

Plant Wearable Pesticide Biosensor for Smart Agriculture

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Smart agriculture has significantly improved the efficiency of crop production management and resource utilization. During the production process, the application of pesticides, along with their subsequent residues and migration within the plant living system, continues to pose a persistent risk of food safety and environmental pollution. Hence, it is imperative to establish a comprehensive management system that covers the entire lifecycle of pesticide use including application, monitoring, and degradation, controlling pollution at the source and ensuring the sustainable development of agriculture.

In the present contribution, we report a series of high-performance enzyme-based plant wearable biosensors that enable rapid on-site detection of pesticides. The sensors based on the enzyme@framework as the sensing unit and hydrogel as supporting matrix exhibited ultrahigh sensitivity (ppb level) and stability (for one month) to organophosphorus pesticides. We provide new strategy for achieving highly sensitive enzyme-based pesticide sensing in areas such as sensor material design, investigation of sensitization mechanisms and the development of new analytical platforms.

Keywords: Biosensors; Enzyme; Hydrogel; Pesticide

References

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