Effect of weathering, rinsing and aging on permethrin durability of impregnated military battle dress uniforms

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Abstract

Aims: Various factors can affect the resistance and durability of permethrin molecules on the impregnated fabrics. The aim of this study was to evaluate the effect of environmental factors such as weathering, rinsing and aging on endurance and persistency of permethrin residues in the fibers of clothes in military uniforms.

Methods: This survey is an experimental study. In this study, common Iranian military and police uniforms' clothes were impregnated by concentrated emulsion of permethrin insecticide, at 125 µg/cm² using a dipping method. Then, the influence of environmental factors such as weathering, rinsing, and aging on the persistency of impregnated clothes were analyzed. The amount of permethrin residue was determined by High Performance Thin Layer Chromatography (HPTLC) technique.

Results: Without considering the uniforms, on average, 89.7±2 µg/cm² of the permethrin equivalent to 71.7% remained after 12 weeks of permanent, day and night weathering. After rinsing of impregnated uniforms with permethrin for 12.5 hour in water, only 93.5±2.7 µg/cm² of permethrin, equivalent to 75%, remained in fabrics.

Keeping the impregnated clothes for 6 months away from the influence of environmental factors in darkness, and laboratory condition in package form, did not significantly reduces the amount of permethrin.

Conclusion: The environmental agents such as wind and weathering, raining and chemical reactions which happen gradually and with the passage of time, all have a moderate and little effect and cannot considerably affect the reduction of the efficiency of impregnated uniforms.

Keywords: Impregnation, Permethrin, Military Uniforms, Weathering, Rain, Aging