Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.
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. 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 Organisation (WHO) officially labelled the COVID-19 outbreak a pandemic. 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. 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. 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; 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. Exposure to methanol can result in systemic toxicity and, in some cases, death. 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. 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%.

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.

References
1. Guan WJ, Ni ZY, Hu Y, et al. Clinical characteristics of coronavirus disease 2019 in China. N Engl J Med. 2020. https://doi.org/10.1056/NEJMoa2002032.
2. Coronavirus Disease (Covid-19). Events as they happen. Who.int. [cited 18 March 2020]. Available from. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen; 2020.
3. Bolon MK. Hand hygiene: an update. Infect Dis Clin. 2016;30:591–607.
4. Wong VY, Cowling BJ, Aiello AE. Hand hygiene and risk of influenza virus infections in the community: a systematic review and meta-Analysis. Epidemiol Infect. 2014;142:922–932.
5. World Health Organization. WHO Guidelines on Hand Hygiene in Health Care. First Global Patient Safety Challenge: Clean Care Is Safer Care. Geneva, Switzerland: WHO; 2009.
6. Dubai Municipality withdraws 6 sterilizers for hands that do not meet specifications from the local market. Localities - health - emirates today. . [Internet]. [cited 2020 Apr 13]. Available from. https://www.emaratlyoum.com/local-section/health/2020-04-01-1.128166 a. (1).
7. Public Health. England. Methanol—toxicological overview. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/456293/Methanol_TO_PHE_260815.pdf; 2015.
8. Ghannoum M, Hoffman RS, Mowry JB, Lavergne V. Trends in toxic alcohol exposures in the United States from 2000 to 2013: a focus on the use of antidotes and extracorporeal treatments. *Semin Dial.* 2014;27:395–401.

9. Zakharov S, Pelclova D, Urban P, et al. Czech mass methanol outbreak 2012: epidemiology challenges and clinical features. *Clin Toxicol.* 2014;52:1013–1024.

10. Thanacoody RH, Gillilan C, Bradberry SM, et al. Management of poisoning with ethylene glycol and methanol in the UK: a prospective study conducted by the National Poisons Information Service (NPIS). *Clin Toxicol.* 2016;54:134–140.

11. Rostrup M, Edwards JK, Abukalish M, et al. The methanol poisoning outbreaks in Libya 2013 and Kenya 2014. *PloS One.* 2016;11.

12. Paasma R, Hovda KE, Tikkonen B, Jacobsen D. Methanol mass poisoning in Estonia: outbreak in 154 patients. *Clin Toxicol.* 2007;45:152–157.

13. Aufderheide TP, White SM, Brady WJ, Stueven HA. Inhalational and percutaneous methanol toxicity in two firefighters. *Ann Emerg Med.* 1993;22:1916–1918.

14. Choi JH, Lee SK, Gil YE, et al. Neurological complications resulting from non-oral occupational methanol poisoning. *J Kor Med Sci.* 2017;32:371–376.

15. Law RK, Sheikh S, Bronstein A, Thomas R, Spiller HA, Schier JG. Incidents of potential public health significance identified using national surveillance of US poison center data (2008–2012). *Clin Toxicol.* 2014;52:958–963.

**Ammar Abdulrahman Jairoun**

*Health and Safety Department, Dubai Municipality, Dubai, United Arab Emirates*

*E-mail address: aajairoun@dm.gov.ae.*

Sabaa Saleh Al-Hemyari

*Pharmacy Department, Ministry of Health and Prevention, Dubai, United Arab Emirates*

*E-mail address: drsabasaleh@hotmail.com.*

Moyad Shahwan

*College of Pharmacy and Health Sciences, Ajman University, United Arab Emirates*

*E-mail address: moyad76@hotmail.com.*

---

*Corresponding author. Health and Safety Department, Dubai Municipality, P.O. Box 17666, Dubai, United Arab Emirates.*

2051