

Ecofriendly synergists for insecticide formulations (EcoSyn): *in vivo* and *in vitro* evaluation of novel synergists against *Musca domestica*



Introduction

In vivo assays were carried out to evaluate the performance against *Musca domestica* L. (Diptera, Muscidae) adults of novel potential synergists in combination with a pyrethroid insecticide.

The inhibitory effect of these new compounds was evaluated biochemically against enzymes involved in degradation of xenobiotics (oxidases and GSTs).

Materials and Methods

Bioassays

Contact tests using a glass surface sprayed with a commercial formulation of cypermethrin alone or in combination with the new synergists.

Biochemical analysis

Total activity and inhibition was determined using 7-ethoxycoumarin (7EC) for oxidases and the 1-chloro-2,4-dinitrobenzene (CDNB) for GSTs.

Results

Bioassays

All synergists, assayed *in vivo* against a moderately resistant population (Hun_A), showed a high level of efficacy and EN1-126 achieved the best performance (Figure 1).

Biochemical analysis

The Hun_A and Hun_B populations showed similar oxidase and GST activities, always higher than those of the susceptible reference strain S-WHO (Figure 2). PBO and novel synergists (except "EN16-55") significantly inhibited activity of oxidases. On the contrary only "EN16-55" inhibited GST activity (Figure 3).

