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Microbial production of L-asparaginase and its immobilization on chitosan for the mitigation of acrylamide in heat processed carrot slices

R Aiswarya & G Baskar*

Department of Biotechnology, St. Joseph's College of Engineering, Chennai-600 119, Tamil Nadu, India

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Starchy foods such as acrylamide, formed when food components are exposed to higher temperature, are carcinogenic, and FDA recommends reduction of their concentration in foods. Enzyme asparaginase is reported to be efficient in acrylamide reduction. Influence of hydrocolloids with the molecular structure in maillard reaction has been shown to be effective in reduction of acrylamide. In the present work, asparaginase was produced from *Aspergillus terreus* and used for pretreatment of carrot slices before roasting. Both deep frying and roasting of carrot slices were evaluated. The process parameters such as soaking, roasting and the type of oil used were studied using free and chitosan immobilized asparaginase produced from *Aspergillus terreus*. The optimal soaking temperature and time was found at 50°C and 15 min, respectively. The optimal roasting temperature and time was found at 170°C and 10 min with the acrylamide concentration of 906 µg/kg using chitosan immobilized asparaginase. The concentration of enzyme used for the mitigation of acrylamide using free and immobilized chitosan was found to be 3 U/mL. The influence of oil absorption and energy involved during the reaction was also studied.

Keywords: *Aspergillus terreus*, Carcinogenic, Food industry, Hydrocolloids, Maillard reaction