MEDICAL OPINION REGARDING EXPOSURE TO REPULS® IRRITANT SPRAY

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INTRODUCTION

This document represents my clinical opinion regarding an assessment of the potential risk of injury associated with exposure of human subjects to REPULS® chemical irritant deterrent spray produced by Crotega, LLC of Minneapolis, Minnesota.

This opinion is based on a review of technical documents provided by Crotega, including scientific testing performed by a third party hired by Crotega, as well as material safety data sheets pertaining to the active ingredients of REPULS, a review of available medical literature, and professional clinical experience.

CHEMICAL OVERVIEW AND COMPARISON

The resources named above demonstrate that the risk for eye, skin and respiratory injury from exposure to REPULS spray is at least comparable to, and potentially lower than, the risk of injury that could be sustained from exposure to existing chemical irritant products on the market such as those that contain oleoresin capsaicin (OC) as their primary active ingredient.

According to the "Encyclopedia of Toxicology," the active ingredient in REPULS, propionic acid, has been "designated as generally regarded as safe by the US Food and Drug Administration…[and] has shown little toxicity in humans and other organisms. Toxicological characteristics generally involve acute symptoms resulting from contact with propionic acid, and few if any effects of chronic exposure have been demonstrated."

Through my clinical experience as an emergency medicine and EMS medicine physician, I have had several occasions to care for subjects that have been exposed to products containing OC and similar chemical irritants. In my experience, care of these subjects requires significant investment of time, effort and medical resources to achieve adequate decontamination of skin and eye tissues. Decontamination often requires use of detergents and other chemical "antidotes" in addition to large volumes of water to achieve adequate reduction of a subject's symptoms of OC exposure.

Further, I have witnessed the that the risk of exposure for healthcare providers to OC-containing products via transfer or off-gassing from contaminated subjects is significant and that healthcare providers performing decontamination of OC-contaminated subjects should ideally use specialized PPE.

In contrast to these observations, I have also witnessed volunteer subjects who have been exposed to REPULS. I have been impressed at how quickly and easily subjects exposed to REPULS can be decontaminated using even small volumes (500mL or less) of plain water by personnel with a minimum of training.

It is my clinical opinion that the ability to rapidly and easily decontaminate subjects exposed to REPULS likely translates to a significant reduction in the risk for injury from this product compared to the risks associated with exposure to OC-containing chemical irritants. Additionally, the risks associated with cross-contamination to first responders and other healthcare personnel appear to be substantially reduced with REPULS compared to other deterrent spray products on the market.

ADDRESSING THE RISK OF HIGH-PRESSURE SPRAY

Concerns have been raised in the deterrent spray industry about the possibility of soft tissue injury caused by a theoretical mechanism of injury called "hydraulic needling." This theory suggests that injury to ocular tissues and/or skin could occur if the eye or skin is exposed to high-pressure particles or liquid released from a pressurized dispersal canister.

A search of the medical literature for "hydraulic needling" and similar terms did not identify any published manuscripts regarding this theory. However, the concept of high-pressure injection injury (typically occurring with pressures exceeding 580 psi) is well described. Manufacturer material safety data sheets for several OC-containing chemical irritant sprays indicate that canister filling pressures of 54–110 psi are typical.

The propellant, canister pressurization, and dispersal mechanism used by REPULS® is like that of existing products on the market, and as such the risk for injury from true high-pressure injection injury appears low. However, based on recommendations from manufacturers of other chemical irritant deterrent sprays, the conceptual risk for "hydraulic needling" from close-distance discharge of the pressurized canisters containing REPULS can likely be mitigated by avoiding discharge of the canisters at distances fewer than 1 meter (3 feet) from a subject.

SUMMARY

The risk of injury from exposure to the active chemicals in REPULS chemical irritant spray appears acceptably low in comparison to the risk of injury from other deterrent sprays on the market. As with any chemical irritant exposure, subjects exposed to REPULS should be promptly decontaminated and should undergo evaluation by a medical professional if they experience sudden acute difficulty breathing, if they continue to experience significant effects of exposure following proper decontamination, or if they demonstrate signs or symptoms of other acute illness or injury.

ABOUT CROTEGA

Crotega employs technology to bring about a safer world. We empower law enforcement, individuals, and building owners to take control with advanced solutions that neutralize active threats while reducing the risks to the user. We aim to make public safety more humane, offer peace of mind, and ultimately, save lives. Learn more at **crotega.com**.

ABOUT THE AUTHOR

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