

## **STUDY OF CHEMICAL ANALYSIS AND BIOLOGICAL EFFICIENCY OF DATE PALM MALES, CV. SAMISEMI**

IBTIHAJ HANDIL AL TEMIMI

Department of Horticulture and Land Scap, College Of Agriculture, University of Basra, Iraq

### **ABSTRACT**

This study was carried out during the agricultural seasons 2016 - 2017 in three agricultural sites that were in the province of (Dhi Qar, Basra and Babylon) in order to estimate the most important chemical components of pollen of date palm cv semisemi and study of the pylogenetic effect of the ethanolic extract of the pollen by adopting of the random complete block design. Thirty-six trees of date palms were randomly selected from the group of trees planted in agricultural sites (Dhi Qar, Basrah and Babil) The biologic experiment included the effect of concentrations (0, 50, 100, 200) mg / l of ethanolic extract of semisemi toxin pollen in inhibiting the growth diameter of Pathogenic fungi of humans, *Candida albican* and *Aspergillus Niger*. The most important results of the study were that the pollen of the Dhi Qar sit was significantly higher in dry matter (62.89%) and calcium, magnesium and boron (0.263, 1.380, 1.46) mg / g respectively. The lowest water content was achieved in the pollen of Thi-Qar Governorate (37.11%). Significant differences were found in the concentration of the amino acid proline and the high concentration was in the Samismi pollen of Basrah and Babil governorates (0.26,0.31)µgm/gm respectively. The results showed that the ethanolic extract of 200 mg / L inhibition of the growth rate of the fungus *Candida albican* was 15 mm higher than the other concentrations under study, while the highest inhibition of *Aspergillus Niger* was achieved with ethanol concentration 200, 100 mg / L and significantly different from the comparison treatment (distilled water).

**Keywords:** Calcium, magnesium, boron, propylene, inhibitory activity, dry matter.

### **INTRODUCTION**

The date palm *Phoenix dactylifera* L belongs to the family Arecaceae, which includes about 235 genas and 400 species, The date palms of dioecious plants are unisexual so male flowers are carried on male trees (palms), while female flowers are carried on female trees (shah and shah savar, 2017). There is increasing interest in the study of pollen not only because it is a direct cause of the fruits of date palm trees, but because it contains good chemical compounds useful to

humans and thus is an integrated food and is considered the royal food of honey bee (Aly, 2018). There are significant differences between the varieties of male palm, which is the Quantity and vitality of the pollen and its chemical components in addition to the date of flowering and the number of Flowers and the weight of the Inflorescences Liu et al (2013) These traits are greatly affected by many factors, including genetic and environmental factors Including the characteristics of agricultural soils and the quality of irrigation water and climate in addition to the agricultural service operations and the most important fertilization, irrigation and trimming IQBAL et al (2012). The season of production of male pollen starts from the middle of February until April, and the production is in three batches, where the types of gholami and the usual male varieties of early flowering. The average varieties of flowering, which starts flowering in early March, include wardi and ganami in red and green, Flowering begins to bloom in late March, such as the Samismi and al-gratly CHAO and KRUEGER (2007). The results of the studies showed that the semisemi was significantly higher in the quantity and vitality of the pollen and the mineral content compared to the wardi, keratili and Aadi varieties, while no significant difference was observed between the Samismi and green ganami ISMAIL(2014). This was supported by Jassim et al (2000) through their study of the protein and mineral elements of five varieties of date palms (ganami in red and green, wardi, aadi and Samismi) Sweden and Ati (2011) agree with their study to estimate some mineral elements (N, P, K, Na) Because the chemical composition of pollen is affected by several factors, including the quantity and quality of irrigation water and the nature of the soil of agriculture where the soil is preferred to maintain high water and rich organic matter and free of toxic elements such as boron and chlorine with a drainage system (Al Tamimi, 2012). It has become necessary to study the effect of the agricultural site because of its obvious impact on the balance and activation of the biological processes of the plant, which is positively reflected "in the chemical composition of pollen Samaismi class.

