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"CBRN Decontamination: Current Trends and Future Perspectives"

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Abstract

With the advancement of technology threats from toxic Chemical, Biological, Radiological and Nuclear (CBRN) agents have increased. These agents are used in chemical industries, medical facilities, agriculture, research laboratories, etc. Biological agents are naturally present in the environment. The agents can be used intentionally or accidental exposure can occur at workplace.Dermal contamination with CBRN agents can occur in any form such as of powder, dust, liquid, or gases. They get deposited on the exposed skin of the victims from where they may penetrate into blood circulation causing toxic effects. Recent health crisis caused by coronavirus disease (COVID) 2019 has shown us importance of the dermal decontamination.Apart from these chemical attack in Syria and Tokyo subway, Fukushima nuclear catastrophe has proved us urgency of development of CBRN dermal decontamination formulations.So far now there are individual formulations for the individual decontamination of the CBRN agents. There is the huge requirement of the compatible safe pharmaceutical formulations for dermal decontamination. The Personal Decontamination Kit (PDK), RSDL, M291 kit, Shudhika and Remocon are few examples of the dermal decontamination formulations targeting the individual contaminants which widely cover the chemical warfare agents and radionuclides. Still there is the lack of the single pharmaceutical formulation capable to remove the CBRN contaminant from skin.We had optimized and prepared the dermal formulations for CBRN decontamination and evaluated its efficacy against various contaminants of interest. Since the formulation is to be used topically on skin, studies on skin permeation, penetration and interaction were carried out to ascertain formulation mechanism and safety. The future work can involve research on the herbal based dermal decontamination formulations.