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Hasan Tuner



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Decay and microwave power saturation features to determine the radiation-induced radicals of sorbic acid and potassium sorbate

Hasan Tuner

Department of Physics, Faculty of Art and Science, Balikesir University, 10145, Cagis, Balikesir, Turkey

*Tel: +90 266 612 10 00. Fax: +90 266 612 12 15. htuner@balikesir.edu.tr

Abstract

Gamma irradiated sorbic acid (SA) and its potassium salt (KSA) were present complex unresolved Electron Paramagnetic Resonance (EPR) spectra. Spectroscopic features and possible structures of the radiation-induced radicals were determined using spectrum simulation calculations according to the microwave power saturations, room and high-temperatures decay findings. It is found that while the radicals decayed in time some of the radicals transferred to another type of radical. The spectrum simulations of SA and KSA were carried out on different spectra recorded in different conditions. Although, most of the radiation-induced radicals of SA and KSA have the similar chemical structures different EPR spectroscopic features were observed. It has been determined that there are three and four different radical species best describe the experimental spectra of SA and KSA, respectively. If the decay rates of the radiation-induced radicals are different, using the information derived from the decay findings present significant information about the spectroscopic features of the existing radicals.

Keywords: Sorbic acid, potassium sorbate, radiation-induced radical, decay, simulation, EPR

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