

ABSTRACT

INVESTIGATION OF RADIATION SENSITIVITY OF SOME FOOD ADDITIVE USED AS A PRESERVATIVE USING ELECTRON SPIN RESONANCE SPECTROSCOPY (ESR)

MS'C THESIS

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Packaged food, cosmetics, medical, and similar products consumed intensively in recent years. Sterilization of these products and/or adding some additives should be used to extend the shelf life of these products or to take precaution against harmful micro-organisms. Sterilization with high-energy radiation is widely used comparing to other sterilization methods to remove the micro-organisms from foods. Besides the advantages of the radiosterilization, it could be produced some radiolytic intermediates by break the chemical bonds. Electron Spin Resonance (ESR) spectroscopy is used to determine the structure, and some other physical and chemical features of the radiolytic intermediates. The dosimetric features and structure of the radiation induced intermediates produced in the benzoate compounds, Benzoic Acid (BA), Potassium Benzoate (KB), and Sodium Benzoate (NaB), which are used as preservative in foods were investigated using ESR spectroscopy in this thesis. The features of the radiolytic intermediates were investigated using the results derived from room temperature stability, microwave saturation behavior, dosimetric feature, and annealing findings. The absence of ESR signal in unirradiated sample, and existence of an ESR signal in radiation exposed samples, is resultant of irradiation damage in the structure of the sample. The structure and spectroscopic features of the proposed intermediates were determined by using spectrum simulations. For this purpose, simulation programs that are used in the literature were used.

KEYWORDS: ESR, Gamma Irridation, Food Additive, Benzoate, Sterilization, Radical