

A Study of the Fractionation Dose Effect on the Radiation Response of Windose B3 Dosimeter

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Received: 07 February 2017 / **Accepted:** 24 August 2017 / **Published online:** 12 September 2017

Abstract: Windose B3 dosimeters have been investigated using UV–vis spectrophotometry to determine the impact of the frequent interruptions during gamma irradiation on the absorbed dose. To achieve this purpose, a set of experiments were conducted by examining the behavior of these dosimeters as result of these accidents. Experiments were conducted based on varying four influencing factors: the storage temperature, the number of fractions, the total delivered dose and the storage time. The chosen parameters (dose and fraction time) are selected from pre-studies and in accordance with conditions of industrial irradiation. The obtained results for one fraction or five fractions had bigger specific absorbance than the dosimeters receiving its dose without fractionation and that the effect of five fractions on the response of dosimeters is more significant than the effect of one fraction. The most important over response (15%) is obtained for 10 kGy as absorbed dose with five fractions, 40 C as a storage temperature, and 24 h as storage time. The influence quantities have an effective effect on the Windose B3 dosimeter response and suitable corrections are indispensable.

Keywords: Dosimetry; Windose B3 dosimeter; Dose fractionation; UV–vis spectrophotometry