

**Title** Effects of ethyl formate fumigation on posharvested dates (deglet nour) quality  
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**Citation** Abstracts of 7<sup>th</sup> International Postharvest Symposium 2012 (IPS2012). 25-29 June, 2012, Putra World Trade Centre (PWTC), Kuala Lumpur, Malaysia. 238 pages.  
**Keywords** Date fruit; ethyl formate; quality; residue

### Abstract

Dates fruit (*PhoenixDactylifera*) variety Deglet Nour, is the most important variety, economically, in various producing countries: Tunisia, Algeria, Israel and United States. Dates fruits are subject to serious pest attack, especially from Carob moth (*Ectomyelois certaniae*), that causes annually quantity and quality crop losses.

Currently, most industrials in the date fruit sector use methyl bromide (MB) as fumigant. However, MB is now associated to depletion of the Earth's ozone layer and is under the restriction of the Montreal Protocol. Others use Phosphine and sulphuryl fluoride which require long exposure time (up to 3 days) and leave residue in the fruit. Hence, dates conditioners are still searching for alternatives allowing substitution of these fumigants by an efficient, environmentally friendly, and ensuring product quality fumigant. In a previous study, ethyl formate (EF) has been tested as an alternative for dates fruit fumigation and optimum EF concentration leading to 94.5 % mortality of the most resistant stage of carob moth (fifth-instars larvae), and control in all their physiological stages (eggs, pupae), has been determined.

In this work, effects of EF fumigation with the previously determined optimum concentration, on fruit quality have been analyzed. Hence, dates color was analyzed using a Minolta chromameter. EF residue was checked for acetate aldehyde, ethanol, ethyl acetate, and ethyl formate using a gas chromatograph (GC-9AM, Shimadzu Scientific Instruments, Columbia, MD). Date quality evaluation i.e. score decay, sugar contents, pH value and acidity, and volatile content were examined after treatment and 0 day, 7 days and 14 days storage at 0°C, 5°C and 20°C. No significant difference ( $P < 0.05$ ) between dates treated and untreated was observed on date color, pH value, acidity and sugar content. Residue levels were almost the same as a control sample, for acetate aldehyde, ethanol, ethylacetate after 7 days and 14 days storage, whereas EF residue disappeared after 7 days storage. In addition, control and treated dates were stored at 20°C, allowed molds multiplication after 7 days storage and thus some dates started fermentation.