

MITIGATION - SCIENCE AND TECHNOLOGY ADVANCES FOR CHEMICAL AND BIOLOGICAL HAZARD MITIGATION

Decontamination Of Unbroken Skin

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Reactive Skin Decontamination Lotion (RSDL) is used to treat unbroken skin contaminated with chemical warfare agent. Although effective, RSDL possesses a limited shelf-life. Due to its limited shelf-life, alternative solutions for achieving immediate decontamination of unbroken skin are sought. A dual-sided decontamination mitt was developed to meet immediate decontamination needs associated with unbroken skin. The decontamination mitt is comprised of zirconium hydroxide powder immobilized onto textile in a non-shedding and non-scratching formulation. The dual-sided feature allowed the user to remove the bulk of the chemical agent from the unbroken skin using side 1 of the mitt, while removing any traces of chemical agent using side 2. The mitt was evaluated for its ability to remove both chemical agent simulants and chemical agents from porcine skin (human skin simulant) contaminated at 3 g/m² area. Testing was performed by depositing chemical droplets onto porcine skin and allowing the chemical to stand for either 2 or 15 minutes ("stand time") prior to decontamination. Upon completion of the decontamination operation, the porcine skin was evaluated for residual chemical. In the case of HD and HD simulants, the decontamination efficacy exceeded 90%. A minimal decrease in the decontamination efficacy with an increase in the stand time was observed. This behavior was attributed to HD and HD simulants remaining at the external surface of the porcine skin, where the chemical could be effectively removed by the decontamination mitt. When testing was performed using VX and VX simulants, the decontamination efficacy exceeded 90% only when the chemical was allowed to remain on the porcine skin for 2 minutes. Increasing the stand time to 15 minutes resulted in a decrease in the decontamination efficacy to below the 90% threshold. The decrease in the decontamination efficacy with increasing stand time was attributed to the VX absorbing into the porcine skin. Results of this effort demonstrate that the decontamination mitt is able to very effectively remove chemical agent and corresponding simulants from the external surface of porcine skin; however, as a surface technique, the technology is unable to remove chemical that has absorbed into the skin. Results further underscore the need to remove chemical agent from the skin immediately following contact.

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