Lipolytic Microorganisms from Oily Residues derived from Environmental Sanitation

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Filamentous fungi has a key potential for lipase production for diversified uses in several bioprocesses limited mainly by the enzyme costs. One possible approach for lipase production and use in bioprocesses is the direct use of biomass with characteristic endo-activity of lipases or whole cells within porous biomass support as a bulk biocatalyst. This represents an attractive approach specially for oily waste treatment and for bulk production of biodiesel from oil and grease wastes. In this study 20 fungi isolates, being 15 filamentous and 5 yeasts, were isolated from oily residues, mainly of scum, crusts and grease traps. The isolates were grown in a selective medium and quantified for lipolytic specific activity and biomass production using a liquid medium composed of minimal salts, soybean oil and tween80. The lipolytic activity measured in supernatant, varied from 0.13 to 18.06 $U.mg^{-1}$ for F2 and F18 isolates. The biomass varied from 7.61 mg. mL^{-1} to 12.68 mg. mL^{-1} . The F2 and F18 isolates showing high and lower exo-lipase activity were then tested for specific lipolytic activity, surfactant activity, oil and grease content and biomass production using a liquid and solid phase reactors with minimal medium with soybean oil. The results showed that although the F18 isolate with low exo-lipase activity presented a high biomass conversion, high biosurfactant production and high efficiency of oil and grease removal from growth medium, showing evidences for lipolytic endo-activity. The F18 isolate should be tested as whole cell biocatalyst for transesterification reactions in biodiesel production.

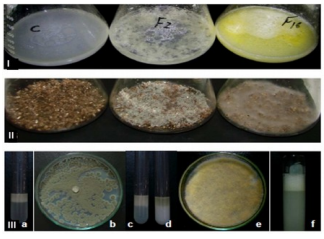

Figure 01: I) Liquid phase reactor (LPR) 120 h growth; c = control and F2 and F18 isolates. II) Solid Phase Reactor (SPR), 120 h growth; control left and F2 and F18 isolates. III) a) detail of emulsification oil water (control). b) F2 isolate (*Penicillium* sp) growth on solid media; c and d) emulsification with F2 and F18 isolates respectively; e) F18 isolate (*Rhizomucor* sp.) growth o n solid media; f) Emulsification activity visible as foam production using SPR F18 culture extract.