In recent years, solid state fermentation (SSF) has shown much promise in the development of several bioprocesses and products. Some of these applications include bioremediation and biodegradation of hazardous compounds, biological detoxification of agroindustrial residues, production of micotoxins, antibiotics, gibberellins, biopesticides, organic acids, flavour compounds, enzymes, etc. This study deals with the comparison of the oxygenases, produced by Aspergillus niger, ATCC 9642, under submerged fermentation (SmF) and SSF using hexadecane as inducer, in the presence and absence of glucose. In addition, the characterization of both systems is also presented here. The results show higher biomass yield (Yx/s), higher specific growth rates (µ) and higher rates of hexadecane consumption (qs) for SSF than for SmF, when only hexadecane is used as substrate. Mineralization is higher, for both systems, when a mixture of glucose and hexadecane is used as substrate. The oxygenase produced under SSF has no specificity difference for aliphatic hydrocarbons (linear and non linear). But, it increases for aromatic substrates as the complexity of the ring increases. Oxygenase produced under SmF has lower activities, at least 7-folds, compared to SSF.

**Keywords**

Oxygenases, solid state culture, aromatic hydrocarbons, hexadecane, polyurethane matrix support, A. niger.

**Abstract**

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