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Synergistic effect of chitosan immobilized L-asparaginase nanobiocomposite on acrylamide mitigation in fried bitter gourd chips

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One of the major challenges in food industries is to remove acrylamide present in the fried foods. Asparaginase is generally used to mitigate acrylamide in fried food. Here, we studied the synergistic effect of chitosan with asparaginase on mitigation of acrylamide in fried bitter gourd chips. The chitosan immobilized asparaginase (CIA) nanobiocomposite was characterized using AFM. The treated and untreated fried chips were characterized using SEM and FT-IR analysis. The optimized pre-treatment temperature of 55°C and 10 min time showed less acrylamide formation using CIA nanobiocomposite. The acrylamide formation was reduced to 948 µg/kg at 170°C frying temperature for 5 min using 3 U/mL of CIA nanobiocomposite. The use of CIA nanobiocomposite was found effective for mitigation of the acrylamide present in fried bitter gourd chips. Chitosan provided synergistic effect with asparaginase on acrylamide mitigation and it neither altered the appearance nor the taste of the fried chips.

Keywords: Acrylamide mitigation, Fried foods, Food Processing, Immobilized asparaginase, Nanobiocomposite, Nesslerization QuEChERS extraction