

Intensified DES mediated ultrasound extraction of tannic acid from onion peel

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ABSTRACT

Ultrasound–assisted extraction using deep eutectic solvent (DES) was performed to extract tannic acid from onion peel. Notably, DES is an excellent extraction agent, which yielded $641.16 \pm 0.01 \mu\text{g/g}$ of tannic acid compared to the extraction using a conventional solvent ($368.99 \pm 0.02 \mu\text{g/g}$). Subsequently, the research was conducted based on several exploited parameters and achieved the highest extraction yield ($1705.79 \pm 0.01 \mu\text{g/g}$) at the DES ratio of 1:1 (mass ratio of choline chloride to urea), solid to solvent ratio of 1:10 and duty cycle of 10%. The onion sample exhibited higher antioxidant capacity than standard ascorbic acid, which was expressed in the lower values of the half-maximal inhibitory concentration (IC_{50}) at 7.70 ± 1.12 and $10.14 \pm 0.11 \text{ mg/ml}$, respectively. Moreover, the Fick's model successfully forecasted that diffusivity is the controlling factor in the extraction of tannic acid via the DES mediated ultrasound–assisted extraction method.

KEYWORDS

Deep eutectic solvent; Ultrasound–assisted extraction; Tannic acid; Onion peel; Antioxidant analysis; Kinetics

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