不同種類蜂膠之組成分分析及抗生特性研究

Chemical analysis and antimicrobial assay of propolis from the different region

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[摘要]

蜂膠是蜜蜂採自植物不同部位所產生的樹脂、膠質經其酵素作用後所形成物質，蜂膠具有廣泛之生物活性，如抗細菌、抗真菌、抗病毒、抗腫瘤、抗氧化等。主要成份為類黃酮、芳香族醇、醛類、酸及其衍生之酯類、脂肪酸族及其衍生之酯類、碳氫化合物、胺基酸、醣類等。本研究選擇不同產地蜂膠分析，進行色澤分析、一般化學成份分析、游離胺基酸分析，薄層色層分析、分光光度計、高效能液相層析將主要之抗生成分定性定量。並篩選適當菌株作為其抗生特徵之應用，選擇不同溶劑系統，包括甲醇、乙醇、乙醚、氯仿，就脂溶性、醇溶性、水溶性等不同條件下萃出物，與常用抗生素、食品級防腐劑比較其抗菌性，並進一步探討其在應用上之協力作用。研究結果顯示，不同產地蜂膠其色澤有明顯差異，如台灣蜂膠為淡黃綠色，而澳洲蜂膠為紅棕色。一般化學成份以粗脂肪含量最高，介於 41.63~81.12％平均為 59.03％，總糖含量介於 1.80~9.65％平均為 6.65％居次；而蜂膠萃出物以粗脂肪含量最高，介於 23.2~87.9％平均為 42.98％，總糖含量介於 5.84~10.18％平均為 8.30％居次。就總胺基酸而言，佔蜂膠 2.20~5.79％，除台灣蜂膠以天門冬胺酸及麩醯胺含量較高，其他產地蜂膠則以麩醯胺含量較高。而蜂膠萃出物總胺基酸佔 0.07~0.94％，除台灣蜂膠以脯胺酸含量較高，其他產地蜂膠仍以麩醯胺含量較高。總類黃酮含量以中國大陸（華南）蜂膠最高佔 13.02％，而總類黃酮中槲皮酮含量則以台灣 12.02％最高。利用薄層色層分析，可簡易定性總類黃酮中之槲皮酮及金黃素，其 Rf 分別為 0.37 及 0.65，在不同產地蜂膠均可發現此 Rf 值。萃出量會因產地、處理方式不同有明顯差異，以 95％乙醇萃取蜂膠最高為 62.39％；同方式的水萃取最高為 6.67 ％，多種溶劑萃取不同產地之蜂膠發 現以氯仿萃取率最高為 45.40％。於測試之九種細菌、三種黴菌、三種酵母菌評估蜂膠之抗菌性，不同產地蜂膠最低抑菌濃度平均顯示其抑制格蘭氏陰性菌的效果較佳，餘依次為黴菌、酵母菌、格蘭氏陽性菌，抑菌效果較好有綠膿桿菌、圓假絲酵、大腸桿菌。以不同溶劑系統萃取蜂膠發現，脂溶性萃出物抑菌效果較水溶性及醇溶性佳，蜂膠抑菌效果較食品用防腐劑佳，介於常用抗生素之間，並與抗生素有協力作用。

關鍵字: 蜂 膠 propolis
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分析 analysis

[摘要]

Propolis is a natural resinous substance collected by bees from buds,young leaves and jnjurious parts of plants. It was reported to have manyversatile biological activties such as antibacterial, antifungicidal, antiviral, antioxidant. These valuable properties of propolis are original from its chemical composition. Flavonoids, aromatic alcohols, aldehyde, acids andtheir esters, aliphatic acids and aliphatic esters, hydrocarbons, amino acidsand sugars. This study deals with the above issue as follow：(1) Characterize colorant of propolis from different regions by Color Measuring System. (2) Analyze the proximate chemical compositions of propolis from differentregions including crude proteins, crude fats, total sugars, ash and moisture, aswell as amino acids. (3) Quantify the total flavonoids of propolis fromdifferent regions by using UV spectrophotometer. (4) Quantify the quercetin ofpropolis from different regions by using HPLC. (5) Qualitative analysis by UVspectrum and TLC. (6) Analyze antimicrobial ability by Gram-positive,Gram-negative, yeast and mold of propolis, antiseptic(Sodium Benzoate 1000ppm；Benzoicacid 250ppm；Propionic acid 2500ppm；Sorbic acid 2000ppm), antibiotic(Ampicillin 10MCG；Chloramphenicol 30MCG；Penicillin G 10units；Polymyxin B 300units ；Tetracycline 30MCG). Results showed that the propolis from variousregions the colorant was significant with difference. Taiwan propolis is lightyellow and green, Australia propolis is light red and brown. Their proximatechemical compositions from different regions, especially in the percentage of crude fats, from 41.63% to 81.12%, mean 59.02％. Total sugars were from 1.80%to 9. 65%, mean 6.65%. The propolis extraction were from different regions, especially in the percentage of crude fats were from 23.2% to 87.9%,mean42.98 ％ and total sugars from 5.84% to 10.18%, mean 6.65%. Total amount of amino acids in raw material and extracts were 2.20~5.79％, 0.07~0.94％.Quantifying the flavonoids of propolis showed, especially high in the percentage ofHwa- nan (13.02 ％), but the quercetin was especially high in the percentage of Taiwan (12.02％). Analyzing the quercetin and chrysin of flavonoid by TLC,the Rf value is 0.37 and 0.65 respectively. The extraction rate by different solvents showed that 95% ethanol extract reached 62.39%, water extractlowed as 6.67%. The overall chloroform extract yield 45.40% of propolis from different regions. Serious tests on antibacterial properties of thevarious solvent extracts of propolis from different regions showed the activity as lipid soluble system＞alcohol soluble system＞water soluble system.Analysis on antimicrobial by nine bacterias, three molds, three yeasts at minimun inhibitory concentration resulted as Gram-positive＞yeast＞mold＞Gram-negative. When propolis was used with antibiotics, it was foundsynergistic effect obviously.