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超声强化亚临界水提取脱脂葡萄籽中原花青素的工艺及其抗氧化研究

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中文摘要:目的: 优化超声强化亚临界水提取脱脂葡萄籽中原花青素的最佳工艺参数, 研究其抗氧化活性, 并与传统方法进行比较。方法: 采用自行设计的2 L超声强化亚临界水提取设备, 研究影响超声强化亚临界水提取原花青素的几个因素, 包括提取温度、提取时间和提取压力, 并通过响应曲面法优化出最佳工艺参数; 通过对DPPH自由基和亚硝酸钠清除作用研究了抗氧化活性。结果: 超声强化亚临界水提取原花青素的最佳工艺参数为提取温度145 ℃, 提取时间18 min和提取压力14 MPa, 此时得率为4.05%; 此条件下得到的原花青素对DPPH自由基和亚硝酸钠都有较好的清除作用; 与传统索氏提取和热回流提取相比, 超声强化亚临界水提取具有提取时间短、得率高等优点。结论: 采用超声强化亚临界水提取技术提取脱脂葡萄籽中原花青素是可行的。

中文关键词: 超声强化亚临界水提取 原花青素 响应曲面法

Ultrasound-assisted subcritical water extraction of proanthocyanidins from defatted grape seed and its antioxidant activity

Abstract: Objective: To optimize the the ultrasound-assisted subcritical water extraction (USWE) parameters of proanthocyanidins from defatted grape seed, study antioxidant activity of proanthocyanidins and compare the effects of USWE and other extraction techniques. Method: The 2 L equipment of USWE was designed and used to extract the proanthocyanidins. The factors including extraction temperature, extraction time and extraction pressure were studied. The best extraction condition was found through the response surface design. Antioxidant activity of proanthocyanidins was studied by its DPPH free radical and NaNO₂ scavenging action. Result: The USWE parameters were extraction temperature 145 ℃, extraction time 18 min, extraction pressure 14 MPa and the extraction yield (EY) was 4.05% under this extraction condition. The proanthocyanidins extracted under this optimized extraction condition had better scavenging action on DPPH free radical and NaNO₂. As compared with the conventional soxhlet's extraction and heat reflux extraction, the USWE cost less extraction time, and possessed high efficiency and so on. Conclusion: The extraction technology of USWE is highly feasible to extract proanthocyanidins from defatted grape seed.

keywords: ultrasound-assisted subcritical water extraction proanthocyanidins response surface methodology

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