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Yusoff, N.A.H.[a] , Rukayadi, Y.[b] , Abas, F.[b] , Khatib, A.[c] , Hassan, M.[a]

Antimicrobial stability of Cosmos caudatus extract at varies pH and temperature, and compounds identification for application as food sanitiser

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[a] Higher Institution Centre of Excellence (HICoE), Institute of Tropical Aquaculture and Fisheries, Universiti Malaysia Terengganu, Kuala Nerus, Terengganu, 21030, Malaysia

[b] Faculty of Food Science and Technology, Universiti Putra Malaysia, Serdang, Selangor Darul Ehsan, 43400 UPM, Malaysia

[c] Kulliyyah of Pharmacy, International Islamic University of Malaysia, Kuantan, Pahang Darul Makmur, 25200, Malaysia

Abstract

The occurrence of foodborne diseases and food poisoning due to the consumption of contaminated foods is increasing nowadays, thus become a major threat to food industries in particular. In order to overcome this problem, prevention must be taken at the early stages of food preparation like sanitization. Typically, chemically based antimicrobial sanitisers were used in food industries to remove dirt and microbial population on food surfaces or food equipment. However, the emergence of microbial resistance and consumer awareness on the formation of carcinogenic compounds and safety issues in long term effects has led researchers to find an alternative. Therefore, a study was conducted to find a natural food sanitiser that was able to minimize the number of harmful bacteria without a change in the food quality and safety. In this study, the stability of Cosmos caudatus extract at different pH (pH 3, pH 7, pH 8 and pH 11) and temperatures (25°C, 30°C, 50°C, 80°C and 121°C) were determined for suitability as food sanitiser. The identification and quantification of this plant extract also were performed using HPLC and LC-MS/MS analysis to detect the major compounds which contributed to the biological activity of C. caudatus extract. Generally, results showed that the antimicrobial activity of C. caudatus extract was stable after exposure to various pH and temperatures, in fact, the extract increased its antimicrobial activity at lower acidity (pH 3) and higher temperature (50°C) against most pathogens. Furthermore, quercetin 3-O-rhamnoside was identified as a major compound in C. caudatus extract with the relative amounts of 29.66 mg/g. It can be concluded that C. caudatus extract is stable when exposed to various pH and temperatures. These useful findings have proved the antimicrobial stability of C. caudatus extract after exposure to several pH and temperatures thus can be further developed as a food sanitiser in food industries.

Author Keywords

Cosmos caudatus; PH; Sanitiser; Stability; Temperature

Index Keywords

antiinfective agent, isoquercetin, organic compound, plant extract, quercetin, quercetin 3 O arabinoside, quercetin aglycone, quercitrin, rutoside, unclassified drug; antimicrobial activity, Article, Bacillus cereus, Bacillus subtilis, biological activity, Candida albicans, Cosmos (genus), drug stability, Escherichia coli, food industry, food quality, food safety, high performance liquid chromatography, Klebsiella pneumoniae, liquid chromatography-mass spectrometry, Listeria monocytogenes, minimum bactericidal concentration, minimum inhibitory concentration, nonhuman, pH, Proteus mirabilis, Pseudomonas aeruginosa, Salmonella enterica serovar Typhimurium, Staphylococcus aureus, temperature

Chemicals/CAS

isoquercetin, 21637-25-2, 482-35-9; quercetin, 117-39-5; quercitrin, 522-12-3; rutoside, 153-18-4, 22519-99-9

Manufacturers

Agilent; Thermo

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Correspondence Address
Hassan M.; Higher Institution Centre of Excellence (HICoE), Kuala Nerus, Malaysia; email: husnayusoff@gmail.com

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