Title Effect of storage conditions and packages on engineering and sensory properties of Barhi dates at Khalal stage

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Abstract

The accelerated change of Barhi dates from the Khalal stage to the R utab and fully ripen dates stages is considered one of the problems dates farmers and marketing sectors. This is because consumers prefer it in the Khalal stage during the season whereas, the objective of this study was to investigate the effect of storage temperatures (1, 5 and 10°C) and package type (polyethylene, polypropylene, the composite package and control (exposed to air) on the mechanical characteristics (texture profile analysis and penetration, TPA), sensory evaluation, color, water activity and moisture content of fruits during the storage period which extended to three months. The experimental results of the basic physical characteristics of Barhi fruits in the Khalal stage showed that the average values and the standard deviation were 13.72±1.93 cm^3 for volume, 13.80±2.033 g for mass, 1.01±0.035 g/cm^3 for density, 33.66±2.240 mm for length, 28.035±1.46 mm for diameter, and 29.670±3.502 cm^2 for surface area. There was a decrease in the water content of the unpacked dates during the storage period at 1, 5, and 10 °C. Basic color factors (b*, a*, L*) and relevant derived factors that include color difference, color intensity, angle of color, and the browning index were determined. The values of a* were fluctuating during storage at 1°C but generally decreased during storage in all packages at 5 and 10°C. Texture Profile Analysis showed that the values of hardness for fresh unpacked dates was 145.76 N and decreased during the storage period to 24.9, 12.82, 11.81 N at storage temperatures 1, 5 and 10°C, respectively. In the penetration tests, values of stiffness of pulp with skin for the fresh dates was 15.18 N.mm and then decreased for the unpacked dates to 6.50, 6.47 and 4.51 N.mm at 1, 5 and 10°C, respectively. The values of penetration modulus of the skin, decreased during the storage period at the different temperatures. The sensory evaluation of the fresh Barhi in the Khalal stage was measured every 15 days during the storage period. The values of color, taste, texture and overall acceptance decreased significantly during the storage period for all packages at 1, 5 and 10°C. The best temperature evaluated by the panelists was 1°C for all packages and the best packages were polyethylene and polypropylene at all temperatures.