

# MASSIVE PARALLEL SEQUENCING IN SUGARCANE RESIDUES REVEALS IMPLICATIONS FOR HUMAN HEALTH

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## **Abstract:**

Filter cake is a residue derived from sugarcane juice filtration rich in phosphorus, nitrogen, organic matter and high moisture content. This substrate has been largely used as fertilizer in agricultural crops. However, no study evaluated the fungal community composition and its safety for human health. Here, we assessed the fungal community composition by 454-pyrosequencing of ITS libraries. From fresh filter cake substrate, a composite sample of 0.3 g was used for DNA extraction using PowerSoil® DNA Isolation Kit (MO-BIO Laboratories, CA). The ITS region was amplified using the ITS1F-ITS4 primer pair with adapter regions. Sequencing of adaptor-ligated amplicons was performed in a Genome Sequencer FLX Plus by a sequencing provider (Macrogen, Seoul, Korea). After processing for length (>400 bp) and quality (Phred  $\geq 25$ ), a total of 14,474 ITS reads were obtained. All reads were checked for chimeras and clustered in MOTUs (Molecular Operational Taxonomic Units) using ITScan, an automated pipeline for fungal diversity analysis. A total of 108 MOTUs were obtained and the most abundant were identified as *Scedosporium prolificans* (51.89% of all reads) followed by *Thermomyces lanuginosus* (10.14%), a thermophilic fungus often associated with composting. *S. prolificans* is an emerging opportunistic fungal pathogen with high levels of resistance to most antifungal drugs and infections are often fatal. Additional opportunistic pathogenic fungi (*Candida tropicalis* and two species of the genus *Trichosporon*) were found in the filter cake as well (>1%). Less abundant (<1%) opportunistic pathogens were found as *Trichosporon mycotoxinivorans*, *Candida* spp., *Acremonium kiliense*, *Phialemonium curvatum*, *Sporothrix schenckii*, *Lecythophora* sp. and *Aspergillus flavus*. Our results indicate that raw filter cake residue as a source of human pathogenic fungi and the potential danger to apply this substrate as fertilizer without pre-treatment. Thus, composting with thermophilic phase might be able to minimize the amount of opportunistic pathogenic fungi in this substrate.

**Keywords:** *Scedosporium prolificans*, fertilizer, sugarcane, waste, metabarcoding.

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