

Side effects of triazoles on treated crops

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Abstract

Triazolic fungicides are widely applied in crop production to protect plants against fungal pathogens. However, they may influence the biochemical processes in plants and other non-target species. This paper is aimed at the effect of triazoles (namely tebuconazole, cyproconazole, and penconazole) single/mixed applications on the phenolics production in tomato (*Solanum lycopersicum* L.) fruit peel, amount of chlorophyll *a* and *b* in tomato leaves as well as on basic plant growth parameters. For this purpose, cherry tomatoes were planted in the pot experiment and foliarly-treated weekly, with the same total triazoles dose of 3.52 μmol per plant (in mixtures of 1.71 or 1.17 μmol of each in two or three components, respectively). The treatments increased the weight of fruits in the 1st harvest about 43%, however, this effect was not observed in the next harvest. Increased oxidative stress in the triazoles presence was observed, based on the elevated production of antioxidant phenolics in the 1st harvest. Most alarming is the decrease of the weight of thin stems and foliage and the concentration of chlorophyll *a* (*b*) in leaves in all triazoles-treated variants. The non-target impacts on plant biochemical processes (related to the phenolics or chlorophylls production and functionality) were confirmed.

Keywords

chlorophylls; foliar treatment; group interactions; phenolic compounds; photosynthesis; redox conditions; *Solanum lycopersicum* ; tomato; triazolic mixtures

Acknowledgement

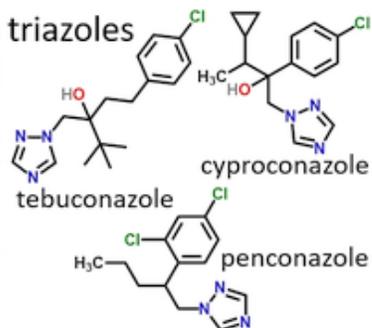
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Graphical abstract

No treatment



Treatment with triazoles



Increased – fruits, total yield, *p*-coumaric acid, hesperidin, quercetin
Decreased – green biomass, salicylic acid