Crotega Safety Solutions response to the article published in the ARVO Journal titled Ocular Surface Burns from Repuls, a new Ammonium Propionate Replacement for Law-Enforcement Oleoresin Capsicum Pepper Spray. Ocular Surface Burns from Repuls, a new Ammonium Propionate Replacement for Law-Enforcement Oleoresin Capsicum Pepper Spray. | IOVS | ARVO Journals

The authors of the afore-mentioned article highlight what can occur when an individual attempts to use REPULS in the same manner as pepper spray during testing of the product or during training. A typical test and evaluation and/or training in the use of pepper spray include spraying the individual at fairly close range and having the individual open their eyes to ensure the pepper spray contacts the surface of the eye, then having the individual complete a series of skills scattered throughout a course, with the last station of the course being an eye-wash station including fans to help mitigate the effects of the pepper spray. This strategy is used to teach incoming officers how to fight through an exposure of pepper spray and is a result of the years of field experience with pepper spray where officers on site would be subject to the debilitating effects of pepper spray when it was used in the course of duty.

Crotega Safety Solutions strongly advises that trainers only use pepper spray to train how to fight through the effects of pepper spray. REPULS is a direct contact spray that does not cross-contaminate or blow back as is the case with pepper spray. We also strongly recommend that, when training with REPULS, instructors not require the subject to force open their eyes to do skills maneuvers. REPULS, when used as recommended, is a more humane use of a chemical irritant than pepper spray, as it is an ocular irritant that does not impact breathing and is quickly mitigated. Mitigation with water is recommended to begin when the subject is compliant. Further use of a sterile saline solution to sooth the eyes is recommended. As with any chemical irritant, if symptoms persist, seek medical attention.

As REPULS entered the market, we quickly became aware of the need for training to ensure proper use of REPULS. This awareness was further supported by the aforementioned report. As the authors indicate, the subject, and as we found in our investigation, others in the training, were subjected to the initial exposure, required to complete the skills course, and then required to walk around the campus for up to 40 or more minutes before any mitigation occurred. The untrained instructor used water, milk, and baby shampoo to try to mitigate the irritation. This egregious misuse of REPULS resulted in adverse reactions, as noted by the authors. This incident involving several individuals occurred in June 2022.

Mild adverse reactions are unfortunate but expected in a small percentage of exposures to REPULS. Humans can have different reactions to any chemical, as witnessed by the warnings of side effects for any medication on the market.

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Crotega Safety Solutions strengthened our training over the past two years. Since that time, the evidence strongly shows, with proper training and application of REPULS, the incidents of mild adverse reactions are less than with pepper spray. In a 2023 Star Tribune article, Hennepin County Medical Center reported over 60 REPULS field use incidents without an adverse reaction. A large agency did a one-year pilot program using REPULS and found that their officers were 250 times more likely to use REPULS than pepper spray, without a single adverse reaction. All the major hospitals in the Mpls/St. Paul metro have approved and are using REPULS, without a single reported adverse reaction. The evidence from the Crotega Safety Solutions Train-the Trainer courses show less than 2% mild adverse reactions to exposures during training, a much lower rate of adverse ocular reaction to pepper spray as reported in the studies below.

Additionally, we challenge the statement by the authors that the reported injuries "are more severe than prior reports of oleoresin capsicum pepper spray-related ocular injuries." While the authors may not have record of more severe injuries, a quick Google search for ocular injuries reveal that statement to not reflect the data. **And most importantly, while the authors presented evidence of adverse reactions, in all three cases the eyes returned to normal**.

Examples of studies/articles on ocular injury from OC/pepper spray:

Sustained corneal abrasions occurred in 7% of subjects in a jail's emergency department exposed to pepper spray at a 10% concentration https://pubmed.ncbi.nlm.nih.gov/10830682/

People report scratches to the eyeball, or corneal abrasions, in about 10% of cases. https://www.medicalnewstoday.com/articles/238262#physical-effects

"serious and long-lasting damage to the ocular surface—including the cornea—can arise when medical attention is delayed or omitted." **Feeling the Burn, Review of Optometry**. https://www.reviewofoptometry.com/article/feeling-the-burn

"However, more severe injury is possible including corneal abrasions, wheezing, and skin blisters; People with lung conditions, such as asthma or COPD, can have more severe breathing effects when pepper spray is inhaled. **How Dangerous is Pepper Spray, Poison Control**, https://www.poison.org/articles/how-dangerous-is-pepper-spray

"Although previously thought to have only transient effects on exposed patients more severe complications such as corneal stromal opacities, corneal neovascularization, neurotrophic keratopathy, conjunctival necrosis, and pseudo pterygium can occur." **Noxious effects of riot control agents on the ocular surface: Pathogenic mechanisms and management** https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9887149/

"While conducting chemical irritant training in our recruit academies or In-Service training it was not uncommon for an individual (s) to have an adverse reaction to pepper spray that required first aid and or a visit to the emergency room". **William Martinez, Assistant Chief (Retired) St. Paul Police**

Author: Jody Allen Crowe, Founder and CEO, Crotega Safety Solutions