

Documents

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Carotenoids composition, antioxidant and antimicrobial capacities of *Crocus sativus* L. stigma
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Abstract

Carotenoid compounds are effective free-radical scavengers because they display a singlet oxygen-quenching property and can trap peroxy radicals. Many extracts derived from natural sources consist of unique bioactive compounds. For example, hydrophilic carotenoids, such as crocin, are present in saffron and possess antioxidant, anticancer, anti-inflammatory and antimicrobial properties. Crocin is responsible for preventing and curing many health issues. This study investigated the antioxidant and antimicrobial properties of hydrophilic carotenoid (C50) molecules extracted from *Crocus sativus* L. (saffron stigma) grown in different locations. These compounds were tested for their antioxidant properties through 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay, while antimicrobial activity was determined using disc diffusion method. Four carotenoid compounds (i.e. crocin, crocetin, β -carotene and zeaxanthin) were detected from the three saffron samples collected from various localities. High-performance liquid chromatography (HPLC) analysis was carried out to determine the physical and chemical properties of the carotenoid samples. The HPLC results indicated the presence of a single crocin peak at 440 nm. The crocin concentration in Iranian saffron was higher ($11414.67 \pm 516.34 \mu\text{g/g DW}$ with 99.9% purity) than those in Turkish and Kashmiri saffron. This finding suggested that location significantly affected crocin concentration as well as carotenoid composition and content in saffron. Crocin molecules ($100 \mu\text{g/mL}$) showed the highest antibacterial activity against *Staphylococcus epidermidis*, with a 6.0 mm inhibition zone. Hence, crocin molecules ($500 \mu\text{g/mL}$) were effective antioxidant compounds as they showed 68% inhibition, with an IC50 value of $283.918 \pm 3.934 \mu\text{g/mL}$. In addition to being a biocolourant source, crocin may be used for its antioxidant and antibacterial properties. © 2023 The Authors. Published by Rynnye Lyan Resources.

Author Keywords

Antimicrobial; Antioxidant; Crocin; Maceration extraction; Saffron

Index Keywords

1,1 diphenyl 2 picrylhydrazyl, ascorbic acid, beta carotene, carotenoid, clotrimazole, crocin, *Crocus sativus* extract, transcrocetin, zeaxanthin; antimicrobial activity, antioxidant activity, Article, *Bacillus cereus*, *Crocus sativus*, disk diffusion, DPPH radical scavenging assay, *Escherichia coli*, high performance liquid chromatography, hydrophilicity, IC50, methicillin resistant *Staphylococcus aureus*, nonhuman, phytochemistry, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Staphylococcus epidermidis*, zone of inhibition

Chemicals/CAS

1,1 diphenyl 2 picrylhydrazyl, 1898-66-4; ascorbic acid, 134-03-2, 15421-15-5, 50-81-7; beta carotene, 7235-40-7; clotrimazole, 23593-75-1; crocin, 39465-00-4, 42553-65-1; transcrocetin, 27876-94-4, 591230-99-8; zeaxanthin, 144-68-3

Tradenames

1200, Agilent, United States; Alpha 1-4 LD Plus, Martin Christ; UF55, Memmert; Unimax 1010 DT

Manufacturers

Heidolph, Germany; Agilent, United States; Martin Christ; Memmert

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