

Antioxidant effect of curry leaves (*Murraya koenigii*) powder on acrylamide mitigation in spring rolls covered with bread crumbs

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Plant extracts are rich in phenolic compounds like phenolic acids, flavonoids, and tannins, which exhibit diverse biological effects, including antioxidant and antibacterial properties. Acrylamide is a food toxicant formed through Maillard reactions in carbohydrate-rich foods at high temperature associated processing. The European Commission has set benchmark levels for the acrylamide content in different foods. Spring rolls covered with bread crumbs (SRCBC) are fried food susceptible to acrylamide formation. This study examines the antioxidant effect of newly incorporated curry leaf powder (CLP) on reducing the acrylamide formation in SRCBC and its fried oil. The CLP was incorporated into SRCBC at concentrations of 0.5, 1.0, and 2.0 %, at the expense of wheat flour. Antioxidant activities (FRAP, ABTS), flavonoid content and total phenolic content (TPC) of SRCBC significantly increased ($p < 0.05$) with higher CLP concentrations. Sensory analysis was done by 30 semi-trained panellists and it indicated no significant differences ($p < 0.05$) in characteristics, except for taste, aroma and texture which had improved with increased CLP content. Considering improved antioxidant and sensory properties, 1% and 2% CLP added SRCBC were selected for acrylamide content analysis. The control, 1% and 2% CLP incorporation had acrylamide contents of 511.39 ± 1.68 , 388.17 ± 4.24 and 260.93 ± 5.59 , respectively, showing the acrylamide reduction by 24.10% and 48.98% in 1% and 2% CLP added SRCBC and 10.48% and 9.93% in fried oil, respectively. Acrylamide content in oil showed a very strong positive and moderate positive correlation ($p < 0.05$) with the peroxide value ($r = 0.855$) and the acid value ($r = 0.522$), respectively. A significant ($p < 0.05$) reduction (34.48%) in peroxide value was observed in the 2% CLP added sample. Therefore, CLP incorporation is feasible and effective in reducing the acrylamide formation in both SRCBC and fried oil, indicating its potential as an acrylamide mitigation strategy in high-temperature food processing.

Keywords: Acrylamide, Antioxidants, Curry leaves, Maillard reactions, Total phenolic content.

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