

Prediction of Ionizing Radiation Doses in Irradiated red Pepper (*Capsicum annuum*) and Mint (*Mentha piperita*) by Gel Electrophoresis

Authors : Şeyma Özçirak Ergün, Ergün Şakalar, Emrah Yalazi, Nebahat Şahin

Abstract : Food irradiation is a usage of exposing food to ionising radiation (IR) such as gamma rays. IR has been used to decrease the number of harmful microorganisms in the food such as spices. Excessive usage of IR can cause damage to both food and people who consuming food. And also it causes to damages on food DNA. Generally, IR detection techniques were utilized in literature for spices are Electron Spin Resonance (ESR), Thermos Luminescence (TL). Storage creates negative effect on IR detection method then analyses of samples have been performed without storage in general. In the experimental part, red pepper (*Capsicum annuum*) and mint (*Mentha piperita*) as spices were exposed to 0, 0.272, 0.497, 1.06, 3.64, 8.82, and 17.42 kGy ionize radiation. ESR was applied to samples irradiated. DNA isolation from irradiated samples was performed using GIDAGEN Multi Fast DNA isolation kit. The DNA concentration was measured using a microplate reader spectrophotometer (Infinite® 200 PRO-Life Science-Tecan). The concentration of each DNA was adjusted to 50 ng/µL. Genomic DNA was imaged by UV transilluminator (Gel Doc XR System, Bio-Rad) for the estimation of genomic DNA bp-fragment size after IR. Thus, agarose gel profiles of irradiated spices were obtained to determine the change of band profiles. Besides, samples were examined at three different time periods (0, 3, 6 months storage) to show the feasibility of developed method. Results of gel electrophoresis showed especially degradation of DNA of irradiated samples. In conclusion, this study with gel electrophoresis can be used as a basis for the identification of the dose of irradiation by looking at degradation profiles at specific amounts of irradiation. Agarose gel results of irradiated samples were confirmed with ESR analysis. This method can be applied widely to not only food products but also all biological materials containing DNA to predict radiation-induced damage of DNA.

Keywords : DNA, electrophoresis, gel electrophoresis, ionizeradiation

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