THE STUDY ON STRIPPABLE POLYMER COATING FOR SURFACE DECONTAMINATION OF MEDICAL RADIOACTIVE ISOTOPES

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A large amount of radioisotopes have been used in medicine such as I-131, P-32, Tc-99m. These isotopes are typically short-lived and decay within a days or weeks. However, unavailability of equipment or space in medical facility related to radioisotope contamination is costly and can impact patient care. Although liquid agents can be used to decontaminate but they often require multiple applications and can produce large volumes of low-level radioactive waste. Therefore our study was conducted on the use of strippable decontamination coating, from produce a polymer coating to use it for decontamination of these medical isotopes on the surfaces of glass, stainless steel, ceramic, PVC plastic. The polymer coating is gel solution of polyvinyl alcohol, plasticizing agent and decontamination agent, which was sprayed or brushed on the contaminated surfaces, after short time (24h) it was dried and formed a strippable strong thin film and it was easily peeled off from a contaminated surface with the radioactive isotopes and can be disposed off as normal solid waste (after complete decay). Decontamination factor of this polymer coating these isotopes have been compared with decontamination coating Decongel 1101 (USA). The influence of decontamination agents, activity, thickness of film to decontamination factor have been studied. The interaction between iodine, phosphor ions with PVA, and gel polymer have been conducted by Fourier transform infrared spectrophotometric (FTIR). The results showed that decontamination efficiency of I-131, P-32 and Tc-99m strongly depended on property, porosity and smoothness of the contaminated surface and obtained from 99-94 % on glass and stainless steel, ceramic and PVC plastic surfaces. The decontamination efficiency also depended on activity and coating thickness. Optimization of film thickness is around 0.2mm. Mechanism of decontamination for I-131, P-32 by polymer gel also revealed on this paper.