

Bioremediation of distillery spent wash in a pilot scale bioreactor using fungal and bacterial strain

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Distilleries are one of the most polluting industries; in addition, they are high consumers of raw water. The distillery wastewater known as spent wash is characterized by its dark brown colour, high temperature, low pH, and high percentage of dissolved organic and inorganic matter. Various physical, chemical, and alternate treatment methods have been adopted for removal of colour. Six bacterial and five fungal strains were isolated from sediment core of distillery mill site. They were screened on the basis of their decolorization and COD reduction potential and finally two fungal and one bacterial strain were selected. The microbial isolates were identified based on microbial, biochemical and molecular methodologies using ARDRA, 16S rDNA, ITS and DGGE techniques. The fungal strains were identified as *Emericella nidulans* var. *lata*, *Neurospora intermedia* and bacteria as *Bacillus* sp. *Emericella nidulans* var. *lata* was capable of removing color of the distillery spent wash by 60% (24 hrs), *Neurospora intermedia* by 55% (4 hrs) and *Bacillus* sp. by 64% (12 hrs) alone after optimization of growth factors and process parameters using Taguchi approach (employing L-8 orthogonal array). While when all these three strains were applied in a sequential manner in a fifteen liters bioreactor it was found that the combination was efficient enough to remove significant amount of colour (73%) and COD (75%). Thus, it can be said that compared to the common and expensive physical or chemical ways for decolorization, an efficient bioremediation system was developed involving suitable microorganisms, as a potential of using microbial diversity on the site itself for the betterment of industries and environment.

Biography

Garima Kaushik has completed her PhD from Jawaharlal Nehru University, New Delhi and presently working as Assistant Professor in the School of Earth Science in Central University of Rajasthan, India. She has teaching and work experience of about eight years. Dr. Kaushik has published several research papers in the field of Bioremediation and has contributed in organizing various conferences and seminars. She has also worked with various World Bank funded Projects of Rajasthan Government like Health Care.

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