

記錄編號	6562
狀態	NC094FJU00255014
助教查核	
索書號	
學校名稱	輔仁大學
系所名稱	食品營養學系
舊系所名稱	
學號	493446136
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論文名稱(中)	米蛋白水解物胜肽對抑制血管收縮素轉化酶活性及降血壓之效果

論文名稱(英)	The antihypertensive effect and angiotensin I-converting enzyme activity inhibition of rice protein isolate hydrolysate
其他題名	
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校內全文開放日期	不公開
校外全文開放日期	不公開
全文不開放理由	

電子全文送交國圖.	同意
國圖全文開放日期.	2007.01.01
檔案說明	電子全文
電子全文	01
學位類別	碩士
畢業學年度	94
出版年	
語文別	中文
關鍵字	米蛋白水解物、降血壓胜肽、血管收縮素轉換酶

(中)	
關鍵字(英)	rice protein isolate hydrolysate, antihypertensive peptides, angiotensin converting enzyme
摘要(中)	<p>高血壓是常見的慢性疾病症狀，為目前已開發國家中引起心血管疾病的重要因素之一。腎素-血管收縮素系統 (Renin-angiotensin system, RAS) 主要在調節血壓、水分及電解質之恆定，RAS 異常會造成高血壓的發生，其中血管收縮素轉換? (Angiotensin converting enzyme, ACE) 在血壓調控扮演重要角色。研究指出米發酵製成的清酒和酒渣水解物具有降血壓之作用。因此，本研究將含不同比率 (10、20、40%) 含少量糖分 (CHO : 35.4%) 的米分離蛋白粉 (rice protein isolate, RPI) 飼料餵食自發性高血壓大白鼠 (Spontaneously hypertensive rat, SHR)，探討其對動物體內血壓及血脂的影響。另外，利用麴菌 (Aspergillus oryzae) 發酵產生的酵素分解米蛋白質，純化並鑑定米分離蛋白水解物 (Rice protein isolate hydrolysate, RPIH) 中具有降血壓功能之胜?，及其對於 SHR 大白鼠血壓短時間內的影響。結果顯示，飲食中添加不同比例的 RPI，對血壓無顯著的影響，但確可降低血脂。體外實驗中，RPIH 在不同水解時間下 (0、10、30、60、120 分鐘)，以水解 120 分鐘後具最佳抑制 ACE 之能力 (Angiotensin converting enzyme inhibition, ACEI = 84.1 %，IC50= 5.83 mg/ml)，其水解率為 29.4 ± 0.4%，蛋白質濃度為 0.69 ± 0.04 (mg/ml)。將此水解液利用膠體過濾層析，可得五個主要劃分物，其中 A2 具有最強 ACE 抑制效果 (ACEI = 94.4%, IC50= 0.1 mg/ml)，進一步以逆相高效液相層析純化，得 A2-8 之胜?其 ACEI 為 91.9%。動物實驗中，將抑制能力最佳的水解液 (RPIH)，以單次不同劑量餵食 SHR，當給予每公斤體重 1 克或 2 克，可在第 2 及 4 小時顯著降低收縮壓 (p < 0.05)。降低管餵劑量 (0.5 g/kg)，同樣可於第 2 及 4 小時顯著降低收縮壓 (p < 0.05)，若給予 0.1 g/kg 則只在第 4 小時具有降低收縮壓 (p < 0.05) 之作用。綜合上述，RPI 可顯著影響動物體內血脂濃度，且米蛋白質利用酵素水解可純化具有抑制血壓之胜?，對動物血壓有短期降血壓之效果，可利於開發其附加價值。</p>
摘要(英)	<p>Hypertension is a common chronic symptom and a risk factor for cardiovascular diseases in the people of the developed countries. The renin-angiotensin system (RAS) is a blood volume and/or blood sodium content regulatory cascade that plays an essential role in the homeostasis of blood pressure, water and electrolytes. Inappropriate activation of the RAS may lead to elevation of blood pressure, in which angiotensin converting enzyme (ACE) plays a key role in blood pressure regulation. In recent studies, the peptide fractions of sake and hydrolysates of sake lee which are from rice fermentation have been found to be antihypertensive. Therefore, the purposes of this study are to determine the effect of rice protein isolate (RPI) which contained 35.4% CHO on blood pressure (BP) and lipid concentrations in spontaneously hypertensive rat (SHR). Meanwhile, antihypertensive peptides were purified and identified from rice protein isolate hydrolysates (RPIH) with <i>Aspergillus oryzae</i> fermented and the antihypertensive effect in SHR were also examined. Results indicated that there was no significant</p>

different of change in BP by different content of RPI in diet, but lower blood lipid concentrations were found. In addition, proteases from fermented *Aspergillus oryzae* reacted to rice protein isolate for 0, 10, 30, 60 or 120 min and the highest ACE inhibitory (ACEI = 84.1%, IC50= 5.83 mg/ml) activity was at 120 min (R120). The degree of hydrolysis of R120 was $29.4 \pm 0.4\%$, and soluble protein content was 0.69 ± 0.04 mg/ml. The R120 was separated into 5 fractions by gel fractions, and the A2 fraction had the highest inhibition of ACE (94.4%, IC50= 0.1 mg/ml). This fraction was further purified by reversed-phase HPLC and the ACEI of A2-8 was 91.9%. Single oral dose of RPIH was given to SHR rats and the dose of 0.5, 1 or 2 g/kg b.wt. of RPIH exerted a significant lowering effect on systolic blood pressure (SBP) after 2 and 4 hour ($p < 0.05$). Furthermore, a lower dosage of oral administration 0.1 g/kg RPIH showed a reduced SBP at 4 hour ($p < 0.05$). In conclusions, the blood lipid concentrations could be reduced by adding RPI in the diet in an animal model and antihypertensive peptide was found in RPIH and added value of the rice protein isolate may be developed.

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