

台灣產蜂膠的組成與生物活性

Chemical composition and biological activity of propolis from Taiwan 巫雪紋

[摘要]

蜂膠是蜜蜂從特定的樹皮、樹枝及樹芽上，採得一種樹脂狀物質，再混入大顎腺分泌物和蜂蠟製成的蜂產品。蜂膠具有多樣的生物活性，但隨著膠源植物、生產地與季節的不同，蜂膠的組成與生物活性皆有差異，而本土相關的研究卻非常缺乏。為了探討本土蜂膠的組成與生物活性，本論文利用自行設計的蜂膠採集器，於 89 年 5-12 月期間，在全台架設 9 個採集點逐月收集，共收集 34 個蜂膠樣品，這些樣品以 80% 乙醇萃取分析後，可區分為台灣-I、台灣-II 和台灣-III 等 3 種類別蜂膠。其中以台灣-I 蜂膠的樹脂含量達 $70.5 \pm 7.3\%$ ，明顯高於巴西 (52.2%) 與中國大陸 (58.3%) 的樣品。台灣-I 蜂膠也含有高量 ($73.3 \pm 6.8 \text{ mg/g}$) 的總酚類，明顯高於巴西蜂膠 ($48.5 \pm 0.8 \text{ mg/g}$)，但台灣-I 蜂膠的類黃酮含量較低 ($16.1 \pm 2.1 \text{ mg/g}$)，明顯低於巴西蜂膠 ($31.8 \pm 0.3 \text{ mg/g}$) 與中國蜂膠 ($55.1 \pm 2.9 \text{ mg/g}$)。在生物活性方面，台灣-I 蜂膠與中國蜂膠具有最高的清除 DPPH 自由基能力；在抗菌活性方面，台灣-I 蜂膠對所有的測試菌株均呈現最高的抗菌效果，其中對水產病原 *Vibrio damsela* 的最低抑菌濃度 (minimum inhibitory concentrations, 簡稱 MIC) 為 $2.5 - 20 \text{ } \mu\text{g/ml}$ ，對 *Streptococcus* spp. 為 $5 - 20 \text{ } \mu\text{g/ml}$ ；最低殺菌濃度 (minimum bactericidal concentrations) 則為 MIC 數值的 2 - 8 倍。這些結果顯示台灣-I 蜂膠最具開發價值，它是極佳的天然抗氧化劑，而且具有防治水產疾病的潛力。

關鍵字: 蜂膠 propolis、台灣 Taiwan、蜜蜂 honey bee、類黃酮 flavonoid、
自由基 free radical、抑菌 antibacteria

[摘要]

Propolis is a resinous hive product collected by honey bees from various plant sources. The composition of the propolis depends on the time, vegetation and the area of collection. Although propolis has been reported to possess a broad spectrum of biological activities, very few studies have been done on the composition and biological activities of propolis from Taiwan. For this purpose, 32 different propolis samples from Taiwan, one from Brazil, and one from China were evaluated in this study. Their alcoholic extracts were prepared for further studies. Taiwanese propolis may be classified into three different groups, i.e. Tw-1, Tw-2 and Tw-3 propolis. Tw-1 propolis contained the high balsam content ($70.5 \pm 7.3\%$), high total phenolic

substances content (73.3 ± 6.8 mg/g of propolis) and the moderate total flavonoid content (16.1 ± 2.1 mg/g) in comparison with the foreign samples. However, these contents in Tw-2 and Tw-3 propolis were much lower. It was also observed that Tw-1 and Chinese propolis showed stronger DPPH free radical scavenging activities than the others. For the antibacterial activity assay, minimum inhibitory concentrations (MIC) and minimum bactericidal concentrations (MBC) against aquatic pathogens and other bacteria were determined. Tw-1 propolis again showed the highest potency against all tested bacteria. The ranges of MIC values were $2.5 - 20$ $\mu\text{g/ml}$, for *Vibrio damsela*; and $5 - 20$ $\mu\text{g/ml}$, for *Streptococcus* spp., respectively. The MBC was two to eight times that of MIC values. These results revealed that Tw-1 propolis possess high potency as a source of natural antioxidants, and a natural reagent for the aquatic disease control.