

ABSTRACT

This study was carried out to determine the toxicity of four insecticides, e.g. Dursban, Imidagold, Achook and Piresan plus. The effect of their binary mixtures with and without a plant source substance, against the second instar larvae and newly emerged adults of the house fly *Musca domestica* L., were also evaluated using laboratory and field strains collected from Cairo and Fayoum governorate. The LC₅₀'s of Imidagold, Achook, Dursban and Piresan plus against the house fly larvae were 59.06, 85.62, 258.30, and 290.49 ppm, respectively, 48h post treatment. Twenty four hours post treatment, the LC₅₀'s of Dursban, Piresan plus, Achook and Imidagold, against adult *M. domestica* were 20.14, 84.21, 99.63 and 270.29 ppm, respectively. Achook was the most effective insecticide and Imidagold was the least one against *M. domestica* the larvae, where their LC₅₀'s were 29.62 & 362.66 for the Cairo strain; and 62.296 & 434.083 ppm, for the Fayoum strain, respectively, 48h post treatment. Regarding the adult treatments, Achook was the most effective insecticide, while Dursban was the least effective one, having LC₅₀'s of 114.3 and 388.99 ppm, respectively, for the Cairo strain while with the Fayoum strain, Imidagold was the most effective insecticide and Dursban was the least one, having LC_{50s} of 206.129 and 609.353 ppm, respectively, 24h post treatment.

The binary mixtures of Dursban/Imidagold, Imidagold/Achook at the ratios of 1:1, 2:1 and Piresan plus/Dursban (at 1:1) showed potentiation against the adults, 48h post treatment. Concerning the binary mixtures of the tested

insecticides and the Chamomile oil against *M. domestica* larvae, Dursban with Chamomile oil at all ratios and Piresan plus/Chamomile oil (at 2:1) gave synergistic effects with the laboratory strain. On the other hand, when the mixture of Dursban/Garlic oil was used at the ratio of 1:2, the mortality increased from 25 % to 44%. Results revealed also that the mixture of Piresan plus/Garlic oil (at1:1) showed a highly synergistic action; while the mixtures of Dursban, Achook and Piresan plus with Watercress oil showed synergistic effects at the ratio of 2:1. The mixture of Dursban/Lantana leaves extract when used at all ratios and Imidagold/Lantana leaves extract at the ratios of 1:2, and 2:1, exhibited synergistic actions. In addition, the mixtures of Achook and Piresan plus with Lantana leaves extract showed synergistic effects at the ratios of 1:2 and 2:1 against *M. domestica* larvae of the laboratory strain. The treatment with the mixtures of Dursban or Imidagold with Chamomile oil at the ratio of 2:1 and with the mixtures of Achook or Piresan plus with the Chamomile oil at the ratio of 1:2 showed synergistic actions. The mixtures of Dursban, Imidagold and Piresan plus with Lantana flowers extract showed synergistic actions at the ratio of 1:2. In addition, the mixtures of Imidagold or Achook with Lantana leaves extract showed synergistic effects at the ratio of 2:1 against *M. domestica* adults of the laboratory strain.

The effect of binary mixtures of the tested insecticides against larvae of the Fayoum and Cairo field strains were recorded 48h post treatment. The mixture of Dursban/Imidagold showed potentiation at the ratio of 1:1, against the Fayoum strain, but the same ratio gave an additive effect against the 2nd

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instar larvae of the Cairo strain. The mixtures of Piresan plus/Chamomile oil (at 1:2), Dursban/Lantana flowers extract (at 1:2) and Imidagold/Lantana leaves extract (at 2:1) exhibited synergistic effects against the Cairo and Fayoum field strains of adult *M. domestica* , 24h post treatment.

No significant changes were observed among the protein contents of the laboratory, Fayoum and Cairo strains. The esterase activity increased significantly in adults of Fayoum and Cairo field strains in comparison with the laboratory strain. The activity of the Acetylcholinestrerase enzyme decreased significantly in the Fayoum and Cairo comparable with the laboratory strain. The Glutathione-S-transferase activity increased significantly in the Fayoum field strain compared with the laboratory strain. On the other hand, the Glutathione-S-Transferase decreased significantly in the Cairo strain compared with the laboratory strain.

Keywords: *Musca domestica*, insecticides, essential oils, plant extracts, joint action.