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## The pandemic of COVID-19 and its implications for the purity and authenticity of alcohol-based hand sanitizers: The health risks associated with falsified sanitizers and recommendations for regulatory and public health bodies



### ABSTRACT

With the beginning of the pandemic of COVID-19 throughout the world, the demand and consumption of hand sanitizers has increased, which had led to a sharp crunch in these products at all levels. This shortage has led to an increase in the prevalence of falsified alcohol-based hand sanitizers, including the illegal addition of methanol to hand sanitizers and the production of hand sanitizers with an alcohol concentration of less than 60%. These findings indicate that regulatory and public health bodies should take an active role in ensuring the safety and quality of antimicrobial products such as alcohol-based hand sanitizers at every stage of the products' lifecycle, including distribution, manufacture and import.

The emergence of novel virus strains has always posed a serious challenge for the global community. Severe acute respiratory syndrome coronavirus 2 or SARS-CoV-2, more commonly and simply known as coronavirus and the cause of COVID-19, first emerged at the close of 2019 in Wuhan, a city in Central China.<sup>1</sup> Sufferers may be asymptomatic or suffer mild to life-threatening respiratory symptoms. In mid-March 2020, the disease's spread across the globe was such that the World Health Organization (WHO) officially labelled the COVID-19 outbreak a pandemic.<sup>2</sup> To control the spread of the virus, it is essential to implement strict preventative measures, including repeated hand-washing with water and soap.

In healthcare settings and within communities, alcohol-based hand sanitizers are a popular alternative to washing one's hands with water and soap. In the context of the COVID-19 pandemic, routine use of hand sanitizer is a favoured method of cleaning one's hands and stopping the spread of infection.<sup>3,4</sup> A range of sanitizers is available, but alcohol-based sanitizers are the most effective and enjoy a higher rate of compliance for use in healthcare contexts. Made with n-propyl alcohol, isopropyl alcohol, ethanol, or a combination of alcohol types, these sanitizers are also less irritating to the skin and can be applied quickly.<sup>3,5</sup> Given the popularity of hand sanitizers and their importance in preventing the spread of COVID-19, falsified alcohol-based sanitizers pose a significant public health risk.

There are two key types of falsified alcohol-based hand sanitizers: 1) sanitizers that contain methanol, an additive that would typically not be listed as an ingredient<sup>5</sup>; and 2) sanitizers with an alcohol content below 60%. First, methanol should not be used in hand sanitizers because it is highly toxic and can cause severe reactions when exposed to the skin, lungs or mouth.<sup>7</sup> Exposure to methanol can result in systemic toxicity and, in some cases, death.<sup>8–14</sup> The substance's elevated intrinsic toxicity, its ready availability and its widespread use make poisoning from undeclared methanol in hand sanitizers an important public health concern.<sup>15</sup> Second, a hand sanitizer that contains less than 60% alcohol would be ineffective as a germicide and offer users no biocidal effect, leaving the public vulnerable to contracting and spreading COVID-19.

Recently, inspections to authenticate antimicrobial product safety (including alcohol-based hand sanitizers available locally) have been carried out by the Dubai Municipality. In this safety survey, 6 of the 102 alcohol-based hand sanitizers tested were found to contain undeclared/

unlisted methanol, while others were found to have an alcohol content of less than 60% despite their labels claiming an alcohol content of 70%.<sup>6</sup>

The above discussion identifies falsified alcohol-based hand sanitizer as a serious public health risk, especially in the context of the outbreak of COVID-19. The popularity of alcohol-based sanitizers in healthcare and community settings coupled with the risk of methanol poisoning and ineffective hand antisepsis posed by falsified sanitizers demands a response. It is recommended that regulatory and public health bodies take an active role in ensuring the safety and quality of antimicrobial products such as alcohol-based hand sanitizers at every stage of the products' lifecycle, including distribution, manufacture and import. Specifically, the following recommendations are made:

- 1 The introduction of regulatory and monitoring mechanisms throughout the manufacturing process to verify the purity of alcohol-based hand sanitizers.
- 2 The use of good manufacturing practice (GMP), research, reporting (of usage and any adverse effects), education and regulatory control to increase inspection and oversight of alcohol-based hand sanitizers' quality and safety.

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