## **MATERIALS AND METHODS OF WORK**

This study was carried out in three agricultural sites, namely Basrah Governorate, Abi Al-Khasib District, Dhi Qar Governorate, Agricultural Research Station (Akked) and Babylon Governorate, Hashemite District, Soil and water samples for agricultural sites were analyzed in the laboratories of the Faculty of Agriculture / Department of Soil Science and Water Resources (Table 1 and 2).

**Table 1: Analysis of agricultural soil in palm orchards**

the value			Unit	Property
The district of Hashimiya / Babylon	Akkd / Dhi Qar	Abi alKhasib district/Basra		
7.67	7.62	7.97	1:1	Soil reaction (pH)
15.75	11.15	24.60	Ds/M	Electrical conductivity (EC)
322.75	290.25	432.30	Mg/kg	Calcium carbonate (CaCo3)
11.60	14.81	7.73	Mg/kg	Organic material (O M)
4.53	6.14	3,56	C / N ratio	
188.96	12.72	90.35	gm/Kg	(sand)
544.01	429.13	491.74	gm/Kg	(silt)
267.05	449.15	417.91	gm/Kg	(clay)
Mixed Green	Mix	Greywater	Soil tissue	

**Table 2: Analysis of water in palm groves**

the value			Unit	Property
Hashimiya district / Babylon	Akkd / Dhi Qar	Abi al Khasib district/Basra		
7.54	7.31	7.89	-	pH
2.15	0.310	2.85	Ds/M	EC
12.72	14.20	11.49	M / Lμ	SO4
2.35	1.26	2.96	M / Lμ	HCO3
8.48	4.76	9.31	-	SAR
C3S2	C2S2	C3S2	-	Water class

The pollen samples were collected from the mature pollen of the semisemi Samismi at the same age and had the same growth force and at the rate of twelve tree in each site. After the pollen was prepared in dust after removal of the outer shell of each trip. The isolation was done in a place isolated from each other and then dried by the air for several days and then spread the flowers in paper bags and then took a known weight of pollen and dried in an oven at 65 ° C for 48 hours

until the weight stability in preparation for "to conduct chemical analysis in the laboratories of the University of Basra, Faculty of Agriculture, Department of Horticulture And the Department of Soil Science and Water Resources to studi following characteris :

### **Water content and dry matter (%)**

The percentage of water content and dry matter was estimated using the drying method. The weight of 5 g of soft mature pollen was dried and dried at 65 ° C for 48 h. The samples were weighed after their weight was confirmed and the percentages of water content and dry matter were calculated Using the two equations.

$$\text{Percentage of water content} = \frac{\text{weight of the soft sample} - \text{weight of the dry sample}}{\text{The weight of the soft sample}} \times 100$$

$$\text{Percentage of dry matter} = \frac{\text{Dry sample weight}}{\text{weight of the soft sample}} \times 100$$

### **Proline content (µg / g)**

The Bates et al (1973) method was used to estimate the concentrations of pollen in the pollen, taking a weight of 100 mg of the sample and then adding 5 ml of sulfosalicylic acid at a concentration of 3% and crushed in a ceramic mortar And was promoted by the centrifuge then Mix the leachate with 3 ml of acetic acid and 3 ml of nenhydrin acid and put the mixture in a boiling water bath for 30 min and then cool until the red color appeared as a result of the reaction of the proline with the nenhydrin acid, which was separated by the addition of 5 mL of toluene. The absorption of the red-toluene layer was measured by the spectrometer at the 250 nm wavelength and the amount of proline was calculated based on the straight line equation using the proline curve.

### **Concentration of calcium and magnesium (mg / g)**

0.2 g dry samples were taken and digested in a 100 mL Cd flask by a mixture of sulfuric acid and the perchloruric acid (96 + 4) ml in sequence with the heating for one hour and then transfer the digestion solution to a volumetric flask of 50 cm ³ and complete the volume with distilled

water according to the Cresser and parsons method (1979). Calcium and magnesium were estimated in the semisemi pollen using an atomic absorption according to page et al (1982).

