

Table S1. Contact toxicity to insects of the 17 essential oil components used in our studies.

Essential oil	Insect	Scientific Name	LD ₅₀ /LC ₅₀	Reference
R-Limonene	House fly	<i>Musca domestica</i> (Diptera: Muscidae)	68 µg/fly	[35]
	Maize weevil	<i>Sitophilus zeamais</i> (Coleoptera: Curculionidae)	29.86 µg/ insect	[59]
	Red flour beetle	<i>Tribolium castaneum</i> (Coleoptera: Tenebrionidae)	20.14 µg/insect	[59]
	Rice weevil	<i>Sitophilus oryzae</i> (Coleoptera: Curculionidae)	477.19 µg/cm ²	[60]
	Red flour beetle	<i>Tribolium castaneum</i>	478.46 µg/cm ²	[60]
	Tobacco cutworm	<i>Spodoptera litura</i> (Lepidoptera: Noctuidae)	273.7 µg/insect	[61]
Carvacrol	House fly	<i>Musca domestica</i>	92 µg/fly	[35]
	House fly	<i>Musca domestica</i>	63 µg/fly	[34]
	German cockroach	<i>Blattella germanica</i> (Blattodea: Ectobiidae)	0.186 mg/insect	[62]
	Tobacco cutworm	<i>Spodoptera litura</i>	42.7 µg/insect	[61]
p-Cymene	House fly	<i>Musca domestica</i>	282.1/insect	[35]
Geraniol	House fly	<i>Musca domestica</i>	73 µg/fly	[35]
	House fly	<i>Musca domestica</i>	103 µg/fly	[34]
	House fly	<i>Musca domestica</i>	45.63µg/fly	[63]
	German cockroach	<i>Blattella germanica</i>	0.832 mg/insect	[62]
	Red flour beetle	<i>Tribolium castaneum</i>	179.35 µg/cm ²	[60]
	Rive weevil	<i>Sitophilus oryzae</i>	28.76 µg/cm ²	[60]
Linalool	House fly	<i>Musca domestica</i>	116 µg/fly	[35]
	House fly	<i>Musca domestica</i>	0.04 µg/fly	
	House fly	<i>Musca domestica</i>	106.88µg/fly	[63]
	House fly	<i>Musca domestica</i>	189 µg/fly	[34]
	Rice weevil	<i>Sitophilus oryzae</i>	66.74 µg/cm ²	[60]
	Red flour beetle	<i>Tribolium castaneum</i>	105.63 µg/cm ²	[60]
	Maize weevil	<i>Sitophilus zeamais</i>	10.46 µg/insect	[64]

Essential oil	Insect	Scientific Name	LD ₅₀ /LC ₅₀	Reference
Eugenol	Maize weevil	<i>Sitophilus zeamais</i>	34 µg/insect	[65]
	Red flour beetle	<i>Tribolium castaneum</i>	174 µg/insect	[65]
	House fly	<i>Musca domestica</i>	77 µg/fly	[35]
	Tobacco cutworm	<i>Spodoptera litura</i>	157.6 µg/insect	[61]
	Wireworm	<i>Agriotes obscurus</i> (Coleoptera: Elateridae)	516 µg/insect	[66]
Thymol	German cockroach	<i>Blattella germanica</i>	0.294 mg/insect	[62]
	House fly	<i>Musca domestica</i>	29 µg/fly	[35]
	House fly	<i>Musca domestica</i>	33 µg/fly	[34]
	Tobacco cutworm	<i>Spodoptera litura</i>	25.4 µg/insect	[61]
	Wireworm	<i>Agriotes obscurus</i>	195.5 µg/insect	[66]
(+)–Pulegone	German cockroach	<i>Blattella germanica</i>	0.122 mg/insect	[62]
	House fly	<i>Musca domestica</i>	39 µg/fly	[35]
	House fly	<i>Musca domestica</i>	78 µg/fly	[34]
	Tobacco cutworm	<i>Spodoptera litura</i>	51.6 µg/insect	[61]
	House fly	<i>Musca domestica</i>	32 µg/fly	[35]
Citronellic acid	House fly	<i>Musca domestica</i>	43 µg/fly	[34]
	German cockroach	<i>Blattella germanica</i>	0.491 mg/insect	[62]
	House fly	<i>Musca domestica</i>	222 µg/fly	[35]
l-Fenchone	Rice weevil	<i>Sitophilus oryzae</i>	291.80 µg/cm ²	[60]
	Red flour beetle	<i>Tribolium castaneum</i>	179.49 µg/cm ²	[60]
	House fly	<i>Musca domestica</i>	214 µg/fly	[35]
(–)-Carvone	House fly	<i>Musca domestica</i>	102 µg/fly	[35]
	House fly	<i>Musca domestica</i>	173 µg/fly	[34]
	Rice weevil	<i>Sitophilus oryzae</i>	28.17 µg/cm ²	[60]
	Red flour beetle	<i>Tribolium castaneum</i>	19.80 µg/cm ²	[60]
	House fly	<i>Musca domestica</i>	176 µg/fly	[34]

