SHORT REPORT

The Potential Use of Defend Wearable Tags (Antah Pharma Sdn Bhd., Malaysia) to Protect Against Coronavirus Diseases (COVID-19)

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Disclosure

The authors of this review have no competing interest in this subject.

Disclaimer

This review is essentially a brief report, prepared on an urgent basis, to reflect the highest level of evidence available regarding the subject at this specific time. The conclusion draws on restricted reviews from analysis of pertinent literature, on expert opinion and/or regulatory status where appropriate. All efforts have been made to ensure all relevant published material has been reviewed but this document may still not fully reflect all scientific research available. Additionally, other relevant scientific findings may have been reported since completion of this review.

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Introduction

Recently, online sellers have been claiming wearable cards and tags, Virus Shut-out (TOAMIT, Japan), Defend (Antah Pharma Sdn Bhd., Malaysia), to have the ability to protect the wearers from the coronavirus severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The active ingredient in the card is claimed to be sodium chlorite, which is claimed to have protective effect against 99.9% airborne viruses up to one (1 cubic meter around the bearer, for 45 days, when worn. This tag can be easily purchased on various Malaysian online marketplaces such as Lazada, Shopee, and in local pharmacies such as Watsons. The claimed mechanism of action is via the release of chlorine dioxide, acting as disinfectant from the sodium chlorite bag.

What is sodium chlorite and chlorine dioxide?

Sodium chlorite is a disinfectant which is used for industrial purposes such as water treatment and purification, surface cleaner for areas of food preparation, antimicrobial treatment for food, bleaching and stripping of textiles, pulp, and paper; and as sterilising agent in water treatment plants (1–4).

Sodium chlorite is a strong oxidising agent, highly flammable, and can be dangerous to handle. The dry form of sodium chlorite, though is stable in pure form, is highly reactive and explosive when placed in contact with organic substances such as gloves, clothes, sawdust, oil and grease. Heat, friction, and impact may also spark and initiate such reactions. Liquid sodium chlorite is less reactive than solid sodium chlorite but is highly corrosive and also requires careful handling (5).

Safety

The gas chlorine dioxide is currently used in many countries as a drinking water disinfectant (6). However, both chlorine dioxide and sodium chlorite are not meant to be ingested. The U.S FDA has received reports of consumers who presented severe vomiting, severe diarrhea, life-threatening low hypotension due to dehydration, and acute liver failure after drinking commercially sold chloride dioxide containing drinks (7).

The maximum allowable contaminant level of 1 milligram of chlorite per liter (1 mg/L) has been set by U.S. Environmental Protection Agency (EPA) for drinking water. As

for gas and atmospheric exposure, a limit of 0.1 parts of chlorine dioxide or chlorite per million parts of air (0.1 ppm) in the workplace during an 8-hour shift, 40-hour workweek was set, as exposure to air which contains chlorine dioxide may lead to nose, throat, and lung irritation (8).

Antiviral efficacy evidence

In terms of antiviral efficacy evidence of chlorine gas, one animal study of mice in semi-closed cages exposed to low levels of chlorine gas (0.03ppm, 15 mins, for three days) and exposed to aerosols of influenza A virus, had significantly lower viral load. In the same study, in vitro evidence showed that chloride dioxide denatured viral envelope proteins (haemagglutinin and neuraminidase) of the influenza A virus (9). On wet surfaces, chlorine dioxide was also shown to inactivate various microbes, including enveloped viruses of influenza A virus subtype H1N1 (10).

Interpretation of evidence

Specific to this product, first of all, it remains questionable that sodium chlorite can spontaneously generate chloride dioxide in the atmosphere, and how much can be yielded as the preparation of chloride dioxide in industry is through various generators and controlled reactions (11–13). Secondly, even if chloride dioxide is generated, in open air, it is questionable how fast such gas dissipates and if it will actually linger in the air of one cubic meter, long enough to protect the bearer all the time. Thirdly, although preclinical data have shown some efficacy in vivo and in vitro, it was conducted on influenza A virus, in a controlled environment (e.g. half-closed cage/ solid surfaces) and was not further explored in clinical trials in open air to prove its translation into daily human use. All these concerns are backed by findings of a team of Japanese scientists whom detected little or no chloride dioxide at 10 cm distance from four different Japanese tags, which also did not show antiviral effects in the air against aerosolised influenza A /Aichi/2/68 strain virus (14). Last but not least, safety consideration of the explosiveness, reactivity and toxicity of sodium chlorite if swallowed should be considered, as such products are readily purchased and accessible to the public who may be unaware of the danger.

Recommendation against use of Defend Tag and Virus Shut Out Cards

International media including telegraph UK, Hong Kong Free Press, and Vietnam News have reported such tags as scam and urged the public not to be fooled, but to follow recommended guidelines of hand washing and social distancing instead (15–17). Facebook and Ebay have since removed and banned the sales of such cards on

their platforms from early March 2020 (15). On 25th March 2020, the EPA announced that it has banned and prevented several shipments of importing the Virus Shut Out Card into the U.S. Pacific ports under federal pesticide laws (18).

Again, it should be stressed that the article quoted by the websites and companies selling this product on efficacy is only an in vivo study conducted in a controlled environment on influenza A virus. It is important to highlight that this efficacy data has not been translated into human trials and is not advocated by any agency as a strategy in pandemics that can prevent the need of evacuation or other pandemic management strategies, as claimed by the company (9). There is a play on words by quoting the conclusion in the published article directly without thorough understanding and consideration of the level of evidence and study conducted, hence misleading the public. It is also important to point out that by wrongfully disseminating such information, the bearer may acquire false sense of security by wearing these tags, which may then further hamper the efforts of social distancing.

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