

苦水玫瑰花渣类黄酮提取工艺优化及抗氧化活性评价

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摘要: 为提高苦水玫瑰花渣资源再利用, 本研究采用超声波辅助乙醇提取苦水玫瑰花渣中的类黄酮, 通过响应面法优化了类黄酮提取工艺, 并评价类黄酮醇提物体外抗氧化活性。结果表明: (1) 采用 Box Behnken 法确定料液比 1:35, 提取时间 60 min, 提取温度为 66℃, 乙醇体积分数为 54% 为苦水玫瑰花渣类黄酮最佳提取工艺, 在此条件先类黄酮提取量实际值 43.98 mg/g 与预测值 45.91 mg/g 基本相符。(2) 当类黄酮浓度为 0.05 mg/mL 时, 苦水玫瑰花渣醇提物总抗氧化能力为 105.24 mmol/L, 约为抗坏血酸总抗氧化能力的 2 倍, 苦水玫瑰花渣醇提物对羟自由基、DPPH 自由基、超氧阴离子自由基的清除率分别为 91.10%、75.02%、24.50%, 均极显著高于同浓度抗坏血酸 ($P < 0.01$), 其中对羟自由基的清除率高达抗坏血酸清除率 15 倍以上。综上, 优化后的苦水玫瑰花渣类黄酮提取工艺显著提高其类黄酮提取量, 且花渣类黄酮具有较强的抗氧化能力和自由基清除能力, 可作为一种天然的抗氧化剂。为苦水玫瑰花渣中类黄酮广泛应用于抗氧化类食品、保健品和化妆品提供理论依据。

关键词: 苦水玫瑰花渣, 类黄酮, 响应面法, 抗氧化能力

Optimized extraction and evaluated on antioxidant activities of flavonoids from Kushui rose residue

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Abstract: To effectively utilize the resources of Kushui rose residue, the flavonoids from flower residue were extracted by ultrasonic-assisted ethanol extraction. Response surface method was used to optimize the extraction process of flavonoids, and the antioxidant activity of flavonoid in ethanol extract was evaluated. The results were as follows: (1) The actual value of flavonoid extraction was 43.98 mg/g under the best extraction condition with solid-to-liquid of 1:35, extraction time of 60 min, extraction temperature of 66℃ and Ethanol concentration of 54.%, which was basically consistent with the predicted value of 45.91 mg/g. The best extraction condition of flavonoids from rose residue was determined by Box Behnken test on the basis of single factor test. (2) When the flavonoid concentration was 0.05 mg/mL, the total antioxidant capacity was 105.24 mmol/L in the ethanol extract of the rose residue, which was slightly higher than that of the rose bud, and about twice that of ascorbic acid at the same concentration. When the flavonoid concentration was 0.05 mg/mL, the DPPH radical, superoxide anion and hydroxyl radical were scavenged by ethanol extract of Kushui rose residue about 91.10%, 75.02% and 24.50%, which were significantly higher than ascorbic acid at the same concentration ($p < 0.01$), and the hydroxyl radical scavenging rate was up to 15 times of ascorbic acid scavenging rate. To sum up, optimizing the extraction process

of flavonoids provided a new method for flavonoids extraction from Kushui rose residue. Flavonoids have strong antioxidant ability and free radical scavenging ability from Kushui rose residue, which can be used as a natural antioxidant, which is the theoretical basis for the wide application of flavonoids from rose residue in antioxidant food, health products and cosmetics.

Key words: Kushui rose residue; Flavonoids; Response surface methodology; Antioxidant activities