to contain moisturizers and evidence shows that have no net effect on skin health, despite that they are drying the skin. It has been shown that the use of hand sanitizers in place of frequent hand washing actually results in improved skin condition for health care workers and recent advancements have made it possible to include skin care ingredients that improve the condition of health care workers.

In conclusion, hand sanitizing is now a proven public health benefit that is growing globally.

Alcohol is the most tested and proven and thus most commonly used active ingredient for hand sanitizing. When formulated and tested effectively, hand sanitizers deliver antimicrobial efficacy especially against bacteria and viruses, as well as non-irritating and non-sensitizing skin care. In addition, they are aesthetically acceptable. When one couples these performance attributes with the intrinsic benefits of cost, portability and convenience, the result is the successful, relatively new category of hand sanitizing.

**Keywords:** Hand Hygiene, Hand sanitizers, Skincare, Alcohols, Antimicrobials, Covid19.