

Supplementary materials

Bio-insecticide of *Thymus vulgaris* and *Ocimum basilicum* extract from cell suspensions and their inhibitory effect against serine, cysteine, and metalloproteinases of the Red Palm Weevil (*Rhynchophorus ferrugineus*)

Hossam Moustafa Darrag^{1,2}, * Mohammed Refdan Alhajhoj³, and Hany Ezzat Khalil^{4,5}

¹ Research and Training Station, King Faisal University, Al-Ahsa 31982, Saudi Arabia; hdarag@kfu.edu.sa

² Pesticide Chemistry and Technology Department, Faculty of Agriculture, Alexandria University, Egypt; hdarag@kfu.edu.sa

³ Arid Land Agriculture Department, College of agricultural and Food Sciences, King Faisal University, Al-Ahsa 31982, Saudi Arabia; malhajhoj@kfu.edu.sa

⁴ Department of Pharmaceutical Sciences, College of Clinical Pharmacy, King Faisal University, Al-Ahsa 31982, Saudi Arabia; heahmed@kfu.edu.sa

⁵ Department of Pharmacognosy, Faculty of Pharmacy, Minia University, Minia 61519, Egypt; heahmed@kfu.edu.sa

* Correspondence: hdarag@kfu.edu.sa; Tel.: +966508299027

Table S1. The weight of the callus and the cell suspension produced from *T. vulgaris* and *O. basilicum* at different times of germination in artificial solid MS and liquid LS media with and without infection by *V. dahliae*.

Age of Callus (days)	Weight of Callus (g)/Petri dish \pm SD			
	<i>T. vulgaris</i>		<i>O. basilicum</i>	
	Without Infection	With Infection	Without Infection	With Infection
5	2.16 ^p \pm 0.03	2.96 ⁿ \pm 0.07	2.24 ^l \pm 0.14	3.41 ^k \pm 0.06
10	2.87 ^o \pm 0.03	3.23 ^m \pm 0.01	3.29 ^k \pm 0.23	4.29 \pm 0.01
15	3.49 \pm 0.03	4.18 ^k \pm 0.04	4.37 \pm 0.02	5.85 ^h \pm 0.08
20	4.25 ⁱ \pm 0.01	4.82 \pm 0.01	5.22 \pm 0.02	6.32 ^g \pm 0.04
25	5.17 ^h \pm 0.04	5.87 ^g \pm 0.04	6.17 ^g \pm 0.09	8.31 ^d \pm 0.13
30	5.96 ^f \pm 0.06	6.74 ^d \pm 0.04	6.76 ^f \pm 0.10	8.85 ^c \pm 0.10
35	6.26 ^e \pm 0.03	7.23 ^b \pm 0.01	7.27 ^e \pm 0.01	9.83 ^b \pm 0.04
40	7.11 ^c \pm 0.01	7.80 ^a \pm 0.02	8.25 ^d \pm 0.10	10.51 ^a \pm 0.06
<i>F</i>	7515		2028	
Df	15,32		15,32	

Sample (at intervals in days)	Weight of Cell Suspension (g)/200 mL media \pm SD			
	<i>T. vulgaris</i>		<i>O. basilicum</i>	
	Without Infection	With Infection	Without Infection	With Infection
5	1.45 ^m \pm 0.04	2.32 ^k \pm 0.01	1.91 ^o \pm 0.07	2.46 ^m \pm 0.06
10	1.92 ^l \pm 0.02	2.99 ⁱ \pm 0.02	2.26 ⁿ \pm 0.05	3.15 \pm 0.04
15	2.37 \pm 0.03	3.14 ^h \pm 0.05	3.27 ^k \pm 0.04	4.28 ^h \pm 0.04
20	3.11 ^h \pm 0.01	3.94 ^g \pm 0.04	3.36 \pm 0.03	4.86 ^g \pm 0.04
25	3.95 ^g \pm 0.03	4.55 ^d \pm 0.01	4.14 \pm 0.07	5.21 ^f \pm 0.02
30	4.23 ^f \pm 0.03	5.00 ^c \pm 0.01	5.19 ^f \pm 0.05	6.34 ^e \pm 0.06
35	4.43 ^e \pm 0.01	5.26 ^b \pm 0.04	5.62 ^e \pm 0.04	7.03 ^b \pm 0.07
40	5.03 ^c \pm 0.02	5.35 ^a \pm 0.04	6.24 ^d \pm 0.11	7.42 ^a \pm 0.05
<i>F</i>	5760		2700	
Df	15,32		15,32	

Data are averages \pm SD of three replicates. Values followed by the same letter within a column are not significantly different ($P \leq 0.0001 \equiv$ V.H.Sig. for all values) according to the Student–Newman–Keuls (SNK) test. F: F ratio, df: degree of freedom, P: p-value (significance of the F ratio).

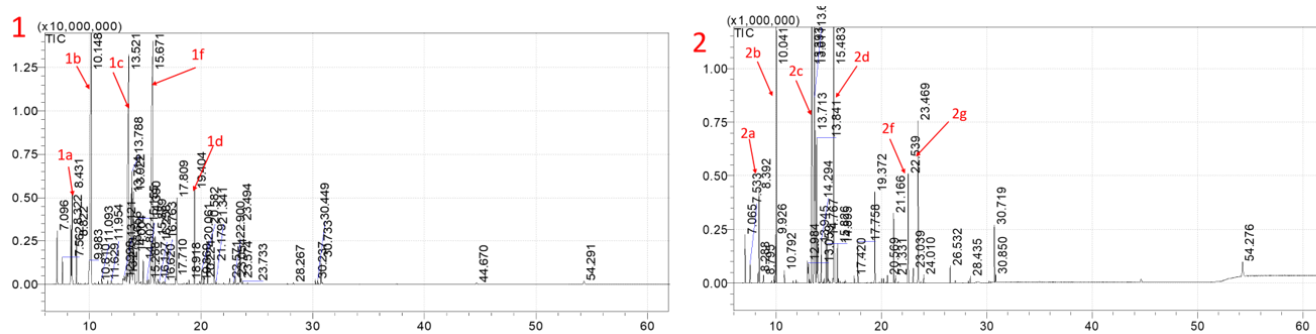


Figure S1. GC-MS Chromatogram of (1) *T. vulgaris* and (2) *O. basilicum* cell suspension extracts after 40 days, (1a) p-cymene, (1b) γ -terpinene, (1c) linalool, (1d) β -caryophyllene, (1f) thymol, (2a) β -terpineol, (2b) (*E*)- β -ocimene, (2c) 1,8-cineole, (2d) Estragole, (2f) eugenol and (2g) germacrene D