### **Concentration of boron (mg / g)**

0.2 g of dry samples were taken and placed in a frying pan with 2 ml of saturated calcium hydroxide solution. The solution is dried in a water bath at a temperature of 70 m. The sample was then placed in the burner and raised degree of heat Gradually "to 450 m for two hours and then refrigerate the sample and add 10 ml of the solution of orthophosphoric acid to melt the remaining material and then leave the mixture to separate into two layers and take 5 ml of dichloroethane extract. The boron concentration in the sample was measured by a spectrophotometer at a wavelength of 660 nm, page et al (1982)

### **Biological effectiveness**

#### **Preparation of alcohol extract**

10 g of seismic pollen was weighed from the dried Dhi Qar plant and placed in a Panasonic electric mixer and 300 mL of 90% ethyl alcohol was added for 15 minutes and then stirred in a hot magnetic magnetic stirrer for 48 hours at 45° C -50 m and then put the solution in the centrifuge at 3000 cycles. And the process was repeated three times to ensure the disposal of the sediment and was nominated using the filter paper Whatman No.1 and drain the leachate using water bath at a temperature of 60 m and put the extract in sterile bottles and kept in the refrigerator at 5 m until use, The dry matter weight was 1.5 g.

#### **Bacterial isolates**

Two bacterial isolates obtained from the Faculty of Dentistry / Basrah University were selected as *Candida albican* and the second was *Aspergillus Niger*.

#### **Test the efficacy of plant extracts against two bacteria**

The efficacy of three concentrations was 50, 100 and 200 mg/ ml of the ethyl alcohol extract of the seismic pollen For the station aked \ Dhi Qar was compared with the treatment of the was compared with the distillation treatment in vitro glass on the testicles Using 20-mL Muller Hinton agar in each Petri dish, and then spread the dishes by spreading 100 microliters of the bacterial suspension recorded from the bacterial isolates used in the experiment for 24 hours, Heat 37° C then transferred the microbial colonies were then moved of each type to the normal saline tubes to obtain an equivalent mass of the Macfrland No-1 tube used for the biological efficacy test, and to take discs of filter paper with equal diameters and to place each set of disks in a type of extract and was left for ten minutes to drink with the extract immersed in it and then

raised and using the forceps and distributed on the dishes planted with the fungi *Candida albican* and *Aspergillus Niger* and then incubated for 24 hours at 37° C and recorded the result by measuring the diameter of the inhibition zones in millimeters meters by the ruler. (Nair et al (2005, Badr Eddin And others, 2016).

**Experimental design and statistical analysis**

The results were statistically analyzed using Randomized Complete Blok Design (RCRD) and three segments to show the effect of the study sites on the chemical composition of the semi-toxic pollen vaccine. The biological efficacy experiment was analyzed using randomized complete design as a simple experiment. (RLSD) Revised Least Significant Difference at a 5% probability level (Al-Rawi and Khalaf Allah, 2000).

**RESULTS AND DISCUSSION**

**Dry matter and water content (%)**

Table (3) shows that there are significant differences in the level of probability (0.05) between the study sites in the percentage of dry matter of pollen Samismi as the superiority of the site of Dhi Qar was significantly in the highest rate of dry matter compared to "sites of study (Basra / Abi Khasib and Babylon / Hashemite district) as the results showed the moral superiority of the site of the study Babel / Hashimiya district dry matter percentage of pollen compared to Basra / Abi Khasib which gave the lowest rate of dry matter for pollen. As for the effect of the study sites on the water content of the date palm pollen, the results of the statistical analysis showed that (3) the moral superiority of the site

**Table 3: Chemical properties of pollen Samismi Class in three agricultural sites**

Proline µg / g	Water content %	Dry matter %	Study site
0.26	37.11	62.89	Hashemite district / Babylon
0.31	41.84	58.16	Abi al-Khasib district / Basra
0.21	29.93	70.07	Akkad Station / Dhi Qar
0.0533	4.3333	4.3333	RLSD

