

Possible molds for a new brachytherapy source for spinal and intracranial cancer

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Central Nervous System (CNS) cancer is the 18th most incident cancer in the world, according to the World Health Organization (WHO), and in 2020, in Brazil, it represented 2.5% of all new cancer deaths [1]. Brachytherapy is a type of radiotherapy that positions the radioactive source close to (or in contact with) the tumor. Thus, the targeted region receives most of the dose, protecting the healthy tissues adjacent to the tumor. A promising radioactive source for use in brachytherapy for the treatment of CNS cancer is phosphorus-32 in a polymeric substrate. This source has been prominent as a minimally invasive treatment for craniopharyngiomas and in the treatment of metastatic bone diseases in general [2]. To produce such a source, it is necessary to search for possible molds that can conform the polymeric material into the desired format. Several tests were carried out to determine the best mold for the radioactive source manufacture. Different materials were tested to observe if the mold material would react with the source's components, silicone rubber mixed with orthophosphoric acid. In order to be considered a possible mold, the mixture should cure; if the cure did not concretize, the mold would be discarded. It was concluded that polystyrene (PS) obtained the best result, due to the ease of unmold after the resin curing process.

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References:

- [1] H. Sung, J. Ferlay, R.L. Siegel, M. Laversanne, I. Soerjomataram, A. Jemal, F. Bray. CA Cancer J Clin, vol. 71(3), pp. 209-249, 2021.
- [2] O. I. Solodyannikova 1, V. V. Danilenko 1, G. G. Sukach. Problems of Radiation Medicine and Radiobiology, vol. 26, pp. 562-572, 2021.