黄玉凤,肖安风,倪 辉,蔡慧农.单宁酶处理提高茶梗儿茶素含量及茶梗提取液生物活性[J].农业工程学报,2013,29(13):277-285

单宁酶处理提高茶梗儿茶素含量及茶梗提取液生物活性

Tannase treatment improves contents of catechins and bioactivity of tea stalk infusion

投稿时间： 2013-03-13 最后修改时间： 2013-04-25

中文关键词：酶,提取,生物活性,茶梗,儿茶素,转化

英文关键词:enzymes extraction bioactivity tea stalk catechins transformation

基金项目:福建省产学研重大专项项目（2010N5009）；集美大学科研创新团队基金项目（No.2010A006）；李尚大基金项目（ZC2011014）。

作者	单位
黄玉凤	1. 集美大学生物工程学院，厦门 361021
肖安风	1. 集美大学生物工程学院，厦门 3610212. 福建省食品微生物与酶工程重点实验室，厦门 3610213. 福建省高校食品微生物与酶工程技术研究中心，厦门 3610214. 厦门市食品与生物工程技术研究中心，厦门 361021
倪 辉	1. 集美大学生物工程学院，厦门 3610212. 福建省食品微生物与酶工程重点实验室，厦门 3610213. 福建省高校食品微生物与酶工程技术研究中心，厦门 3610214. 厦门市食品与生物工程技术研究中心，厦门 361021
蔡慧农	1. 集美大学生物工程学院，厦门 3610212. 福建省食品微生物与酶工程重点实验室，厦门 3610213. 福建省高校食品微生物与酶工程技术研究中心，厦门 3610214. 厦门市食品与生物工程技术研究中心，厦门 361021

中文摘要:

为综合利用茶叶加工副产物茶叶梗，试验设计利用固态发酵得到的单宁酶处理茶梗，比较不同处理条件下的茶梗提取液中儿茶素组成的差异及还原力、DPPH和OH自由基清除率、胰α-淀粉酶和胰脂肪酶抑制活性变化，探讨单宁酶处理提高茶梗提取物中儿茶素含量和生物活性可行性。研究发现：在50℃条件下，利用2 U/mL单宁酶溶液作用于茶梗粉末60 min，茶梗提取液中酯型儿茶素（EGCG、ECG、GCG）基本被水解生成非酯型儿茶素（EGC、EC、GC）和没食子酸（GA），从而减少单宁-蛋白质聚合物和茶乳的形成量；此外，经单宁酶处理的茶梗提取液抗氧化活性与对照比较明显增强，表现为OH和DPPH自由基清除率IC50分别降低了74%和26%；酶解茶梗提取液质量浓度为5 000 mg/L时，胰α-淀粉酶和胰脂肪酶抑制率分别提高了89%和107%。研究结果表明单宁酶可高效水解茶梗提取液中酯型儿茶素，提高茶梗提取液的抗氧化活性以及体外抑制胰α-淀粉酶和胰脂肪酶活性。

英文摘要:

Abstract: Tea stalk, also known as tea stem, a residue obtained from the process of initial tea selection, is a very abundant and low-cost agricultural byproduct which is plentifully available in southern China, and its use has not been exploited and standardized. In this study, in order to use the agricultural byproduct, tea stalk, thoroughly, tea stalk infusion was prepared with the help of tannase preparation from Aspergillus niger JMU-TS528 by the solid state fermentation of tea stalks. Then, the property and effectiveness of a tannase-aided treatment on the contents of catechins and bioactivity changes in tea stalk infusion were illustrated, including their antioxidant activity and inhibitory potential against pancreatic α-amylase and lipase in vitro. Results showed that, with the help of tannase (2 U/mL) treatment at 50oC for 60 min, the contents of catechins in enzymatic hydrolysis tea stalk infusion changed a lot, much ester catechins (EGCG, GCG and ECG) were hydrolyzed into non-ester ones (EGC, GC and EC, respectively), accompanied by the production of gallic acid. Compared to untreated tea stalk infusion which was extracted by boiling water, th total catechin in a tannase-treated analog increased by 11.5%, and ester catechins decreased by 94%, along with the increases of non-ester catechins and gallic acid (156% and 684%, respectively). Meanwhile, the tannase-treated infusion had a relatively lower binding ability with protein and less tea cream formation, which were effective in improving the clarity and stability of tea stalk infusion. Furthermore, after being treated with tannase, the antioxidant activity of tea stalk infusion had a significant increase, as the tannase-treated tea stalk infusion had a greater OH • and DPPH • scavenging effects with their IC50 decreased by 74.1% and 25.9%, respectively. In addition, assays of pancreatic α-amylase and lipase activities were used to evaluate the effects of tannase treatment on pancreatic enzymes inhibitory activities of tea stalk infusion. And whether it was extracted with tannase solution or water, tea stalk had some inhibition rate on pancreatic α-amylase and lipase activities. However, the tannase-treated tea stalk infusion had a significantly higher inhibition rate of pancreatic α-amylase and lipase activities than the untreated analog (89% and 107%, respectively) at a concentration of 5000 mg/L. Results from this study demonstrate that tea stalk infusion with tannase treatment can obtain better quality attributes, which is promising for the economic utilization and value addition of some important agro residues.

查看全文 下载PDF阅读器

关闭

本系统由北京勤云科技发展有限公司设计