

CYTOTOXICITY AND ANTIOXIDANT ACTIVITY OF EXTRACTIVES FROM POLLEN OF BARDY *TYPHA DOMIGENSIS* (PERS.)

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ABSTRACT : There is a growing interest now-a-days in employing medicinal plants for the treatment and prevention of cancer. This study aimed to test the anti-cancer activity of aqueous extract from pollen of Bardy [*Typha domingensis* (pers)]. Phenolic compounds were extracted from pollen using six polar gradient solvents (water, methanol, butanol, chloromethane, diethyl acetate and diethyl ether). The results showed that the extracts contained different types of active substances, including phenols, flavonoids, alkaloids, saponins, tannins and glycosides. The quantities of phenols and flavonoids in these extracts were estimated. It was found that the aqueous extract contain the highest amount of phenols 64 mg equivalent to Gallic acid/g of extract, while ethyl acetate extract had the highest percentage of flavonoids (37.85 mg quercetin equivalent/gm of extract), followed by the rest of the extracts. The aqueous extract also showed the best ability to reduce free radical DPPH, its value ranged between 83.4 ± 1.6 and 48.3 ± 0.7 for concentrations (1000 - 125 $\mu\text{g/ml}$). It was found that this activity is superior to that of the standard substance (ascorbic acid). Aqueous extract of pollen also had the ability to inhibit the growth of the human liver of 4.2% at a concentration of 6.2 $\mu\text{g/ml}$ and this percentage increased to reach 4.5%, 13.5%, 29%, 36.6%, 47.5%, 57.2% for concentrations (12.5, 25, 50, 100, 200, 400) mcg / ml, respectively in comparison to an inhibition rate ranged between (4.4-30.4%) at a concentration of (6.2-400) mg/ml against normal cells line WRL68. Moreover, it was observed, using a high content screening assay, those high concentrations of aqueous extract from pollen of *T. domingensis* (Pers) affects the cytological markers of HepG2 cancer cells line, when exposed to the extract for 24 hours at 37°C. This leads to the induction of cells to enter into the process of programmed cell death (apoptosis).

Key words : *Typha domigensis* Pers., pollen, antioxidant, cytotoxicity, HepG2 cell.

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INTRODUCTION

Medicinal plants are considered one of the most important strategic materials in the pharmaceutical industry and are mainly represented in its production, because they contain effective ingredients that have a direct effect on the body, as they contain essential primary compounds such as fatty acids, proteins and carbohydrates as well as secondary metabolites such as flavonoids, phenols, glycosides, terpenes and alkaloids (Zinab, 2012). Several in vitro and in vivo studies have shown that many plants extracts have antioxidant, antimicrobial and anticancer activities resulting from the activity of these compounds and in the first of these is the flavonoid extracts (Altemimi *et al*, 2017). Cancer is one of the major health problems in the world, as it is one of the important causes in the increase in deaths among children and adults, it spreads widely among the

world's population and ranks second after cardiovascular diseases. In the present time, there are different chemical, surgical and physical treatment ways, but they did not achieve the required results and have different side effects. So that researchers turned to finding new and alternative treatment methods through the use of natural sources such as plants and natural herbs that contain many chemical compounds with high activity in treating it (Demark *et al*, 2015) as more than 50% of the known drugs, at the present time, is a natural products that has the ability to control cancer cells through its effect on the mechanisms of cell division or in the pre-division stage, such as DNA replication (Mohd *et al*, 2010).

T. domingensis (pers) is one of the most popular plants in the Mesopotamian marshes south of Iraq with considerable interests in traditional medicine. Men in Al-Ahwar (marshes) south of Iraq use pollen powder to raise

HepG2 cancer cell line to enter the process of programmed cell death. This cytotoxic effect may be due to the antioxidant activity. Hence, further studies are recommended to recognize the active compounds directly involved in subsequent cytotoxicity both *in vitro* and *in vivo*. Besides, exploring the effect of this aqueous extract against other cancer types may offer new therapies

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