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The contribution of non-thermal and advanced oxidation technologies towards dissipation of pesticide residues

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Abstract*Background*

The use of pesticides has stabilised the food production to a great extent and their usage cannot be avoided anymore. Nevertheless, common food processing operations always allowed dissipating pesticide residues in foods to some extent. Within the food science community and the food processing sector, non-thermal food technologies are being researched and commercialised at a great pace over the past three decades.

Scope and Approach

In this review we provide a critical analysis of the literature pertinent to the fate of pesticide residues during non-thermal processing of solid and liquid foods. We also identify the opportunities for further development and provide guidelines for future research. The non-thermal technologies considered include high pressure processing, pulsed electric fields and advanced oxidation processes (AOPs) such as ozone, ultrasound, ultraviolet light, ionising radiation, non-thermal plasma, and their synergy.

Key Findings and Conclusions

In general, information about the fate of pesticides during non-thermal processing of foods is still very scarce. A considerable number of studies have reported the efficacy of AOPs for breakdown of pesticides in food and water; however, information regarding the mechanism of action and toxicity is limited. For industrial adoption and commercial success, researchers are advised to focus their studies through an economic lens.

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