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BIODEGRADATION OF HIGH GRAVITY DISTILLERY EFFLUENTS USING MICROBES FROM DIFFERENT ECOLOGICAL HABITATS

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Abstract

The distillery wastewaters lead to multiple environmental concerns due to release in large volume of pollutants in water-bodies. In the present study, microbes tolerant to 10-50%, v/v of distillery spent wash (DSW) and decolorization capacity were explored for decontamination. Total 32 microbes from various eco-habitats and depositary were examined to degrade DSW, initially at 10% and successively to 25 and 50%. Of these, 3 thermotolerant *Pichia* sp. viz. Y4, Y16 and D1C and an isolate SS3 identified as *Bacillus firmus* were selected for growth in 25 and 50% MS-DSW at 120 rpm, 30ºC, pH 6.5 (bacteria) and 40ºC, pH 4.5 (thermotolerant yeasts), demonstrating catabolism of DSW as carbon source. The decolorization efficiencies of *Pichia* sp. Y4, Y16 and D1C were 36, 32 and 34%, respectively, while *B. firmus* showed 36%. The gradual decline in decolorization of 50% DSW by yeast and 25% DSW by SS3 occurred possibly due to loss of cell viability and increase in pH to 9.0. The yeasts decreased BOD and COD in the range of 55-72 and 65-80%, respectively, while *B. firmus* SS3 showed reduction in COD and BOD to 67 and 57%, respectively after 96 h. The HPLC analysis of treated effluent further confirmed the degradation of melanoidin.

Key words: Bacillus firmus, bioremediation, distillery spent wash, melanoidin, *Pichia* sp.

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