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SCREENING DE RESIDUOS AGRO-INDUSTRIALES PARA LA PRODUCCIÓN DE UNA ACTIVIDAD LIPASA ASOCIADA AL MICELIO DE *Aspergillus niger* MYA 135 POR FERMENTACIÓN SUMERGIDA

SCREENING OF AGRO-INDUSTRIAL WASTES TO PRODUCE A WHOLE-CELL LIPASE ACTIVITY BY *Aspergillus niger* MYA 135 UNDER SUBMERGED FERMENTATION

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Bioconversion of agricultural wastes for enzymes production is turning in an interesting approach in industrial biotechnologies, mainly in developing countries. Lipases (EC 3.1.1.3) are important industrial enzymes due to their versatile applications. Lipases catalyze a variety of reactions, such as partial or complete hydrolysis of triacylglycerols and reactions of esterification, transesterification and interesterification of lipids. Despite the great interests in the application of lipases in various industries, their high costs of production often restrict their use as biocatalysts. One of the research areas involving lipases currently focuses on the use different microorganisms, supplements and substrates to find the best combinations to obtain high-value lipases using operational conditions that facilitate the reduction of the production costs at industrial scale. This can be achieved through the use of low cost culture media, especially residues from agro-industry so that production can become economically viable. Furthermore, several studies have reported the utilization of microorganisms such as bacteria, yeast and fungi as whole-cell biocatalysts in attempts to improve the cost-effectiveness of the bioconversion processes. Among the established whole-cell biocatalyst systems, filamentous fungi have arisen as the most robust whole-cell biocatalyst for industrial applications. The aim of this work was to analyze the production of a lipase activity from *A. niger* MYA 135 including the use of agro-industrial residue wastes as components in a culture medium through a statistical experimental design. These experimental layouts can be adopted at various phases of an optimization process, such as for screening experiments or for finding the optimal conditions for targeted effects. One of the most frequently used choices as screening tool in statistical design is the *Plackett–Burman*. Among the factors analyzed in this design were included agro-industrial wastes such as cane molasses, vinasse, glycerol, waste cooking oil. In these experiments, all analyzed variables had a significant effect on the hydrolytic activity using *p*-nitrophenyl palmitate as substrate. The waste cooking oil showed the most positive incidence (E= 194.82). However, molasses (E= 102.11) and vinasse (E= 131.40) also had an important positive effect on the response studied. Interestingly, in the most of the analyzed media, we found a promising activity increment as compared to the activity previously reported for this strain. On the other hand, some morphological aspects of the biomasses were also analyzed since it is well known that biotechnological production processes performed with filamentous fungi are dependents of morphology control. Finally, the study presented here demonstrates the feasibility of agro-industrial wastes utilization as a sustainable green technology in the lipase activity production.
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