蜂膠萃取液之抗氧化力及對血小板凝集作用影響之研究

The effects of propolis extracts on antioxidation and platelet aggregation

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[摘要]

減少血栓的產生並降低動脈粥狀硬化及高血壓的形成而達到預防或延緩腦心血管疾病之發生，為目前食品營養學界重要的研究課題。市售蜂膠產品因宣稱具有強之抗氧化力及抑制血小板凝集的成分，似乎可作為一種預防腦心血管疾病的機能性食品。本研究之目的乃在於嘗試建立市售蜂膠產品品質評估之標準及探討蜂膠對活體血漿總抗氧化力及血小板凝集作用之影響。本研究分為體外及活體試驗兩部分，體外試驗是以健康成人之血漿，分別添加水、乙醇及不同濃度蜂膠酊劑，於 37℃培養 30 分鐘後分析總抗氧化狀態並測定血小板凝集反應。活體試驗一是以 24 隻 250 克之雄性 Hartley 天竺鼠，分為 3 組並餵食不同劑量蜂膠酊劑（對照組、低劑量及高劑量組）一週後，分析血漿之總抗氧化力及血小板凝集反應。活 體試驗二是將 20 隻餵食高脂飼料之雄性 SD 大白鼠，分為兩組並給予酒精（對照組）及蜂膠酊劑（實驗組）兩週後，測定血漿之總抗氧化力及血小板凝集反應。活體試驗三則是以 24 隻雄性 SD 大白鼠管灌 Naringenin 以探討其在血漿中之代謝。結果顯示市售蜂膠酊劑在體外實驗時確實具有相當強之抗氧化作用及抑制血小板凝集的能力，但在活體試驗一中並無顯著的影響，推測可能是蜂膠中之類黃酮物質無法被活體吸收的緣故，因此，活體試驗二乃利用油脂混合蜂膠酊劑餵食以利黃酮物質之吸收且避免被消化酵素破壞，並給予高脂肪飲食以突顯其效果，但結果仍無顯著影響，推測可能是類黃酮物質於活體中失去活性的緣故。為探究其原因，將所餵食具有最強抗氧化力之紐西蘭蜂膠，以高效液相層析儀（HPLC）進行成分分析，發現含有高量之類黃酮物質 Naringenin，因此以此物質再進行活體試驗三，結果顯示 Naringenin 進入活體後，會迅速代謝為抗氧化力微弱之配糖體 Naringin，使得蜂膠對於活體之抗氧化作用無法產生顯著之影響。而在血小板凝集反應方面，Naringenin 及 Naringin 於體外實驗皆有相同抑制凝集之效果，但在活體實驗中則無顯著影響，其於活體代謝後失去活性之機制仍有待進一步的探討。綜合上述，蜂膠因含有高量的類黃酮物質，確實具有抗氧化及抑制血小板凝集之作用，但經活體代謝後，因形成具配糖體之類黃酮物質及一些不明的機制，而失去其抗氧化及抑制血小板凝集之效果。

關鍵字: 蜂膠 Propolis
抗氧化作用 Antioxidant
血小板凝集作用 Platelet aggregation
類黃酮物質 Flavonoids

[摘要]

The inhibition of thrombus formation and atherogenesis to prevent the development of cardiovascular diseases is an important issue in the areaof nutritional research. Propolis, a potential antioxidant and platelet- aggregation inhibitor, is one of the popular products in the healthy-food market. The purposes of this research were to establish a standard ofquality control for plopolis products and to investigate the in vivo effect of plopolis extracts on antioxidant capacity and platelet aggregation. In the in vitro test, plasma samples from healthy adult were incubatedwith water, ethanol and plopolis extract for 30 min at 37℃, and serum total antioxidation and platelet aggregation were measured. In the in vivo test1, 24 male, Hartley Guinea pigs were assigned into 3 experimental groups andfed different levels of plopolis extract for 1 week. In the in vivo test 2, 20 male, Sprage Dawley (SD) rats were fed high fat diet first and then orally administered either ethanol or plopolis extract for 2 weeks. At the end of each feeding period, serum total antioxidation and platelet aggregationwere measured in these animals. Finally, 24 male, SD rats were used in the invivo test 3 to investigate the metabolism of naringenin. The results of these studies showed that most of the commercial productsof plopolis extract are very effective in inhibiting serum oxidation andplatelet aggregation in the in vitro tests. However, these effects could not be detected in the following in vivo test 1. In the in vivo test 2, under the condition of feeding rats with high fat diet and orally administered amixture of plopolis extract and soybean oil, the intake of plopolis extract still ineffective in inhibiting serum oxidation and platelet aggregation. Inorder to better understand the ineffectiveness of plopolis extract on in vivotests, analysis of flavonoid composition of plopolis extract from New Zealandusing HPLC was conducted and found that naringenin was the most abundant oneamong those flavonoids. Therefore, naringenin was selected and used in the invivo test 3, and the results showed that naringenin was metabolized rapidlyinto naringin after its administration to rats within few hours. Because both naringenin and naringin are effective in inhibiting platelet aggregationin vitro, lack of an effect of those flavonoids on those in vivo tests need further investigation. In conclusion, the commercial products of plopolis extracts contain a significant amount of flavonoids and these constituents are responsiblefor the inhibitory effects of plopolis extract on serum oxidation and platelet aggregation. The lack of effectiveness of plopolis extract on in vivotests is partly due to the rapid metabolism of flavonoids inside the body.