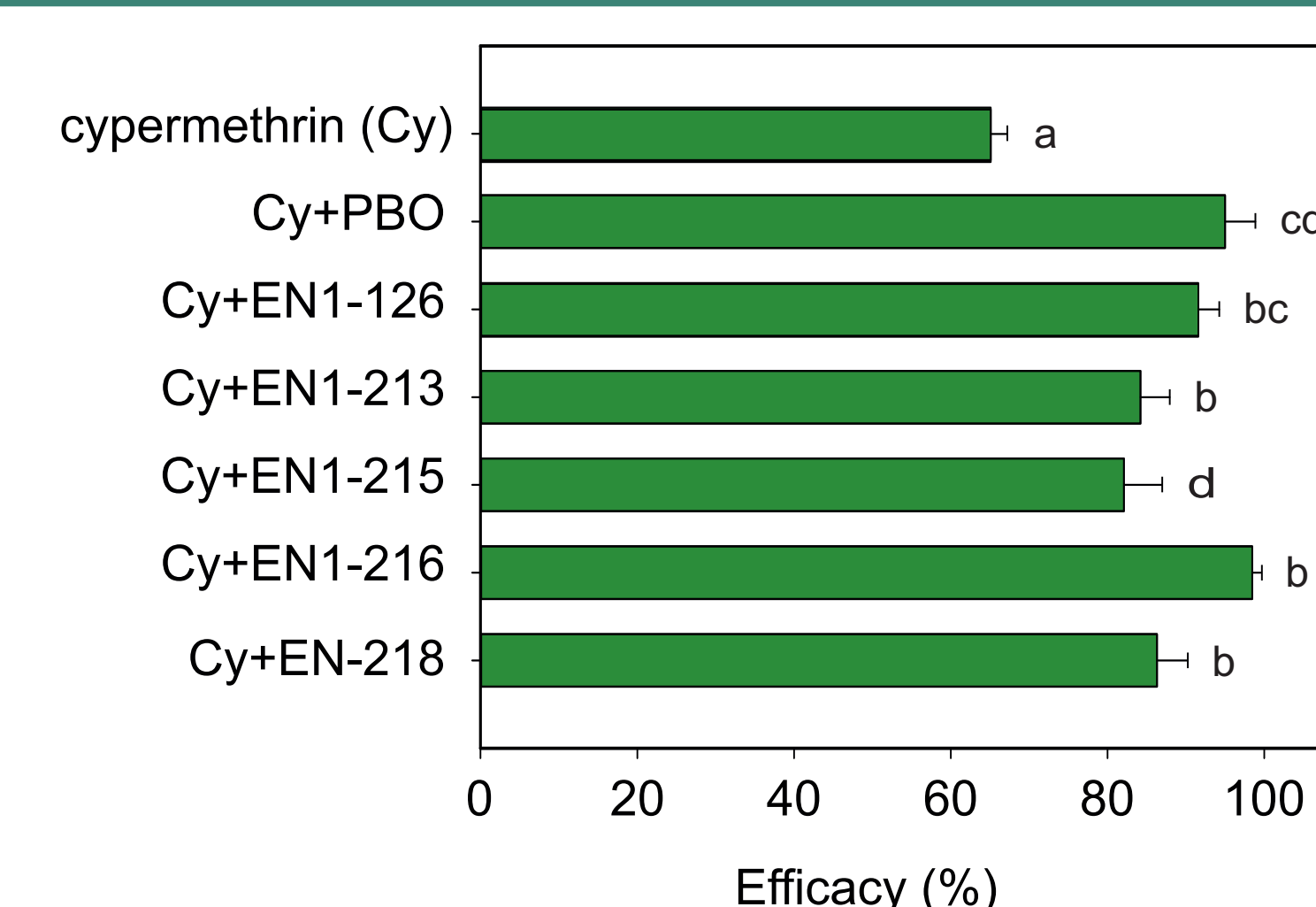


Figure 1 Efficacy (%; Abbott) of cypermethrin and cypermethrin plus synergists in residual bioassays.

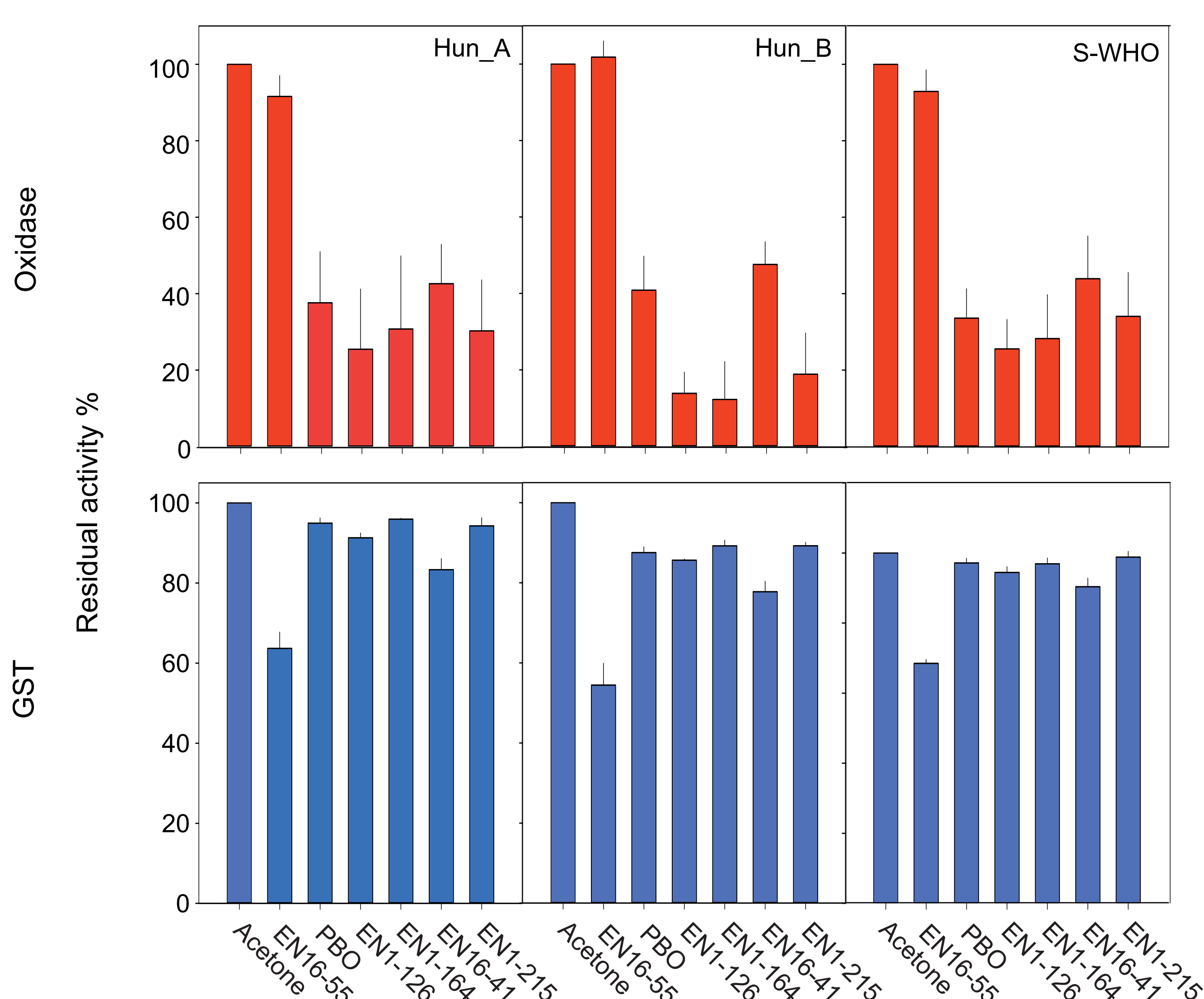


Figure 3 Biochemical analysis: A) total oxidase (red) and GST (blue) activities; B) oxidase (red) and GST (blue) inhibition assays.