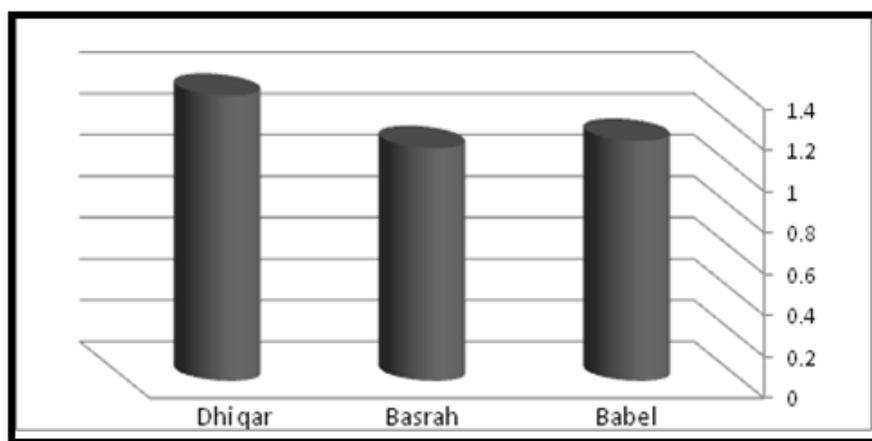
Basrah in giving the highest water content of the pollen compared to the lowest water content of the pollen Which was verified with the site Dhi Qar, this is due to the fact that the source of irrigation water in the site of Dhi Qar / station confirmed from the river Aladda, which is characterized by a low proportion of salts and the soil in the site of Dhi Qar is a mix and is one of the best breeding soil suitable for the growth of palm trees because it is good soil drainage and ventilation and rich elements Food needed for growth (BISHER and DEOUSOUKEY, 2012).

**Proline ( $\mu\text{g} / \text{g}$ )**

The results indicated in Table (3) that the pollen pollen content of broccoli was significantly affected by the different study sites. The lowest pollen content was ( $0.21 \mu\text{g} / \text{g}$ ) in the pollen of Dhi Qar / Date palm pollen is a semisymbiotic cultivar grown tow sites of studying , Basrah / Abi al-Khasib ( $0.31 \mu\text{g} / \text{g}$ ) and Babel / Hashemite ( $0.26 \mu\text{g} / \text{g}$ ). There was no significant difference in the protein content between the study sites Basrah and Babylon (Al umary, 2016).

**Calcium concentration ( $\text{mg} / \text{g}$ )**

The results of the statistical analysis in Fig. 1 showed significant differences in the total concentration of calcium in the semisymbiotic pollen. The high concentration of seismic semisymbiotic pollen was found in the study site Dhi Qar ( $1.46 \text{mg} / \text{g}$ ), which significantly exceeded Concentration of Calcium in the Samsemi Pollen at the Basrah / Abi Al Khasib and Babel / Hashimiya sites by  $0.99$  and  $1.14 \text{mg} / \text{g}$  respectively This may be due to the different nature of the soils and the quality of the irrigation water in the study sites, which in turn influenced the readiness of the calcium element of the plant (Hassan, 2011).

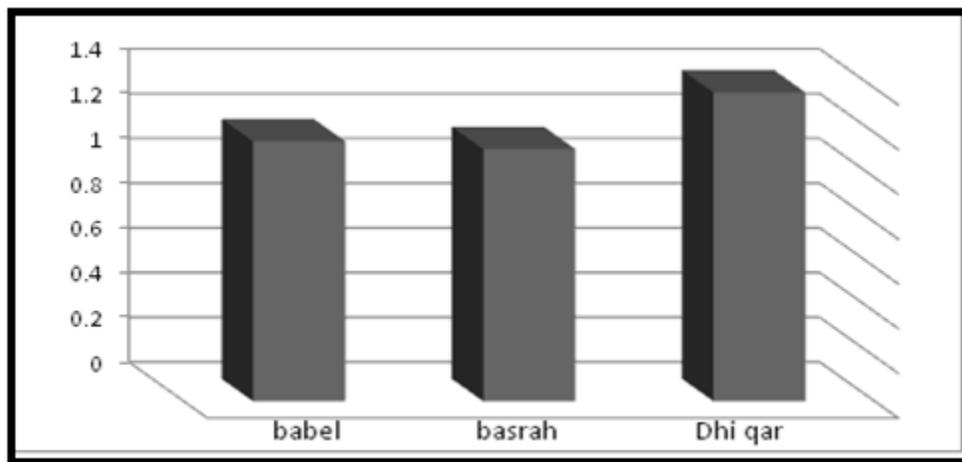


The RLSD value at the probability level is  $0.05 = .3290$

**Figure 1: Calcium concentration ( $\text{mg} / \text{g}$ ) for semisymbiotic septic vaccine in three agricultural sites**

