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[TOP](#) > [Available Issues](#) > [Table of Contents](#) > [Abstract](#)

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A novel function of housefly glutathione *S*-transferase 6B—Its effect on the retention and increase of insecticidal activity of the insecticide prothiofos

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Abstract:

Housefly glutathione *S*-transferases 1, 3, 4, 6A and 6B were obtained from organophosphorus (OP)-resistant Yachiyo and susceptible Takatsuki strains, respectively. Over 90% homology was found between isozymes 6A and 6B but their functions differed in desethylation metabolism. Yachiyo-6A produced more desethyl product of diazinon oxon than Takatsuki-6A, thus suggesting that it plays a central role in the development of *O*-alkyl phosphate-type OP resistance. On the other hand, unlike Takatsuki-6B, Yachiyo-6B barely achieved the desethylation of prothiofos oxon and the resultant effect was more in the direction of resistance suppression. However, the chief role played by 6B with regard to prothiofos was the exclusive desethylation of *S*-oxide, which is the oxidative product of prothiofos oxon, thus giving desethyl *S*-oxide with insecticidal activity and bringing forth a novel active intermediate along with *S*-oxide. © Pesticide Science Society of Japan

Keywords:

housefly glutathione *S*-transferase, GST6A and 6B, resistance suppression, oxidative glutathione conjugation of prothiofos oxon, desethyl *S*-oxide of prothiofos oxon

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