**EPR spectroscopy investigations of some organic materials irradiated by electrons, in prospect of their use in radiotherapy**

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**Introduction:** Cancer is a serious disease, which in many cases is lethal. Different therapeutic methods are undertaken to combat this disease. In order to destroy cancerous tumours, therapy methods using ionizing radiation have been widely developed in recent years as a result to the great technological evolution of linear particle accelerators. The success of this therapeutic method depends essentially on precise transfer energy to the tumour, while preventing the irradiation of healthy bordering tissues. Consequently, the need to use accurate and reliable dosimeters for the control and evaluation of doses attributed to patients. For this purpose, we use the Electron Paramagnetic Resonance "EPR" to study the dosimetric properties of alanine, glucose and table sugar irradiated by accelerated electrons, with a view to applying them as dosimeters in radiotherapy.

**Methods:** Various powder samples of alanine, glucose and sugar are irradiated to different doses [1 - 20 Gy] with electrons of energies 6 and 18 MeV provided by a linear accelerator “Clinac 2300DHX” used in radiotherapy care. EPR measurements were performed just after irradiation and regularly during a twelve-month storage period using the "Magnettech-MS400" spectrometer. All samples were analysed under the same conditions, using the same measurement parameters. The RPE measurements treated by the peak-to-peak and double-integration methods, allowed to establish the dosimetry curves and to analyse the storage effect on the three materials studied.

**Results:** The results showed:

* Complex EPR spectra are observed for irradiated alanine, glucose and sugar.
* An acceptable sensitivity is obtained (Low measurable dose, alanine : 1Gy; sugar : 1.5Gy [1] and glucose : 2Gy [2]),
* Good linearity of dosimetric curves in the used dose range.
* In the case of alanine and sugar, low effect of fading on EPR signal during the period of storage after irradiation, also, the shape of the EPR spectra measured on these two materials remains relatively constant.

**Conclusion:** The results showed that alanine and sugar are very promising materials for their applications in in vivo dosimetry in radiotherapy.

**Keywords:** EPR, Electrons, Organic materials, Dosimetry, Radiotherapy.

**References:**

[1] Performance characteristics of the EPR dosimetry system with table sugar in radiotherapy applications, M. Mikou, N.Ghosne, R. El Baydaoui, Z. Zirari, F.Kuntz ; Applied Radiation and Isotopes 99 (2015) 1–4.

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