



Review

Hand sanitisers amid CoViD-19: A critical review of alcohol-based products on the market and formulation approaches to respond to increasing demand



Alberto Berardi^a, Diego R. Perinelli^b, Hamid A. Merchant^c, Lorina Bisharat^d, Iman A. Basheti^a, Giulia Bonacucina^b, Marco Cespi^{b,*}, Giovanni F. Palmieri^b

^a Faculty of Pharmacy, Applied Science Private University, Amman 11931, Jordan

^b School of Pharmacy, University of Camerino, 62032 Camerino, MC, Italy

^c Department of Pharmacy, School of Applied Sciences, University of Huddersfield, Queensgate, Huddersfield HD1 3DH, United Kingdom

^d School of Pharmacy, The University of Jordan, Amman 11942, Jordan

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ABSTRACT

The world is facing a medical crisis amid the CoViD-19 pandemic and the role of adequate hygiene and hand sanitisers is inevitable in controlling the spread of infection in public places and healthcare institutions. There has been a great surge in demand for hand sanitisation products leading to shortages in their supply. A consequent increase of substandard products in the market has raised safety concerns. This article, therefore, presents a critical review of hand sanitation approaches and products available on the market in light of the scientific evidence available to date. This review also provides a range of hand sanitisation product formulations, and manufacturing instructions to allow for extemporaneous preparations at the community and hospital pharmacies during this urgent crisis. In addition, this emergent situation is expected to continue, hence hand sanitisers will be in demand for an extended time, and the availability and purchase of substandard products on the market create an ongoing safety concern. Therefore, this article shall also provide various commercial organisations, interested in stepping forward the production and marketing of hand sanitisers, with a guide on the development of products of standardised ingredients and formulations.

1. Introduction

A new infectious disease, namely CoViD-19, was first identified in December 2019 in Wuhan, China (CSSE, 2020) caused by a novel coronavirus (SARS-CoV-2) (Zhu et al., 2020). CoViD-19 has then rapidly spread around the world and was declared as a pandemic by the World Health Organization (WHO). As of 14th April 2020, around two million people have contracted the disease, and over 125 thousand deaths have been attributed to CoViD-19 globally (CSSE, 2020). The outbreak has triggered the so-called “pandemic pantries”, a term that well defines the spikes in stockpiling of emergency supplies all around the world. Among these supplies, stocks of hand sanitisers have rapidly vanished from some markets, as soon as the frequent handwashing and sanitisation was recommended by the public health agencies across the world. According to a market research from Nielsen, the sale of hand sanitisers skyrocketed by 300% and 470% in the last week of February and first week of March 2020, respectively, in comparison to the same time in the previous year (Huddleston, 2020). Similarly, in Italy – one of the most affected countries by CoViD-19 - sales of hand sanitisers in

supermarkets augmented by 561% during the first three weeks of the pandemic (24th February–15th March 2020) compared to the previous year (Ufficio Studi Coop, 2020). There have been reports across the world that supermarkets and pharmacies, as well as hospitals and other healthcare facilities, have been running out of hand sanitisers.

A search in Google Trends enables to understand the magnitude of the emergent interest of the general public in hand sanitisers. Google Trends analyse and compare the search volume of given keywords on Google. Fig. 1A shows the trend of the search of the keyword “hand sanitizer” (American English spelling) within the United States. A fairly constant volume of Google searches on this topic was shown until February 2020, when a massive spike of 100-fold increase in interest in “hand sanitizer” appeared. This finding correlated with the increased search of the word “CoViD-19”, hinting the obvious relationship between the two terms. To put these numbers into context, comparison between the search on “hand sanitizer” to that of the words “pill”, “drug” and “medicine” was done in Fig. 1B. Results show that before the spread of the new coronavirus, these words were constantly googled 25–50 times more frequently than “hand sanitizers”, while during the

* Corresponding author.

E-mail address: marco.cespi@unicam.it (M. Cespi).

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