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Chemometrics-based evaluation on the effect of sonication, contact time and solid-to-solvent ratio on total phenolics and flavonoids, free fatty acids and antibacterial potency of Carica papaya seed against S. enteritidis, B. cereus, V. vulnificus and P. mirabilis

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Abstract

This study was aimed at extraction optimization of antibacterial agents from Carica papaya seed against S. enteritidis, B. cereus, V. vulnificus and P. mirabilis as affected by sonication-assisted extraction (SAE), contact time (CT) and solid-to-solvent ratio (SSR). The principal component analysis (PCA) and individual evaluation approaches identified that no SAE, 8 CT and 1:10 SSR were the best treatments with the highest antibacterial potency. The PCA identified no SAE, 8 CT, and 1:5 SSR as the second-best treatment. The yield, total phenolic compound (TPC), C18:1n9t and C16:1 free fatty acids (FAs) in no SAE, 8 CT and 1:10 SSR treatment inhibited B. cereus, V. vulnificus and P. mirabilis growths while C21:0 and C15:0 in 30 min SAE, 8 CT and 1:2 SSR inhibited S. enteritidis growth. The yield, TPC, C18:1n9t and C16:1 FAs, and C6:0 and C24:1n9, C20:1, C4:0 and C20:0 FAs had antagonistic effects on B. cereus, V. vulnificus and P. mirabilis growths. The C21:0, C15:0, C6:0 and C13:0, and C23:0, C20:0 and C11:0 FAs had antagonistic effects on S. enteritidis growth. The PCA also denoted that the MIC50 and MIC0 had a higher variation than MIC; hence, the former variables were better to use in PCA. © 2022

Author Keywords

Antibacterial potency; Carica papaya seed; Contact time; Solid-to-solvent ratio; Sonication-assisted extraction

Index Keywords

Carica papaya extract, fatty acid, flavonoid, phenol derivative; antibacterial activity, Article, Bacillus cereus, bacterial growth, chemical parameters, chemometrics, contact time, controlled study, correlation analysis, drug potency, evaluation study, extraction, MIC50, nonhuman, papaya, plant seed, principal component analysis, Proteus mirabilis, Salmonella enterica serovar Enteritidis, solid to solvent ratio, ultrasound, Vibrio vulnificus

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