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Enhanced Yield of Bioactivities from Onion (*Allium cepa* L.) Skin and Their Antioxidant and Anti-α-Amylase Activities

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Abstract

There is increasing concern for reduction of the ecological impacts of industrial waste caused by fruits and vegetables. To reduce costs of onion waste disposal while obtaining value-added products, onion skin can be used to extract quercetin, a natural flavonoid with antioxidant, anti-inflammatory and anti-cancer effects. The aim was to optimize quercetin extraction from brown onion (*Allium cepa* L.) skin through investigation of the effects of different parameters on quercetin yield. Operational parameters for conventional maceration extraction and for ultrasound-assisted extraction were compared: solvent type, mass-to-liquid ratio, extraction time and temperature. Antioxidant capacity was determined using DPPH· radical scavenging assays and quercetin yield using HPLC/DAD. Anti-α-amylase activity of onion skin extracts was investigated using α-amylase inhibition assays. Optimal extraction conditions of quercetin from onion skin were obtained with maceration extraction, 50% ethanol, 1:100 mass-to-liquid ratio, 25 °C, for 15 min. Under these conditions, the antioxidant capacity (expressed as quercetin equivalents) was 18.7 mg/g and the mass fraction of quercetin was 7.96 mg/g. The onion skin extracts showed a dose-dependent relationship between dry extract concentration and α-amylase inhibition, which confirms that this onion skin extract can be considered as an anti-diabetes agent.

Keywords: Allium cepa L.; anti-α-amylase activity; antioxidant capacity; extraction optimization; quercetin.

Conflict of interest statement

The authors declare that they have no conflicts of interest.

Figures

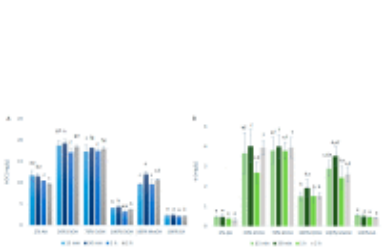


Figure 1 Quercetin equivalent antioxidant capacity (AOC)...

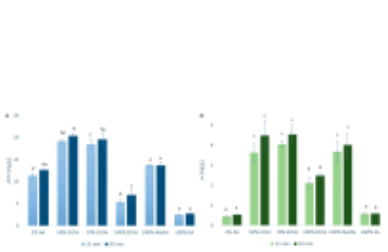


Figure 2 Quercetin equivalent antioxidant capacity (AOC)...

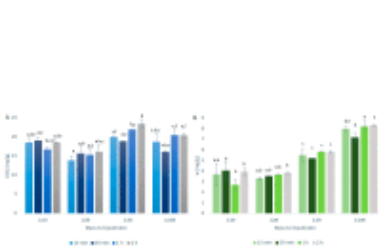


Figure 3 Quercetin equivalent antioxidant capacity (AOC)...

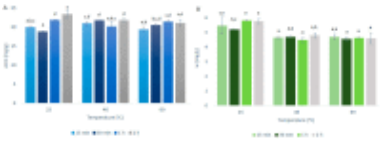


Figure 4 Quercetin equivalent antioxidant capacity (AOC)...

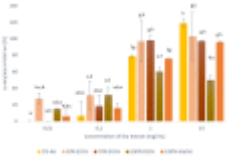
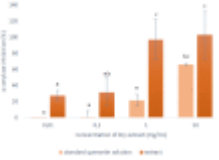


Figure 5 Anti-α-amylase activities of the dry...



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