**Numeric experiment for analysis of uncertainty of spectra processing in EPR dosimetry**

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In dosimetry based on Electron Paramagnetic Resonance (EPR) spectroscopy, radiation doses are evaluated from the analysis of the EPR spectrum. Usually investigators use their own specially designed computer software for extraction of radiation induced signal from the total EPR spectrum and for determination of its intensity. This process is able to discriminate the total spectrum of irradiated material into the radiation induced signal and the non-radiation induced signals. However even after separation of these spectral components the result represents the superposition of true radiation line and a residual noise. The present study is aimed at investigating the process of EPR signal amplitude reconstruction in tooth enamel, one of the most radiation sensitive materials among those used in EPR dosimetry. The specific scope of this paper is the understanding of the influence of the selected model for description of radiation signal, of the fitting method, and of noise variation on the invert restoration of primary signal. Three numerical experiments for simulation of the amplitude reconstruction were performed: 1. Test of models for description of radiation signal: Influence of the complexity of the model for signal reconstruction on the uncertainty of spectra processing was tested. 2. Test of fitting method of radiation signal: Influence of fitting method on the uncertainty of spectra processing was tested. 3. Test on noise and deconvolution influence on specific method of amplitude reconstruction used in DOSEREC software. Modeled cumulative signal was obtained by superposition of modeled radiation signals and simulated random noise. Model of random noise were constructed based on EPR measurements of 156 spectra of tooth samples of Urals rural population. The obtained noise amplitudes include not only white noise but also individual variations of chemical composition of samples and error of preliminary deconvolution. Variation of reconstructed spectra versus simulated spectra gives the information about accuracy of signal processing and about main sources of errors and uncertainties. In this report the results of numeric experiments will be discussed in context of possibility of improvement of spectral analysis.

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