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Wastewater based surveillance of fungi and mycotoxins

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Wastewater and environmental surveillance (WES) has emerged as a powerful tool for monitoring population-level health and environmental exposure. Although WES is widely used for viruses, bacteria and chemical biomarkers such as pharmaceuticals and illicit drugs, its potential for tracking fungal communities and associated mycotoxins within a One Health framework has not been fully realized.

This study surveys the mycobiome and mycotoxins in urban wastewater. Over the course of one year, composite wastewater samples were collected from wastewater treatment plants serving three German cities of different sizes. The composition of the fungal community was characterized through high-throughput sequencing. In parallel, a SPE-UHPLC-MS/MS method was used for the targeted quantitative analysis of selected mycotoxins.

The wastewater mycobiome across all sites showed low seasonality and a dominance of yeasts and yeast-like members. Fungal pathogens and mycotoxin producers were rare if present at all, and most of the mycobiome members were derived from human or environmental sources. Thirteen out of the 35 screened mycotoxins were detected, with several being identified consistently across all seasons, including enniatins, tenuazonic acid, and more site-specific toxins. Combining wastewater mycobiome with targeted mycotoxin quantification provides a promising approach for environmental surveillance of fungal risks in urban ecosystems.

Keywords

Mycotoxins, Public Health, Food safety, Fungi, Mycobiome

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155

Professional Status of the Speaker

Senior Scientist

Junior Scientist Status

No, I am not a Junior Scientist.

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