



DEPARTMENT OF THE NAVY
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PLS
LIE

IN REPLY REFER TO

1640
Ser 24B/96U24002
20 Feb 96

From: Chief, Bureau of Medicine and Surgery
To: Chief of Naval Personnel (Pers-84)

Subj: USE OF OLEORESIN CAPSICUM (OC) SPRAY IN NAVAL BRIGS AS A
DISTURBANCE CONTROL AGENT

Ref: (a) Your ltr 1640 Ser 8411/284 of 5 Sep 95
(b) Your ltr 1640 Ser 8411/048 of 15 Feb 96

Encl: (1) Health Hazard Evaluation Summary Information

1. Reference (a) requested our review and opinion concerning OC spray use in Naval briggs as a disturbance control agent. Reference (b) provided copy of draft Article 410 of BUPERSINST 1640.19A for review.

2. The Navy Environmental Health Center conducted an extensive literature search and contacted a number of subject matter experts. Enclosure (1) summarizes the information obtained on the toxicity of capsaicin and the use of OC spray.

2. Based on the information and data obtained to date, we approve the use of OC to control brig disturbances with the following recommendations.

a. Whenever feasible, use non-chemical means for riot control situations.

b. When use of OC as a riot control agent is deemed necessary, take the following precautions.

(1) Ensure only trained personnel are allowed to use OC spray. Reference (a) of enclosure (1) contains a lesson plan that can be adapted to Navy use.

(2) Exposure to OC spray can cause respiratory failure in susceptible individuals. Ensure brig staff are appropriately trained in basic life support procedures before using OC spray.

(3) Use an OC product that is free of potential or known carcinogens.

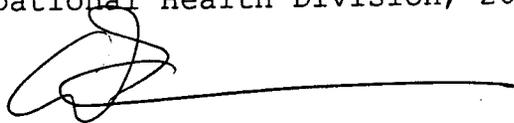
c. Maintain a data base on OC use for disturbance control, training, or accidental release to monitor number of individuals

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exposed and any attributed adverse outcomes.

3. Enthusiasm over the reported effectiveness of OC spray as a disturbance control agent must be tempered by knowledge of the number of reported deaths among those sprayed, as detailed in enclosure (1). Although no scientific evidence links the deaths to direct effects of the spray, there is a significant possibility that OC spray may interact with either alcohol or drugs (prescription or illegal ones), or both.

4. If the utility of this agent warrants, laboratory studies can be sponsored to obtain the information necessary to evaluate suspected harmful effects. These studies can be designed and executed or overseen by the Toxicology Detachment of the Naval Medical Research Institute, as described in reference (b). My point of contact is Captain S. Davis, MC, USN, Deputy Director Preventive Medicine and Occupational Health Division, 202-762-3496 or DSN 762-3496.



WILLIAM M. PARSONS
By direction

Copy to:

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20 Feb 96

HEALTH HAZARD EVALUATION
SUMMARY INFORMATION

OC Spray (capsaicin)

- Ref:
- (a) *Pepper Spray Evaluation Project*, International Association of Chiefs of Police, Final Report Prepared for National Institute of Justice, U.S. Department of Justice, June 21, 1995.
 - (b) PHONCON between Dr. Susan Aitken, Consumer Product Safety Commission and Dennis Smoot, NAVENVIRHLTHCEN of 13 November 1995.
 - (c) Cabarrus County, North Carolina Autopsy No. ME-93-658 of 11 July 1993.
 - (d) *Life Sciences*, Vol. 56, No. 22, pp 1845-1855, 1995, Surh, YJ and Lee, SS, *Capsaicin, a Double-Edged Sword: Toxicity, Metabolism, and Chemoprotective Potential*.
 - (e) Chemical Carcinogenesis Research Information System, National Cancer Institute.
 - (f) Report No. ERDEC-TR-199, H. Salem, E.J Olajos, L.L. Miller, and S.A. Thomson, Edgewood Arsenal Research and Toxicology Directorate, *Capsaicin Toxicology Overview*, August 1994.
 - (g) PHONCON between Dr. Harry Salem, U.S. Army Edgewood Research, Development, and Engineering Center and Dennis Smoot, NAVENVIRHLTHCEN of 6 November 1995.
 - (h) PHONCON between Dr. Robert Mioduszewski, U.S. Army Edgewood Research, Development, and Engineering Center and Dennis Smoot, NAVENVIRHLTHCEN of 2 November 1995.
 - (i) Reprotox(R) Database, Micromedex Inc., Volume 26.

