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Effect of a zero-residue crop protection strategy on yield, fruit quality and pre- and post-harvest diseases of strawberries

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Abstract

Growing concerns regarding environmental and health risks associated with synthetic pesticides residues, together with the adoption of a stricter legislation, are favouring the reduction of pesticide use in agriculture. A zero-residue crop protection strategy was developed and evaluated for the control of diseases of strawberries, in the field and during storage. Two trials were performed in two strawberry farms, located in northern Italy. The zero-residue crop protection strategy was compared to a conventional strategy. Data gathered in field for leaf spots and rotten stems showed no significant differences between the strategies in either farm. Similarly, analyses of total soluble solids, titratable acidity, firmness and colour, as well as yield, showed no difference between the strategies in either farm. Pesticide residue analyses showed undetectable levels of all the pesticides in the zero-residue fruit, except for fosetyl-AI, which has a long degradation time. Even after two years from the last application, the molecule was found in the fruit, though at low levels. Postharvest rots incidence was very low for both strategies in the farm adopting a high number of pesticide treatments, whereas a higher incidence was found in the zero-residue strategy (7%) compared to the conventional one (2%) in the farm adopting a low number of pesticide treatments. The fungi isolated from postharvest rots were mainly *Botrytis cinerea* (92%), followed by *Penicillium* spp. (7%) and *Colletotrichum* spp. (1%). Overall, this study showed that a zero-residue strategy has no negative repercussion on disease management and fruit quality, with the added benefit of a reduced residue amount in the final product.

Keywords: Pesticides residues, postharvest disease, fruit quality, strawberry, *Botrytis*