

Effect of Modified Atmosphere Packaging and Storage Temperatures on Quality of Shelled Raw Walnuts

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Abstract : This study was aimed at analyzing the effects of packaging (MAP) and preservation conditions on the packaged fresh walnut kernel quality. The central composite plan was used for evaluating the effect of oxygen (0–10%), carbon dioxide (0-10%), and temperature (4-26 °C) on qualitative characteristics of walnut kernels. Also, the response level technique was used to find the optimal conditions for interactive effects of factors, as well as estimating the best conditions of process using least amount of testing. Measured qualitative parameters were: peroxide index, color, decreased weight, mould and yeast counting test, and sensory evaluation. The results showed that the defined model for peroxide index, color, weight loss, and sensory evaluation is significant ($p < 0.001$), so that increase of temperature causes the peroxide value, color variation, and weight loss to increase and it reduces the overall acceptability of walnut kernels. An increase in oxygen percentage caused the color variation level and peroxide value to increase and resulted in lower overall acceptability of the walnuts. An increase in CO₂ percentage caused the peroxide value to decrease, but did not significantly affect other indices ($p \geq 0.05$). Mould and yeast were not found in any samples. Optimal packaging conditions to achieve maximum quality of walnuts include: 1.46% oxygen, 10% carbon dioxide, and temperature of 4 °C.

Keywords : shelled walnut, MAP, quality, storage temperature

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