

**Title** Increasing the rate of ripening of date palm fruit (*Phoenix dactylifera* L.) cv. Helali by preharvest and postharvest treatments

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#### **Abstract**

'Helali' is a late season date palm cultivar. At the mature (*Bisir*) stage, the fruit are astringent as a result of high contents of soluble tannins, and removal of tannins is necessary for the fruit to be edible. During the harvesting season, only 30–40% of the total fruit might normally ripen (*Rutab* stage) on the tree and the remaining fruit fail to ripen. This study showed that bunch bagging with different materials such as black or blue polyethylene bags, white 'agrlsafe' (polypropylene fleece) and paper bags during the growing season significantly increased the rate of fruit ripening and increased *Rutab* yield per bunch. In this respect, black and blue polyethylene bags were the most effective followed by 'agrlsafe' and paper bags. Preharvest ethrel application significantly increased *Rutab* fruit yield per bunch compared to the controls. There were no significant differences in *Rutab* yield per bunch between sprays or injection of ethrel into the bunch peduncle. Postharvest dipping of fruit at the *Bisir* stage in ethrel at 4.2 ml/l and abscisic acid at 1.0 mM significantly enhanced ripening, compared to the controls. However, ABG-3168 (an ethylene blocker) application at 3.33 g/l significantly inhibited ripening, suggesting a role for ethylene in the ripening process. Ethanol vapor significantly hastened ripening of *Bisir* fruit over 10 days at ambient conditions in desiccators. The response of immature fruit (according to fruit density and TSS) to ethanol vapor was much greater than mature ones. Also, immersion of fruit in water for 10 h significantly increased fruit ripening compared to the controls, but to a lesser extent. It is concluded that 'Helali' date ripening could be hastened by bunch bagging during growth, or by exposing the *Bisir* fruit to ethanol vapor following harvest. Neither treatment showed any negative impact on the overall quality characteristics of ripe fruit, suggesting that they may be practical tools for increasing the ripening rate of *Bisir* 'Helali' dates.