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IDENTIFICATION AND CHARACTERIZATION OF FUNGAL ISOLATES FROM LAND-APPLIED SEWAGE SLUDGE

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ABSTRACT

Approximately eight million dry tons of sewage sludge is generated in the U.S. each year, with more than half of that now land-applied as the primary method of disposal. Despite the proliferation of this practice, little is known about the microbial constituents of these noxious materials. To address this knowledge gap, we isolated and characterized fungi present in archived samples of land-disposed sewage sludge collected from the Snoqualmie National Forest (Washington State). Sludge samples were resuspended in sterile water and 15 fungal isolates were selected and purified on sabouraud dextrose agar plates supplemented with 50 mg/L of chloramphenicol. Fungal morphology was assessed and photo-documented following growth on sabouraud dextrose agar, potato dextrose agar, yeast maltose agar, and malt extract agar. Additionally, pH and temperature tolerance was assessed by growth in liquid cultures of sabouraud dextrose broth from 0 °C to 50 °C and determined from pH 2 to 11 at 28 °C. Carbon source utilization was assessed using Biolog Filamentous Fungi plates. Amplification and sequencing of the ITS region, commonly used in fungal phylogenetic analysis, is in progress to identify each isolate. Phenotypic assessments of growth, carbon utilization, and lactophenol cotton blue staining revealed that sludge-associated fungi are quite varied in size and appearance, but commonly grow in a mesophilic range (10-40 °C and pH 4-10). Interspecies variation is further evident in the percentage of 31 carbon sources utilized (63-100%). To our knowledge, this work represents the first reported assessment of the fungal community in sewage sludge wastes disposed in the Snoqualmie National Forest.