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Characterization of lignin peroxidase from *Paecilomyces* species for decolorisation of pulp and paper mill effluent

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Eight fungal strains (F₁ to F₈) isolated from the sediment core and degraded wood of the pulp and paper mill effluent and *Phanerochaete chrysosporium* were tested for different cellulolytic (CMcase, FPase, Xylanases) and lignolytic (lignin peroxidase) enzyme activity in pulp. F-3 (*Paecilomyces* sp.) strain showed higher enzyme activity compare to other fungi isolated from effluent. Weight loss, cellulose loss and organic carbon contents were found maximum in F-3 (*Paecilomyces* sp.) strain. Reducing sugar, protein content and colour removing potential was also higher in *Paecilomyces* sp. The culture extract of F-3 strain grew in presence of pulp fractionated into five protein fractions had indicated two fractions of molecular weight, 38,000 and 40,000 Da, having lignin peroxidase activity. Lignin peroxidase had optimum activity at pH 2 to 3 and temperature 20-30 °C, maximum activity at 6 mM to 48 mM veratryl alcohol concentration and 256 mM H₂O₂, however, sodium azide inhibits the enzyme activity. Different metals (CoCl₂, HgSO₄, CaCl₂, SnCl₂, FeSO₄, CuSO₄ and ZnSO₄) also affected the lignin peroxidase activity.

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Process development for lab scale xylitol production and design of pilot scale stirred tank reactor

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Combating the complex disorders such as Diabetes, Cardiac malfunctions and tumors will be possible by suitable regulatory pathways. Xylitol is a polyalcohol having relative sweetness equivalent to fructose and doesn't involve in insulin metabolic pathway. It also acts against dental cavities as anticariogenic compound in pharmaceutical ingredients. The present study deals about the production of xylitol in a two liter stirred tank bioreactor and estimation of its oxygen mass transfer coefficient with corn hydrolysate medium. Then organism employed here was isolated & identified from cane processing industry through standard biotechnological techniques. Corncob was milled, pretreated, hydrolyzed and used as supplementary medium with 49% initial xylose content (w/v). Physiological conditions such as pH, temperature, inoculum volume and agitation speed was optimized using response surface methodology and adopted in bioreactor. The oxygen side mass transfer coefficient was also measured using dynamic gassing method. The stirred tank reactor was designed according to the standard procedures and all materials used for fabrication were stainless steel. The vessel has 17 liters working volume with aspect ratio for H:D as 4:1.

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