### Concentration Magnesium

The results of the statistical analysis in Fig. 2 showed significant differences in the total concentration of magnesium in the semisemi pollen. The high concentration of semisemi pollen was found at the site of the study Dhi Qar (1.38 mg / g) which was significantly higher than Concentration of magnesium in the Samsemi pollen planted at the sites of Basrah / Abi Al-Khasib and Babel / Hashimiya by 1.02 and 1.16 mg / g respectively. This may be due to the low salinity of irrigation water at the Dhi Qar / Plant nutrient readiness (Soliman and Al-Obeed, 2013).

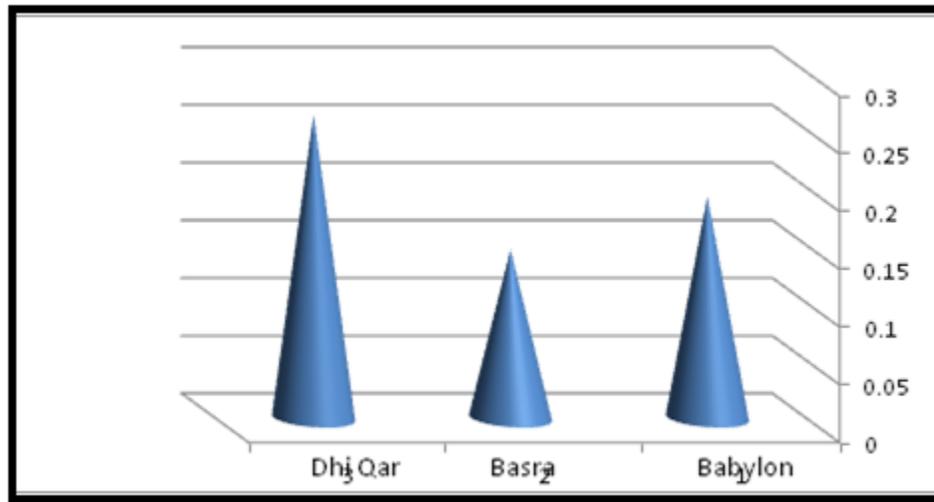


The RLSD value at the probability level is 0.05 = 0.1150

**Figure 2: Concentration of magnesium (mg / g) for Samsemi pollen in three agricultural sites**

### Boron Concentration

The results in Fig. 3 show that the concentration of boron in the semisemi pollen differed significantly in the study sites and that the highest concentration of boron was achieved in the Samsemi pollen plant grown at Dhi Qar (0.263 mg / g) and significant differences in relation to the concentration of boron at the sites of Basra / Abi al-Khasib and Babylon / Hashimiyah, where the concentration of boron is 0.146 and 0.192 mg / g respectively. And the characteristics of agricultural soils which have a major role in determining the readiness of plant nutrients.



The RLSD value at the probability level is 0.05 = 0.0433

**Figure 3: Concentration of boron (mg / g) for Samsemi pollen in three agricultural sites**

Table (4) and Figure (1) show the effectiveness of ethanolic extract of the semisemi pollen towards the growth of both *Candida albican* and *Aspergillus Niger*, which varied according to the concentration of the extract. It was observed that *Candida albican* Was significantly affected by the high concentration of plant extracts under study. The ethanolic extract at 200 mg / L showed a "significant" effect in inhibiting the growth of *Candida albican* with a diameter of 15 mm inhibition relative to other concentrations of plant extract While the rate of growth inhibition of *Aspergillus Niger* was 10 mm achieved with concentrations (100 and 200) mg / l of the ethanol extract under study. This may be due to the inclusion of these extracts on substances that have the potential to inhibit the growth of certain microorganisms, especially phenolic substances, as well as the effect Other active aggregates such as alkaloids, flavonoids, resins, and tannins make the ethanol extract concentrations of semisemic sebum vaccine effective for experimental Biology (Saumendu et al. 2012).

