

**COMBINED EFFECT OF NANOPARTICLES AND
REFRIGERATED STORAGE ON DATE PALM
FRUITS**

By

AMAAL ALI ZAINHOUM MAHMOUD
B. Sc. (Pomology), Fac. Agric., Cairo Univ., Egypt, 2010
M. Sc. (Pomology), Fac. Agric., Cairo Univ., Egypt, 2015

THESIS

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Name of Candidate: Amaal Ali Zainhoum Mahmoud **Degree:** Ph.D.

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Supervisors: Dr. Hemat Mohamed Kamal

Dr. Sahar Mohamed Abd El-wahab

Dr. Ezz Gad Alla Al-abbasi

Department: Pomology

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ABSTRACT

Post-harvest loss is one of the biggest problems which effects agricultural economic growth globally. Physical methods like spray of new types of fertilizers using innovative nanotechnology and refrigerated storage are common practices to minimize post-harvest losses in date fruits; these are one of the potentially effective options of significantly enhancing the global agricultural productions needed to meet the future demands of the growing population. During 2018 and 2019 seasons, “Zaghloul” date palm fruits were sprayed three times (at growth start, just after fruit setting and at one month late) with some nanoparticles (zinc oxide, magnetite, selenium, silver and chitosan), in different concentrations (30, 60 and 90 ppm) in order to study the effect of some nanoparticles to improve quality and storability of date palm fruits. The sprayed fruits were harvested at khalal stage and then fruits stored up to 3 months at 0 °C and relative humidity (RH) 90-95% to evaluate quality attributes. Also, all sprayed fruits immersion in gelatin nanoparticles at 2% as a post-harvest coating material to prolonging the storage life and maintaining their fruit quality of sprayed “Zaghloul” date palm fruits during cold storage for 90 days. All treatments were very effective to improving fruit quality in terms on increasing (dimensions, weight, volume, flesh weight, firmness, total soluble solids, total sugars and total anthocyanin) and decreasing (discarded%, weight loss%, total acidity, total soluble tannins and total phenolic content) as compared with the control. Furthermore, the metal concentrations in sprayed fruit with some nanoparticles were found within the permissible limits regulated for health standard. The best result with regard to fruit quality and storability of “Zaghloul” date palms were obtained with spraying ZnONPs at 90 ppm and coated with GNPs at 2%.

Key words: “Zaghloul” date palm- *Phoenix dactylifera* L.- spray-nanoparticles- zinc oxid- magnetite- selenium- silver- chitosan- gelatin- refrigerated storage- quality.

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List of Abbreviations

Abbreviation	Explanation
NPs	Nanoparticles
Zn	Zinc
ZnO	Zinc oxid
Fe	Iron
Fe₃O₄	Magnetite
Se	Selenium
Ag	Silver
Cs	Chitosan
G	Gelatin
DIM	Daily intake of metals
HRI	Health risk index
C_{metal}	Concentration of the metal
C_{factor}	Conversion factor
D_{food intake}	Daily intake of food
B_{average wight}	Average body weight
Rfd	Reference oral dose
ppm	Parts per million
RH	Relative humidity
kJ	Kilojoules