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脉冲超声辅助酶解制备大蒜降压因子

Preparation of ACE inhibiting factors from garlic with pulsed ultrasonic assisted enzymolysis

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中文摘要:

为了开发安全无毒副作用的食源性降血压活性物质，采取逐步分离及超声辅助酶解的方法筛选大蒜中具有降血压活性的功能因子，并采用响应面设计对超声辅助酶解方法进行了优化。研究结果发现，大蒜的多级分离物均具有一定ACE（血管紧张素转化酶）抑制活性，其中大蒜粉直接酶解产物降压效果最佳。以大蒜粉直接酶解物为目标产物，在底物浓度8%、脉冲超声工作时间3?s、间歇时间2?s的条件下优化得到超声处理参数为：超声处理时间72?min、处理液温度45℃、处理液pH值8.2，此条件下酶解产物的ACE抑制率为67.78%，其IC50（半抑制浓度）值为7.57?mg/ml，比常规酶解（无超声处理）降低了45.03%，说明经超声辅助酶解后产物的活性有大幅度提高。对大蒜ACE抑制因子进行SHR（原发性高血压大鼠）大鼠试验，推荐剂量150?mg/kg下灌胃3?h后，SHR大鼠血压下降18.8?mmHg。

英文摘要:

In order to develop antihypertensive substances with safe and non-toxic side effects from food borne, the antihypertensive factors in garlic were selectively extracted by gradual separation and ultrasound-assisted enzymatic hydrolysis. The response surface analysis was adopted to optimize the conditions of pulsed ultrasound-assisted enzymolysis. The results showed that multi-stage isolates of garlic all hah certain inhibitory activity of ACE(Angiotensin converting enzyme), in which direct enzymolysis hydrolysates of garlic power had the best antihypertensive effect. By the response surface analysis, under the conditions of substrate concentration 8 % and the pulsed ultrasound on-time 3 s and off-time 2 s, the optimum parameters of ultrasonic treatment were as following: total treatment time was 72 min, temperature was 45 ?C, pH value was 8.2. Under the optimum conditions, the ACE inhibitory rate of hydrolysates was 67.78%, and the IC50 (half inhibitory concentration) value was 7.57mg/ml. The IC50 value was decreased by 45.03% compared to that using the traditional enzymolysis (without ultrasound treatment), the activity of products from the ultrasound-assisted enzymatic hydrolysis was greatly improved. Garlic ACE inhibitory factor was used for SHR (spontaneously hypertensive rats) test. When the gavage was done for 3 h with the recommended dose of 150 mg/kg, the blood pressure of SHR droped 18.8 mmHg.

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