Essential oil	Insect	Scientific Name	LD ₅₀ /LC ₅₀	Reference
	House fly	<i>Musca domestica</i>	247 µg/fly	[35]
Estragole	Maize weevil	<i>Sitophilus zeamais</i>	17.63 µg/insect	[64]
	Maize weevil	<i>Sitophilus zeamais</i>	39 µg/insect	[65]
	Red flour beetle	<i>Tribolium castaneum</i>	73 µg/insect	[65]
Camphor	Cigarette beetle	<i>Lasioderma serricorne</i> (Coleoptera: Ptinidae)	11.30 µg/insect	[67]
	Red flour beetle	<i>Tribolium castaneum</i>	54.21 µg/insect	[67]
	Rice weevil	<i>Sitophilus oryzae</i>	>500 µg/cm ²	[60]
	Red flour beetle	<i>Tribolium castaneum</i>	>500 µg/cm ²	[60]
	Maize weevil	<i>Sitophilus zeamais</i>	137 µg/mg	[19]
	Red flour beetle	<i>Tribolium castaneum</i>	887 µg/mg	[19]
Methyl salicylate	Yellow fever mosquito	<i>Aedes aegypti</i> (Diptera: Culicidae)	39700 µg/g	[68]
	African malaria mosquito	<i>Anopheles gambiae</i> (Diptera: Culicidae)	11100 µg/g	[68]
Benzaldehyde	Asian tiger mosquito	<i>Aedes albopictus</i> (Diptera: Culicidae)	47.0 µg/ml	[69]

Table S2. Chemical structure and properties of essential oils and individual components.

Chemical	Density (g/mL at 25°C)	Assay %	Boling point (°C)	Log P	Log (vapor pressure) Log10 (mmHg)
Alcohols					
Geraniol	0.879	98.0	229	2.89	-1.52
Linalool	0.870	97.0	194	2.68	-0.80
Phenols					
Carvacrol	0.976	98.0	236	3.20	-1.90
Eugenol	1.067	99.0	254	2.66	-1.65
Thymol	0.965	99.0	232	3.16	-2.66
Ketone					
(-)-Carvone	0.960	99.0	228	2.77	-0.99
(+)-Fenchone	0.945	99.5	63	2.54	-0.09
(+)-Pulegone	0.935	99.5	223	2.36	-0.91
(1S)-(-)- verbenone	0.975	93.0	227	2.30	-0.60
Camphor	0.992	96.0	204	2.85	-0.19
Aldehyde					
Benzaldehyde	1.045	99.5	178	1.60	0.10
Acid					
Citronellic acid	0.923	98.0	121	2.88	-2.74
Hydrocarbons					
p-Cymene	0.860	99.0	176	4.17	0.16
(R)-(+)-limonene	0.842	99.5	176	4.50	0.19
γ-Terpinene	0.850	99.5	182	4.36	0.04
Ether					
Estragole	0.965	99.5	215	3.23	-0.93
Ester					
Methyl salicylate	1.174	99.0	222	2.07	-1.47