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Enzyme assisted extraction, quantification and antioxidant activity of phenolic compounds of coconut cake

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The aim of this study was to efficiently extract the phenolic antioxidants from coconut cake (CC) in order to apply them in food systems to prolong the shelf life. The cell wall bound phenols from CC were extracted after hydrolysis of CC using different enzymes followed by solid-liquid extraction of thermally stable and unstable phenolic antioxidants using ethanol:water (70:30 v/v).

The impact of five different single and combinations of commercial enzymes; cellulase (CE), pectinase (PE), lipase (LI), cellulase + pectinase (1:1) mixture (CEPE) and cellulase + pectinase + lipase (1:1:1) mixture (CEPELI) on the release of antioxidants was tested. Enzyme hydrolysis was carried out with 1% (w/w) enzyme and phenolic antioxidants were extracted by vortex mixing. Total phenolic contents (TPC) of the phenolic extracts were determined by the Folin-Denis method and expressed as gallic acid equivalents (GAE). The effectiveness of the extracted antioxidants was evaluated using two antioxidant assays, namely ferric reducing antioxidant power assay and 2, 2-diphenyl-1-picrylhydrazyl (DPPH) assay. The results indicate that TPC of the extracts are 4287 ± 95, 3738 ± 148, 3567 ± 50, 3110 ± 11, 2768 ± 19 and 2527 ± 5 GAE mg/kg for CEPELI, LI, CEPE, CE, PE and control with no added enzymes respectively. All the enzyme treated samples contained more phenolic antioxidants than the respective control and it can be concluded that the selected enzymes could release cell wall bound phenolic antioxidants from CC. The results of the DPPH assay reveal that the activity of CC antioxidants is comparable to the BHT as shown in Table 1. Different antioxidant activities at equal total phenol concentrations indicate that different enzyme systems extract phenolic compounds with different antioxidant efficiencies.

Table 1: DPPH radical scavenging activity of different phenolic extracts

Concentration of phenolic extract (µg/mL)	DPPH radical scavenging activity (% inhibition)					
	CEPE	CE	CEPELI	PE	LI	BHT
20	15±1	17±1	17±2	16±2	10±3	30±1
40	34±3	30±1	31±3	26±2	22±2	35±3
60	52±0	45±2	45±3	38±3	34±4	39±2
80	68±1	59±6	56±2	47±1	42±3	44±0

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