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苹果渣多酚提取工艺的优化

Technology optimization of polyphenols extraction from apple pomace

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中文摘要:

为优化苹果渣中多酚提取工艺,并得到提取工艺和多酚组成之间的关系,利用微波辅助提取法设计了由物料颗粒、液料比、乙醇浓度、微波功率和微波提取时间5个因素构成的多酚提取优化试验流程,构建了涵盖黄酮、原花青素2种典型多酚物质和抗氧化能力的提取工艺评价指标体系。采用证据理论对不同工艺在评价指标下的焦元进行识别,并基于信度函数和似真函数得到了不同提取工艺的效用区间和优化方案。优化结果为:物料颗粒60目,液料比30 mL/g,乙醇体积分数60%,微波功率600 W,提取时间70 s,此条件下苹果渣多酚的提取量为213.83 mg/100g,黄酮提取量为83.21 mg/100g,原花青素提取量为52.79 mg/100g,抗氧化的EC50值为3.71 mg/100 mL,验证了采用证据理论进行苹果渣多酚提取工艺优化的有效性。

英文摘要:

To optimize conditions of polyphenols extraction from apple pomace and obtain the relationship between technology and polyphenols, microwave-assisted extraction was applied for polyphenols extraction from apple pomace in this study. The factors (particle size of apple pomace, liquid/solid ratio, ethanol concentration, microwave power and microwave treatment time) affecting extraction yield, were analyzed to optimize the extraction technologies. The evaluation index included total content of polyphenols, flavone, procyanidins and antioxidant activity. The extraction technologies of polyphenolic compounds from apple pomace were evaluated using evidence theory. According to the belief function, plausibility function and evidential ratiocination algorithms, the utility interval number of each extraction technology was obtained. Furthermore, the rank order of all technologies and the optimal extraction technology were attained. The results showed that the optimal conditions were as follows: materials through 60 mesh sieve, liquid to solid ratio of 30 mL/g, ethanol concentration of 60%, microwave power of 600 W, extraction time of 70s. Under these conditions, the extraction rate of apple polyphenols was 213.83 mg/100g, flavone was 83.21 mg/100g, procyanidins was 52.79 mg/100g, and EC50 was 3.71 mg/100mL. The study analysis showed that the evidence theory was efficient for polyphenols extraction from apple pomace.

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