Second Article: Sharing with another inside dan outside the specialization– Published

Article title	**The Binary Mixtures of Lambda-Cyhalothrin, Chlorfenapyr, and Abamectin, against the House Fly Larvae, *Musca domestica* L.**
Participants	El Sherif, D. F[1]., Soliman, N. H.[1], Alshallash, K. S[2]., Ahmed, N[3]., Ibrahim, M. A. R.[4], A. Al-Shammery, K[5]., and Al-Khalaf, A. A[6]. [1]Plant Protection Dept., Fac. of Agric., Fayoum Univ., Fayoum, Egypt. [2,5,6] Universities in Saudi Arabia. [3]Plant Protection Dept., Fac. of Agric., Benha Univ., Benha. [4]Biochemistry Dept., Fac. of Agric., Ain Shams Univ., Cairo.
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ABSTRACT

The house fly *Musca domestica* L. is one of the medical and veterinary pests that can develop resistance to different insecticides. Mixing insecticides is a new strategy for accelerating pest control; furthermore, it can overcome insect resistance to insecticides. This study aims to evaluate three insecticides, chlorfenapyr, abamectin, and lambda-cyhalothrin, individually and their binary mixtures against 2nd instar larvae of *M. domestica* laboratory strain. Chlorfenapyr exhibited the most toxic effect on larvae, followed by abamectin then the lambda-cyhalothrin. The half-lethal concentrations (LC_{50}) values were 3.65, 30.6, and 94.89 ppm, respectively. These results revealed that the high potentiation effect was the mixture of abamectin/chlorfenapyr in all the mixing ratios. In contrast, the tested combination of lambda-cyhalothrin/abamectin showed an antagonism effect at all mixing ratios against house fly larvae. The total protein, esterases, glutathione-S-transferase (GST), and cytochrome P-450 activity were also measured in the current investigation in the larvae treated with chlorfenapyr. Our results indicate that GST may play a role in detoxifying chlorfenapyr in *M. domestica* larvae. The highest activity of glutathione-S-transferase was achieved in treated larvae with chlorfenapyr, and an increase in cytochrome P-450 activity in the larvae was observed post-treatment with Abamectin/chlorfenapyr.

نائب رئيس الجامعة لشئون الدراسات العليا والبحوث
والمشرف على الكلية
أ.د/ عـرفة صبرى حسن

رئيـــس القســم
أ.د/ أيمــن أحمد عويس