



Efficiency test on three types of sanitizers for cleaning sealed radioactive sources for brachytherapy

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Introduction

A great challenge in the brachytherapy sources production is to fulfill the Good Manufacturing Practices (GMPs) requirements, involving the validation of process and of all supporting activities such as cleaning and sanitization. The main goal of GMP is to reduce risks inherent to brachytherapy source production, preventing contamination of employees that will transfer radioactive material from sealed source to the environment.

This work aims to evaluate the effectiveness of different surface cleaning products, determining the best to reduce radiological contamination to acceptable levels during the sources production, according to legislation [1].

Methodology

In the laboratory for brachytherapy sources production, it was established a cleaning program for three production lots of iodine 125 seeds using three types of sanitizers: Lot 1 with extran 1/1 (v/v), Lot 2 with hydrogen peroxide 6% and Lot 3 with sodium hydroxide 1M. Each lots contained seven iodine 125 seeds and was immersed in the sanitizer for 1 hour and then two washes with distilled water. A activity detected in each lots does not exceed 0,2 kBq (≈ 5 nCi).

Results

Table 1: Surface contaminant removal test

Lots of iodine 125 seeds	Activity initial *	Sanitizer	Surface cleaning result after 1 hour under immersed sanitizer *	Surface cleaning result after 24 hour under immersed distilled water *	Surface cleaning result after 1 hour under immersed distilled water with ultrasound *
L1	1,27 mCi	Extran 1/1 (v/v)	$4,64 \pm 0,05$ nCi	$0,07 \pm 0,008$ nCi	$0,07 \pm 0,006$ nCi
L2	1,61 mCi	Hydrogen peroxide 6%	$0,832 \pm 0,02$ nCi	$0,018 \pm 0,03$ nCi	$0,003 \pm 0,005$ nCi
L3	1,24 mCi	sodium hydroxide 1M	$0,310 \pm 0,01$ nCi	$0,029 \pm 0,006$ nCi	$0,006 \pm 0,005$ nCi

*Average value

Conclusions

First of all this study showed all iodine seeds produced were leakage free. According to results the best choice for remove de surface contamination was peroxide hydrogen. Further testing should ensure the sanitizer's choice is based not only on the removal of surface contamination, but also this sanitizer does not leave residues requiring further rinsing with distilled water.

References

- (1) INTERNATIONAL STANDARD ORGANIZATION. **Radiation protection – sealed radioactive sources – leakage test methods**. Feb.15. 1992. ISO 9978.