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Editorial: Agrochemicals in agricultural and non-agricultural settings: fate, distribution, and potential human and environmental health hazards

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Editorial on the Research Topic

Agrochemicals in agricultural and non-agricultural settings: fate, distribution, and potential human and environmental health hazards

Global concerns over the extensive use of agrochemicals, including pesticides, herbicides, and fertilizers, have intensified due to their significant impacts on ecological and human health (Parven et al., 2024). Agrochemicals are widely used in agricultural and non-agricultural settings to enhance productivity and manage pests, but their improper use and persistence in the environment pose serious risks (Ramakrishnan et al., 2019). The articles in this Research Topic delve into various aspects of agrochemical use, highlighting the need for innovative approaches to mitigate their adverse effects.

He et al. presents an evolutionary game approach to promoting the reduction of pesticide and fertilizer use by agricultural enterprises. This study analyses the decision-making processes of different stakeholders, including the government, agricultural enterprises, and consumers, under varying influencing factors. The findings suggest that reward measures by the government significantly impact the adoption of sustainable practices by agricultural enterprises. This research provides valuable insights into policy mechanisms that can encourage the reduction of agrochemical use, contributing to food safety and environmental protection.

Chen et al. focus on the residue determination and dietary risk assessment of mesotrione, nicosulfuron, atrazine, and its metabolites in maize. Using advanced analytical methods, this study evaluates the residues of these herbicides in maize from different locations in China and assesses the chronic dietary risks. The results indicate that the residues are within acceptable limits, guiding the rational use of these herbicides to ensure safe maize production. This research underscores the importance of monitoring and managing agrochemical residues to protect human health.

Dione et al. investigate the levels of pesticide residues in tomatoes sold in urban markets of Ouagadougou, Burkina Faso. This study reveals significant contamination,

with a high percentage of samples containing residues of commonly used pesticides, some exceeding maximum residue levels. The findings highlight the urgent need for better pesticide regulation and consumer safety measures to address the health risks associated with pesticide residues in vegetables. This research emphasizes the importance of stringent monitoring and regulation of pesticide use in urban agriculture.

Phan et al. examine the pesticide regulatory environment for pollinator protection across different geographical regions. Comparing approaches in the United States, the European Union, and selected Asian countries, this perspective highlights the diverse regulatory frameworks and their effectiveness in safeguarding pollinators. The study advocates for comprehensive and proactive pesticide regulations to mitigate non-target risks and protect pollinator populations. This research is crucial for informing global pesticide policies and promoting sustainable agricultural practices.

The articles in this Research Topic collectively address the complex challenges associated with agrochemical use in various settings. They emphasize the need for integrated pest management practices, innovative policy mechanisms, and robust regulatory frameworks to ensure the safe and sustainable use of agrochemicals. By understanding the fate and distribution of these chemicals and their potential health and environmental impacts, we can develop strategies to mitigate risks and promote a healthier future for both humans and ecosystems.

In conclusion, while agrochemicals have played a vital role in enhancing agricultural productivity, their widespread use presents significant challenges. The research presented in this Research Topic provides valuable insights into the risks associated with agrochemicals and offers potential solutions to address these challenges. It is imperative to continue exploring sustainable alternatives and regulatory measures to safeguard human health and the environment.

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