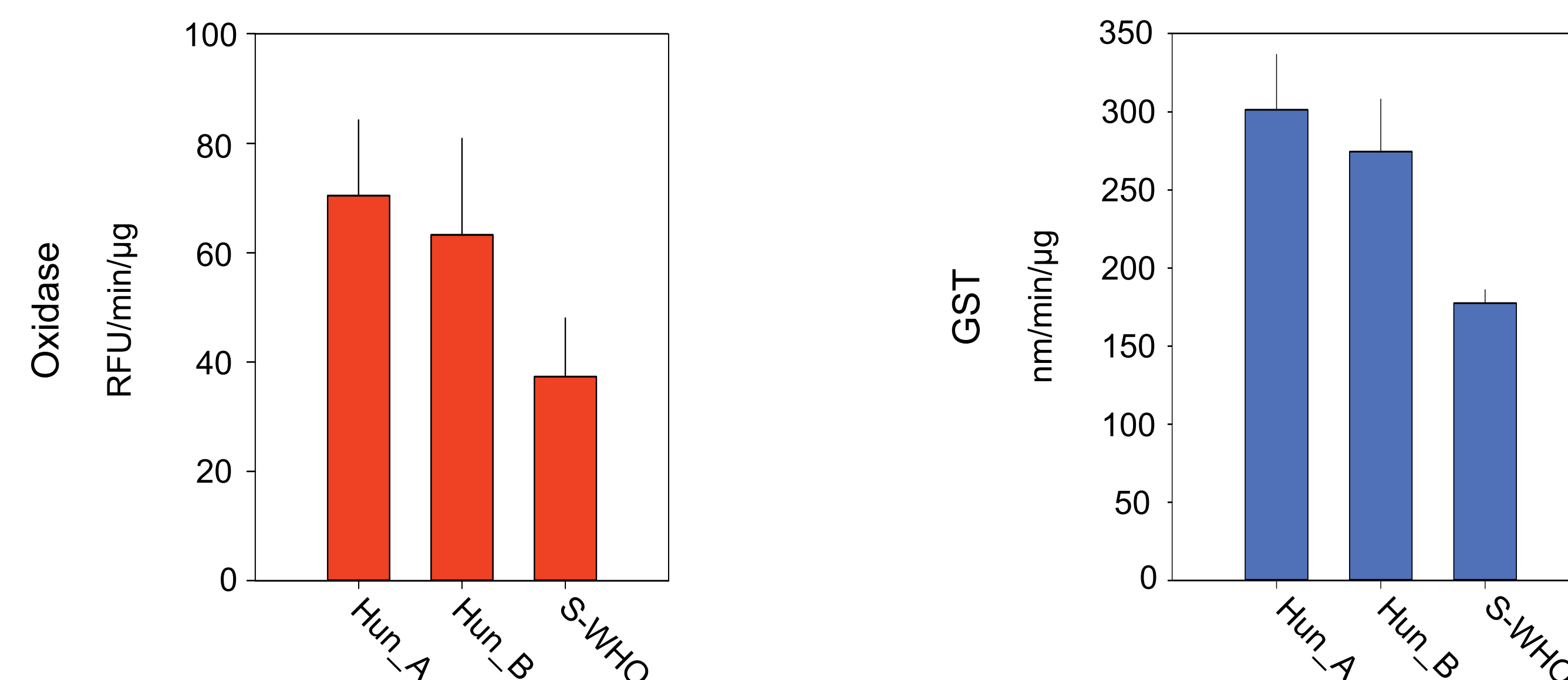


Figure 2 Biochemical analysis: total oxidase (red) and GST (blue) activities.

Discussion

Novel synergists increased significantly the efficacy of cypermethrin demonstrating the possibility to have product performing better than PBO. Different structures showed specificity towards different detoxification systems.

