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Integrated fungal surveillance in poultry litter matrices: profiling yeast and filamentous mold diversity, diagnostic gaps, and multidrug resistance boundaries at the One Health interface

Inhalt

Poultry litter can select and disperse opportunistic fungi. We characterized yeast and mold diversity in commercial broiler farms in Rio de Janeiro, evaluating diagnostic gaps and functional persistence traits. Isolates were screened via MALDI-TOF and verified by ITS sequencing. Yeasts were tested for microstructural adaptations, biofilms (25–40°C), and CLSI/BrCAST-EUCAST susceptibility. Filamentous mold monitoring identified high-confidence *Aspergillus fumigatus* (scores 2.01–2.26) and *Aspergillus niger* (1.86–1.94), alongside *Scedosporium* sp. (2.05), *Penicillium* sp., and *Lichtheimia corymbifera* (2.24). Concurrently, 29 yeasts were recovered; standard proteomics missed 31% of them (low scores/"no peak found"). ITS sequencing resolved these gaps, revealing *Blastobotrys chiropterorum*, *B. allociferi*, and *Debaryomyces hansenii* complex. Non-conventional yeasts showed advanced fitness: dense cell wall chitin, massive lipid reservoirs, absolute halotolerance (2.0M NaCl), and robust biofilms. Pharmacological screening unveiled high azole tolerance: *C. palmiophila* had 100% resistance to fluconazole (MICs 32 to >128µg/mL) and elevated amphotericin B MICs (up to 2µg/mL) without fitness costs, while *B. chiropterorum* reached fluconazole MICs of 64µg/mL and micafungin tolerance of 8µg/mL. Poultry litter is a dynamic reservoir of high-consequence molds and multidrug-resistant yeasts, highlighting the urgency integrating agricultural waste into One Health surveillance.

Keywords

Fungal AMR, Environmental Surveillance, Antimicrobial Resistance, Agricultural Reservoirs, Occupational Exposure, Biofilm Persistence

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Yes, I am a Junior Scientist.

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