

## RESEARCH ARTICLE

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# Antioxidant and Anticancer Activities of Heart Components Extracted from Iraqi *Phoenix Dactylifera* Chick

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### Abstract

**Background:** Breast cancer is one of the most frequent malignancies in women, and it is a major cause of cancer death worldwide, as well as one of the leading causes of cancer mortality. Traditional herbal therapy has been widely used in some developing countries as a complementary and alternative technique. Because of their low toxicity, medicinal edible plants have been allowed to minimize the risk of breast cancer and other diseases. The heart of *Phoenix dactylifera* is a well-known, safe, and common edible part of the *P. dactylifera* plant (Hilwa variety). The biological properties of heart of *P. dactylifera* are nuclear, and the appeal warrants further investigation. The aim of this study is to look into the chemical compositions, antioxidant and anticancer properties of heart of *P. dactylifera* extract obtained via microwave-assisted extraction. **Methods:** Microwave-assisted extraction, ethanol solvent gas chromatography mass spectrometry (GC-MS) analysis, DPPH assay, MTT assay, acridine orange/ethidium bromide staining, cell cycle, reactive oxygen species, and apoptosis were all used to evaluate the activity of heart of *P. dactylifera*. **Results:** GC-MS was used to identify the chemical compositions of heart of *P. dactylifera* extract, which revealed about 15 bioactive compounds. The antioxidant activity of heart of *P. dactylifera* extract was determined to have an IC<sub>50</sub> value of 114.2 µg/ml. The cytotoxicity was measured using MCF-7 cells, and the IC<sub>50</sub> was reported to be 620.1 µg/ml. The cell cycle was measured at the G1 gate, resulting in the formation of reactive oxygen species and apoptosis. **Conclusion:** The findings suggested that regular consumption of *P. dactylifera* heart components is important for nutrition and immune system support in the prevention of breast cancer, and that more research on its molecular properties is needed.

**Keywords:** Apoptosis, breast cancer, cell cycle, microwave assisted extraction, heart of *Phoenix dactylifera*

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### Introduction

Many tree species, including coconuts, are nuts, and date palms, are members of the Arecaceae family (*Phoenix dactylifera*). The *P. dactylifera* tree is a well-known member of the genus, with over 3,000 different varieties found throughout the world (Kherallah et al., 2017). Some of the tree parts used in traditional medicine are the flowers, date fruits, heart, date seeds, and date skin (Al-shawi et al., 2017). Dates vary in shape, size, weight, color, sweetness level, and price depending on location (Hussain et al., 2016). In Iraq, there are approximately 600 different varieties of the *P. dactylifera* tree, distributed based on the soil type and the effects of the climate (Karami et al., 2018). One of the most well-known Iraqi dates is the Hilwa variety, it is a well-known among farmers, so it's easy to distinguish it from other *P. dactylifera* trees. Production of this variety fell to 22,300 tons in 2003 due to lack of attention to this form of date, massive sale of the better varieties during wars, urban growth, and emigration of farmers out of the region. The value of the Hilwa variety stems

from its resistance to climate, stability, and heat, as well as its sweet flavor and early maturity (Bashay et al., 2008). Some date tree parts, such as fruits, pollen, and leaves, have been studied for their biological functions in Egypt and Saudi Arabia (Khan et al., 2016; Renard et al., 2017). Furthermore, when compared to other extraction methods, microwave-assisted extraction is a selective, fast, and low-cost method for determining the chemical composition of medicinal herb extracts. As a result, controlling the MAE extraction process by the use of a suitable solvent, time, and heat, would improve MAE selectively, making it a suitable method for extracting medicinal herb components for biological functions and applications in medicine (Fan et al., 2012). Different countries have studied the chemical composition of date palm and classified it as flavonoids, phenolic acids, carotenoids, phytosterols, and phytoestrogens, all of which have different biological activities (Mohammed et al., 2017; Nehdi et al., 2016; Magwood et al., 2020). A clinical study on pediatric cancer discovered that *P. dactylifera* palm date (Ajwa) had a positive impact and could improve future care (Sobhi et al., 2019). Other benefits of the