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Mechanical, Physical and Chemical Changes of Irradiated Garlic during Storage

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Due to high cost of maintaining, limited storages and high production of garlic in Hamadan province, gamma ray is one of the new method used to store garlic. Therefore, the effect of irradiation dose, storage period and storage temperature on the physical, chemical and color parameter of garlic was studied. Samples were irradiated with 75 and 150 Gy doses and stored for 6 months at 4 and 18°C. During the storage period mechanical parameters (yield and critical stress and strain and energy of rupture), physical properties (size of sample, weight loss, water loss, volume, and geometric mean diameter), color parameters and allicin of control and irradiated samples, were measured monthly. The results showed that with increasing storage period, geometric mean diameter, water content, volume and allicin decreased in irradiated and control samples. Reduction of geometric mean diameter, water content and volume parameters in samples irradiated with 150 Gy dose were more than those of 75 Gy dose at 4°C, 0.26, 6.9 and 13.33 percent, respectively. With aheading storage period, weight loss and color parameters such as a* and b* were increased in 150 Gy dose irradiated samples that were more than 75 Gy dose at 4°C, 5.5, 52.80 and 30 percent, respectively. Also, penetration indices such as yield stress and yield strain, declined in irradiated samples with 150 Gy were 9 and 19 percent at 4°C and 15 and 23 percent at 18°C and energy of rupture reduced with increasing of irradiation dose to 6 percent in 4°C and 7 percent in 18°C, respectively. According to high effectiveness of irradiation, this method can be used to enhance garlics shelf-life during storage.

Keywords: Allicin, Changing color, Garlic, Gamma Ray, Physical properties, Mechanical properties.

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