Title: Ocular and Dermal Toxicity Evaluation of DIGL-RP Solid Propellant

Year Study Completed: 1989

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Compound Tested: DIGL-RP Solid Propellant (D-R) (Radford Army Ammunition Plant, Radford, VA, Hercules Inc) Solid black cylinders (stick configuration). Chemical composition, percentage: Nitrocellulose, 62.5; Diethyleneglycol dinitrate, 36.7; Ethyl Centralite, 0.25; Akardit II, 0.45; Magnesium oxide, 0.05; Graphite, 0.05.

Dose Preparation: Solid cylinders were ground to a fine powder under nitrogen using a Spex freezer mill and passed through an 80-mesh sieve. Administered undiluted.

Test and Results: Tests were conducted in accordance with EPA testing guidelines (a,b).

Eye Irritation:
Protocol: A dose of 83 mg (0.1 ml) of D-R (powder) was applied to each test eye (conjunctival sac) of 6 male NZW rabbits. Eyes were examined at 1, 4, 24, 48, and 72 hr after dosing and scored by the method of Draize (c). The study was terminated after 72 hrs. as there was no reaction.
Results: D-R produced no grossly observable effects in the cornea, iris, or lens. At 1 and 4 hr after dosing all eyes exhibited slight conjunctival redness and chemosis (score of 1), which disappeared by 4 to 24 hr. D-R solid propellant exhibited minimal potential to produce ocular irritation.

Dermal Irritation:
Protocol: The backs of 8 New Zealand White (NZW) female rabbits were close-clipped 24 hr before dosing. A dose of 0.5 g D-R moistened with 1 ml isotonic saline was applied to 2 intact sites, plus saline (vehicle control) site, and a sham control site on each rabbit. After 4 hrs. of exposure, the patch/wrappings were removed. Sites were scored at 1 hr and 1, 2, 7 and 14 days after patch removal by the method of Draize (c).
Results: Very slight erythema and edema (score 1) present in three animals, had returned to normal in 24 hr in one animal and 72 hr in the other two animals. The other animals showed no reaction (score of 0). Primary Dermal Irritation Index=0. D-R is not a dermal irritant.

Acute Dermal Toxicity:
Protocol: D-R (2 g/kg) moistened with saline was applied to close clipped dorsal and lateral surfaces of 6 male and 6 female NZW rabbits. D-R was left in place for 24 hr at which time the wrappings were removed. Animals were observed for 14 days and necropsies were performed at termination.
Results: Neither mortality, clinical signs, nor effect on body weight were observed. Gross and microscopic skin examination at necropsy revealed no D-R related lesions. D-R (2 g/kg) had no effect on body weight and was not toxic to rabbits when applied dermally for 24 hr.

Dermal Sensitization:
Protocol: Three groups of 10 male guinea pigs (Hartley) were exposed to either D-R 0.5 ml of 100% in saline, saline (vehicle controls), or 0.5 ml of 0.1% 1-chloro-2,4-dinitrobenzene (DCNB) in 3% propylene glycol/97% saline (positive controls under a closed patch for 6 hr, once a week for 3 weeks.

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The skin was challenged on week 5 for 6 hr. Skin reactions were scored at 24, 48, and 72 hr after dosing according to Buehler's procedure (d).
Results: D-R (50 mg) did not elicit any dermal response; all animals treated with DCNB exhibited signs of erythema (highest score 1.67) at the challenge phase. D-R was classified as a non-sensitizer.

References:

a. Health Effects Testing Guidelines. August 1982; EPA 560/6-82-001.
b. Federal Register 44 (No. 91):27362, May 9, 1979.
c. Draize JH, Woodard G, Calvery HO. J. Pharmacol. Exp. Ther. 82:377-390, 1944.
d. Buehler EV, Griffith JR. In: Maibach HI, ed. Animal models in dermatology. Edinburgh; Churchill Livingstone. 1975:56-66

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