Laser photostimulation of inoculum of selected fungi could be also supporting factor of stimulation of mycorhisis moulds and adaptation of the infected roots of seedlings to contaminated soil. Proper photostimulation of inoculum of selected moulds and bacteria could also biodegradation of some organic pollutants of soil and water.

Laser biotechnology seems to be a new tool of sustainable development of different kind of the regions (industrial as we as rural), including contribution to prevention against food in the rivers regions as well as for more effective protection of aquatic ecosystems against euthrophisation.

doi:10.1016/j.jbiotec.2010.09.165

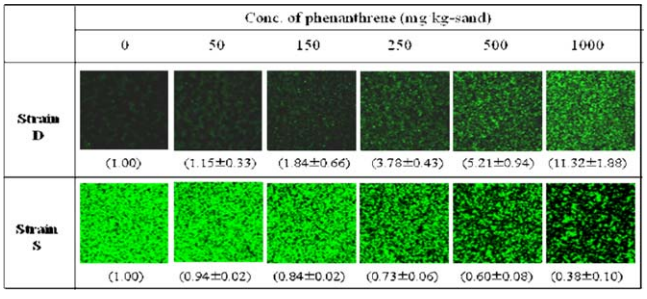
[P-E.144]

Potential use of a novel reporter bacterium to determine phenanthrene biodegradation and toxicity in a model solid

D. Shin[1], H.S. Moon[1], C.-C. Lin[2], T. Barkay[2], K. Nam[1,*]

[1] *Seoul National University, Korea, Republic of*
[2] *Rutgers University, United States*
Keywords: bioavailability; phenanthrene; fluorescence; reporter strains

A novel reporter strain harboring a cell-killing *gef* gene (named strain S) was reconstructed using the phenanthrene-degrading *Sphingomonas paucimobilis* EPA505 as a host bacterium. The strain S was supposed to die on the initiation of phenanthrene biodegradation, which was accomplished by the reconstructed plasmid pBBR1PGEF possessing the phenanthrene-inducible *pbhA* promoter located upstream of the *gef* gene on plasmid pBBR1. Cell death was visualized by a live/dead cell staining method combined with confocal laser microscopic observation (i.e., diminish in green fluorescence with biodegradation), and the extent was quantified by image analysis. Quantitative, linear relationships were established between increasing phenanthrene concentrations and the extents of cell death in solid phase as well as in aqueous phase. As a comparison, another reporter strain (named strain D) who adopted the commonly used *gfp* gene to emit fluorescence when biodegrading phenanthrene was reconstructed. The results demonstrate that the fluorescence intensity generated by strain S decreased (i.e., from 1 to 0.38 ± 0.10 in relative intensity) and the intensity by strain D increased (i.e, from 1 to 11.32 ± 1.88 in relative intensity) in the presence of Ottawa sand with the phenanthrene concentration of up to 1,000 mg/kg. The potential use of the two reporter strains in quantitatively determining available phenanthrene, either toxic or biodegradable, in solid matrix was discussed.



doi:10.1016/j.jbiotec.2010.09.166

[P-E.145]

Discoloration of textile dyes by peroxidases from melon, chayote, lemon and orange peels

Julisa Stuart[1], Myrna Solís[1,*], Aida Solís[2], Leonora Sánchez[3]

[1] *Centro de Investigación en Biotecnología Aplicada-IPN, Mexico*
[2] *Universidad Autónoma Metropolitana, Mexico*
[3] *Universidad Nacional Autónoma de Mëxico, Mexico*
Keywords: discoloration; dye; peroxidases; peels

Traditional textile finishing industry consumes about 100 liters of water to process about 1 Kg of textile materials, it has been estimated that about 10% of the dye used in the process does not bind to the fibers. This wastewater creates environmental problems due to the generation of hazardous degradation products from dyes. In wastewater treatment plants dyes remain unchanged and are discharged to rivers. Additionally there are some advanced treatment systems to discolored the textile dye but they are expensive. The aim of this study was to test different materials: a) lemon peel, b) melon peel, c) orange peel and d) chayote peel, to discolor solutions of three textile dyes: i) indigo carmine, ii) direct brown 2 and iii) direct black 22. The different peels were blended with water, centrifuged and filtered with paper to get the extract; then the enzymatic extract was incubate with the dye solution at room temperature and with magnetic stirrer during 24 hours Periodically it was taken samples and analyzed with the UV-Vis spectrophotometer, and it was calculated the % of discoloration by measuring the absorbance changes. Lemon, orange and chayote peels discolored both the indigo carmine and the direct brown 2 solution in different percentage; melon peel only discolored the indigo, whereas direct black 2 did not have an important discoloration with any of the biological materials. Indigo was discolored easily than others dyes, because it redox potential is the lowest of the three dyes. For indigo, discoloration reached 19% using melon shell, 56% using chayote shell, 50% using lemon and 21% using orange peel, in 24 hours. Results are very interesting because we have demonstrated that cheap material like vegetable peels can be used to treat some textile dye solutions efficiently.

doi:10.1016/j.jbiotec.2010.09.167

[P-E.146]

Comparison of associated and extracellular enzymes and immobilized laccase in the discoloration of indigo carmine

David Sánchez, Myrna Solís*, Edith Bustamante

Centro de Investigación en BIotecnologia Aplicada-IPN, Mexico
Keywords: indigo; discoloration; enzyme

The textile industry is one of the top water polluting industries in terms of spent volume, as well as color and chemical composition of residual wastewater. Textile effluents include dyes that have a complex chemical structure, which frequently are disposed untreated to municipal sewers or into surface waters. The degradation of azo dyes have been extensively studied using a wide range of fungi and bacteria. In this work we compared the discoloration of indigo carmine using associate enzymes (using the mycelia) of *Trametes versicolor*, extracellular enzymes (using the residual culture medium) and immobilized enzymes (using immobilized commercial laccase). *Trametes versicolor* were growth in a complex medium containing 20 g of corn stubble, 0.05 g $CuSO_4$, 0.05 $MnSO_4$, 0.05 $CaCl_2$ in 1 liter of water incubated at 30 °C during 15 days, after that was separated the mycelia and the residual culture