Formulations efficacy as topical skin protectants against organophosphorus compounds.

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Topical Skin Protectants (TSP) to prevent occupational and professional chemicals exposure

TSP against Chemical Warfare Agents (CWA) in vivo
Not designed for a use in all circumstances and for an application on the all body surface.

When the risk of contamination is high, in association with NBC Personal Protective Equipments (PPE) (suits, gloves, gas mask...); to provide an additional protection of specific skin areas (seals, closures, skin areas highly permeable to CWA, susceptible to self-contamination when disrobing...);
When the risk of contamination is low, in association with conventional suits/gloves to improve the operational capacity (reduce the physical and heat stress due to NBC PPE).

Conclusions

Purpose

• To compare the efficacy of formulations specifically designed as TSP against highly toxic OP such as the CWA VX.
• To determine the consistency of results obtained by using in vitro and in vivo efficacy tests.

Methods

In vitro tests

Permeation of OP

Static diffusion cell

Permeant (Lagagent)

Formulation (lagagent)

Skine models (180 µm) human abdominal split-thickness skin
Pig-ear split-thickness skin
Receptor fluid (RF)
Silicone membrane
Sampling

Interfacial interactions between formulations and OP

Goniometer (EasyDrop, Krüss)

Contact angle (μ) measurements

TSP were spread as a thick layer on glass plates and 5 µl water, oil, POX, DSM or VX droplets were loaded on the TSP surface.

In vivo tests

Permeation of MN on human volunteers’ forearms

10 µl liquid droplet of a 0.1% aqueous solution of MN was loaded on the middle of each test site.

Polarization light spectroscopy using modified standard digital camera technology (TIVIKOO, Wheelbridge AB, Linkoping, Sweden).

References