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The mechanism study of migration, transformation and selective removal of Pyrethroid residues in aquaculture ecosystem

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Statement of the Problem: Pyrethroids are usually applied to control insects and weeds in agriculture and fishery. The serious influence of these compounds on the aquaculture and breeding usually occurs at low residue level because of their endocrine-disrupting properties. Therefore, determining the pollution condition and removal of pyrethroids with endocrine-disrupting properties in aquaculture ecosystem is important to protect the aquaculture ecosystem and eliminate the hazards of pyrethroids to aquaculture and breeding. Methodology & Theoretical Orientation: In this study, the pollution condition, migration, and transformation of pyrethroids were elucidated by simulating a natural tidal flat ecology. Furthermore, the novel molecularly imprinted nanostructured polymers (MIPs) were fabricated by surface grafting technique and used as carrier of pyrethroid-degrading bacteria. Findings: The novel MIPs were developed and successfully used as carrier of pyrethroid-degrading bacteria, which can improve the degrading efficiency of specific trace pyrethroid. Furthermore, the degradation efficiency was investigated according to the migration and transformation characteristics of pyrethroid influenced by the immobilized bacteria onto the fabricated MIPs. Conclusion & Significance: The results obtained in this study could provide the theoretical and technological support to eliminate the hazards of pyrethroids with endocrine-disrupting compounds in aquaculture ecosystem and aquatic products.

Biography

Shi Xizhi developed the extraction technique based on the molecularly imprinted polymer and molecularly imprinted membrane with high selectivity to pyrethroids with endocrine-disrupting properties, and obtained reliable analytical method based on GC-MS/MS for multi-residue determination of them in aquatic products and aquaculture environment. Meanwhile, the impact of their residues on the aquatic biology and environment is likely to become more apparent. Therefore, they isolated the degradation bacteria, and developed immobilization technique based on molecularly imprinted polymer, which successfully applied to the bioremediation of trace pyrethroids residue in aquaculture environments.

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