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Studies on anti-neoplastic enzyme: enhanced L-asparaginase activity by filamentous fungus from the Brazilian Savanna using Plackett-Burman Design for screening of culture medium variables

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L-asparaginase is an enzyme used for treatment of Acute Lymphoblastic Leukemia (ALL) in children. Neoplastic cells cannot synthesize L-asparagine unlike normal cells due the absence of L-asparagine synthetase; therefore they obtain the required asparagine from circulating pools. It is important to find new sources of Lasparaginase producing microorganisms that can avoid adverse effects obtained from bacterial L-asparaginase, such as anaphylactoid reactions. Screening and selection of the fungi and optimum concentration of the medium component are very important to determine the overall economic feasibility of the production process. Therefore, the purpose of this study was to evaluate the important variables that influence Lasparaginase activity by a filamentous fungus isolated from the Brazilian Savanna soil. Eleven independent variables were considered to evaluate their effect on Lasparaginase activity by a filamentous fungus (DCFS10) in submerged fermentation. The different variables were prepared in two concentration levels, (-1) low level and (+1) high level. L-asparaginase activity was assayed by measuring the amount of aspartate hydroxamate produced from asparagine and hydroxylamine according to Drainas et al. (1977). The results obtained from PBD showed a wide range of Lasparaginase activity, from 0.5 U/g ± 0.018 to 6.5 U/g ± 0.284. Studies are being conducted in order to purify L-asparaginase produced in this culture medium. This study showed that the screening of culture medium variables using Plackett-Burman increased L-asparaginase activity of a filamentous fungus isolated from the Brazilian Savanna soil as a potential novel anti-leukemic source from eukaryote cell.

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