**Table 4: The inhibitory effectiveness of the pollen extract towards *Candida albican* and *Aspergillus Niger* (mm)**

Diameter Inhibition (mm)		Concentration of the extract mg / L
<i>Aspergillus Niger</i>	<i>Candidia albican</i>	
0	0	0
5	7	50
10	12	100
10	<b>15</b>	200
2.632	2.375	( p = 0.05 ) RLSD



**Figure 1: Biological Effect of Samismi Pollen Extract**

## REFERENCES

- Al-Rawi, K. M. and Khalaf Allah, A.A. 2000. Design and Analysis of Agricultural Experiments, Second Edition, Mosul University, Iraq, pp. 268.
- Al Tamimi, E.H.H. 2012. Effect of soil characteristics and quality of irrigation water in the growth of date palms. Kufa Journal of Agricultural Sciences., IV(2): 305-314..
- Al umary, S.F.S. 2016. Estimate proline and carotenoids in pollen grains of some varieties of date palm *Phoenix dactylifera* L. Journal of the University of Thi qar for Agricultural Research. (1) 5:287-298.
- Aly, H.S.H. 2018. Evaluation of pollen grains germination, viability and chemical composition of some date palm males Middle East Journal of Agriculture .07(2): 235-247.
- Bates, L.w and Teare, I. 1973. Rapid determination of free proline for water stress studies plant and soil, 39: 205 -207.
- BISHERM. and DEOUSOUKEY S., 2012. Comparative study of the nutritional value of four types of egyptien palm pollens. Journal of Pharmacy and Nutrition sciences 2: 50-56.
- CHAO C. T. and KRUEGER R. R., 2007. The date palm (*Phoenix dactylifera* L.): Overiw of biology, uses, and cultivation. HortScience 42 (5): 1077-1089.
- Hassan, H.M. 2011. chemical composition and nutritional value of palm pollen Grains. Global J. of Biotechnology and Biochemistry 6(1):1-7 .

- IQBAL M., NIAMATULLAH M. and MUNIR M. 2012. Effect of various dactylifera males pollinizer on pomological traits and economical yield index of cv's shakri,zahidi and dhakki date palm (phoenix dactylifera L.). *The Journal of Animal &Plant Sciences*, 22(2): 376-383.
- ISMAIL O.M., 2014. Biological and Chemical Sciences In Vitro Germination of Date Palm Pollen Grains Affected By Different Sugar Types. *Research Journal of Pharmaceutical*, 5 (1):880-886.
- Jassim, A. M., Arkan Y. Y.and Al-Jibouri S . M.2000. Use the technique of neutron activation analysis to estimate protein and mineral elements in pollen for different types of palm males. *Basrah Journal of Agricultural Sciences*, Volume 13( 1): 41-55.
- LIU L., HUANG L. and Li Y. 2013. Influence of Boric Acid and Sucrose on the Germination and Growth of Areca Pollen. *American Journal of Plant Sciences*, 4: 1669-1674.
- Nair, R.; T. Kalariya and C.Sumitra.2005. Antibacterial activity of some selected indian medicinal flora. *Turk. Jou. Biol.* 29: 41-47.
- Saumendu, D. R.; Apu, T.; Dhruvajyoti, S.; Arunav, K.; Anupam, B. and Bidyut D.2012. Antimicrobial potential of volatile oil isolated from some traditional ndian spices. *Int. Res. J. of Pharm.* 3(4): 162-163.
- Shah,A. and Shahsavar, A.R. 2017. Evaluation of morphological characteristics of pollen grains and inflorescence in several male Date Palm tree cultivars. *Iranian J. Hort. Sci. and Technology*, 18 (2): 103 – 114.
- Soliman, S.S. and Al-Obeed, R.S. 2013. Investigations on the pollen morphology of some date palm males (phoenix dactylifera L.) in Saudi Arabia. *Australian Journal of Crop Science* 7(9):1355- 1360.
- Sweden, S. Y. and Ati , M.A. 2011. Determination of the mineral content of four components in two date palm cultivars. *Basra Journal for Palm Date Research*, 10, ( 1): 92-102.