Background. Oleoresin capsicum is a product made from the oils and resins of plants of the genus *Capsicum*, including various edible pepper plants. The active principle of oleoresin capsicum is the chemical capsaicin (N-(4-hydroxy-3-methoxybenzyl)-8-methyl-6-nonenamide). Oleoresin capsicum and capsaicin are used as food ingredients, as components of dog repellents and defense sprays, as drugs for research into the mechanism of pain, and as a component of topical pain relief drugs.

Use. Most of reference (a) is devoted to a study of the use of OC sprays in the Baltimore County, Maryland Police Department. The researchers concluded that "statistics on the effectiveness of the spray are quite high, while resultant officer assault and citizen complaint data are conversely low." According to

Enclosure (1)

reference (a), OC is purportedly more effective than traditional chemical irritants because it is an inflammatory agent. Upon contact with OC, the mucous membranes of the eyes, nose, and throat become inflamed and swell, producing involuntary eye closure, nasal and sinus drainage, gagging, coughing, shortness of breath, and a burning sensation on exposed skin areas. Reference (a) reported that 30 deaths of subjects exposed to OC sprays during police operations occurred in the United States from August 1990 through December 1993. It attributed all of the deaths to other factors, such as overdoses of drugs and alcohol.

In reference (b), Dr. Susan Aitken of the Consumer Product Safety Commission (CPSC) stated that the commission has an active file on OC sprays, and indicated that a petition has been received from California requesting that OC sprays be banned from consumer use. Information provided pursuant to reference (b) included reference (c), the report of an autopsy of an apparently healthy male who died in police custody after exposure to OC spray. The cause of death was listed as "asphyxia due to bronchospasm precipitated by pepper spray."

Toxicity. Reference (d) recently reviewed the toxicity of capsaicin. It provides results of tests of general toxicity for several test animals by various routes, including intraperitoneal, intravenous, intramuscular, subcutaneous, and oral. Although the results reported indicate that pure capsaicin is relatively toxic by these routes of exposure, they are not representative of exposures that would occur during law enforcement use. Reference (d) did not report results of any inhalation studies and reported mixed results for genotoxicity and tumorigenicity.

Reference (e) was queried for both capsaicin and CS. Long-term inhalation studies have been conducted with CS for rats and mice of both sexes at several different concentrations. All were negative for carcinogenicity. Only one of 64 *in vitro* mutagenicity tests was positive using CS, while 6 of 17 *in vitro* tests were positive for capsaicin.

Reference (f) is a review of the toxicology of capsaicin conducted at the U.S. Army's Edgewood Arsenal. It reviewed acute toxicity, pulmonary effects, cardiovascular effects, sensitization, thermoregulatory effects, subchronic toxicity, mutagenicity, carcinogenicity, and toxicity to man. Reference (f) concluded that there is a risk in using this product on a large and varied population due to a lack of safety studies conducted on OC sprays. In reference (g), Dr. Salem stated that the number of deaths during police custody subsequent to OC spray

Enclosure (1)

exposure has reached 65.

Reference (h) included a discussion of recent Army inhalation studies with rats exposed to a concentration of 9 milligrams/liter of OC for ten minutes. The rats were sacrificed 14 days after exposure and examined, and reportedly had suffered no damage from the exposure. However, Army toxicologists are concerned that deaths reported during police use of OC sprays, and attributed to drug and alcohol overdoses, may possibly reflect a synergism between the drug and capsaicin. Further, they believe that capsaicin exposure may contribute to body "temperature disregulation" that could contribute to heat illnesses if used under hot conditions. Dr. Mioduszewski stated that more definitive research is needed in these areas.

Reference (i) was queried for reproductive effects of capsaicin. It reported reproductive effects in rats but not in humans.

Prepared by Mr. Smoot, Navy Environmental Health Center

Enclosure (1)