عنوان مقاله:

Optimised extraction of antioxidant components from Calophyllum inophyllum L. seeds using response surface methodology

محل انتشار:

فصلنامه جهانی علوم و مدیریت محیط زیست, دوره 10, شماره 3 (سال: 1403)

تعداد صفحات اصل مقاله: 14

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خلاصه مقاله:

BACKGROUND AND OBJECTIVES: Calophyllum inophyllum (C. inophyllum), or Nyamplung, seeds contain various active compounds. Using C. inophyllum seeds as a source of flavonoids for natural antioxidants can increase their economic value and provide alternative compounds for cosmetics, including lotions. This study applied maceration and ultrasonic methods using ethanol to extract the active compounds from the C. inophyllum seeds. The study optimised extracting the antioxidant components from C. inophyllum seeds using response surface methodology.METHODS: The experimental design used in this study was response surface methodology with a Box-Behnken design to model the influence of variables on the response of the yield and antioxidant activity of extracts obtained through maceration and ultrasonic extraction and to model lotion formulation. The extraction methods were designed with three variables (extraction time, solvent concentration, and sample-solvent ratio) and three levels (low, medium, and high), and the compounds in the extracts were analysed. Lotion formulation was designed with three variables (C. inophyllum seed extract, Tween ۸۰, and carbomer) and three levels (low, medium, and high), and the quality of the lotion product (antioxidant activity and viscosity) was analysed.Results: The C. inophyllum seed extract obtained through maceration had stronger antioxidant activity than that obtained using the ultrasonic method, with ۵۰ per cent inhibition concentration values of ۱۳.۱۵۴ and ۱۶.۳۴۳ part per million, respectively. Characterisation with gas chromatography-mass spectroscopy revealed ten compounds with major percentage values, among them ۲''-(trimethylsilyl)oxy-۳,۴,۴'',۵- tetramethoxychalcone (۴۹.۷۰ per cent). This compound played an important role in enhancing antioxidant activity in C. inophyllum seeds extracted through maceration, whereas butylated hydroxytoluene (۹.۱۶ per cent) was important in the extract obtained using the ultrasonic method. The lotion produced from the C. inophyllum seed extract contained high antioxidant activity with a ۵۰ per cent inhibition concentration of ۴.۶۲۱ part per million; the toxicity text showed it was safe to be used (۵۰ per cent lethal concentration of ۷۸۹ grams per millilitre).CONCLUSION: The results showed the effectiveness of this approach in determining the optimal conditions to maximise antioxidant content. The maceration method better ability enhanced the antioxidant activity capacity of C. inophyllum seeds compared to the ultrasonic ... method, as indicated by the response surface method. Both extraction

کلمات کلیدی:

Antioxidant Activity, Calophyllum inophyllum, Maceration, Response Surface Design, skin lotion, Ultrasonic