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EFFECT OF CO-SUBSTRATE ON OLD LANDFILL LEACHATE TREATMENT WITH A SELECTED FUNGAL STRAIN

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Abstract

Conventional wastewater treatment technologies are ineffective for the remediation of highly polluted wastewaters, such as old LandFill Leachate (LFL). Therefore, innovative, sustainable approaches to achieve satisfactory removal of old LFL recalcitrant fraction are needed. This study focused on old LFL treatment with a selected fungal strain, *Bjerkandera adusta* MUT 2295, through batch and continuous tests, using packed-bed bioreactors. To optimize the overall process performance, diverse types of co-substrates were used, including milled cellulose from beverage cups waste material, malt extract and glucose. The production of the extracellular enzyme Manganese-dependent Peroxidase (MnP) was assayed, in batch tests, as a function of a) milled cellulose concentration, b) leachate initial Chemical Oxygen Demand (COD) and Soluble COD (sCOD), and c) co-substrate type. Bioreactors, operated in non-sterile conditions, were dosed with an initial start-up of glucose in Rg, while cellulose was added in Rc. An additional glucose dosage was provided in both reactors after 75 and 53 operating days, in Rg and Rc, respectively. Co-substrate dosages were associated with significant increases in COD and sCOD removal, providing evidence that irregular co-substrate addition could enhance process performance. The highest COD and sCOD removals were i) 63% and 53% in Rg and ii) 54 % and 51% in Rc.