

Chemical analysis and antimicrobial assay of propolis from the different region

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ABSTRACT

Propolis is a natural resinous substance collected by bees from buds, young leaves and injurious parts of plants. It was reported to have many versatile biological activities such as antibacterial, antifungal, antiviral, antioxidant. These valuable properties of propolis are original from its chemical composition. Flavonoids, aromatic alcohols, aldehyde, acids and their esters, aliphatic acids and aliphatic esters, hydrocarbons, amino acids and 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 different regions including crude proteins, crude fats, total sugars, ash and moisture, as well as amino acids. (3) Quantify the total flavonoids of propolis from different regions by using UV spectrophotometer. (4) Quantify the quercetin of propolis from different regions by using HPLC. (5) Qualitative analysis by UV spectrum and TLC. (6) Analyze antimicrobial ability by Gram-positive, Gram-negative, yeast and mold of propolis, antiseptic(Sodium Benzoate 1000ppm ; Benzoic acid 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 various regions the colorant was significant with difference. Taiwan propolis is light yellow and green, Australia propolis is light red and brown. Their proximate chemical 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%,mean 42.98 % 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 of Hwa-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 R_f value is 0.37 and 0.65 respectively. The extraction rate by different solvents showed that 95% ethanol extract reached 62.39%, water extract lowed as 6.67%. The overall chloroform extract yield 45.40% of propolis from different regions. Serious tests on antibacterial properties of the various 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 minimum inhibitory concentration resulted as Gram-positive > yeast > mold > Gram-negative. When propolis was used with antibiotics, it was found synergistic effect obviously.

Keywords : propolis ; extract ; antimicrobial ; antibiotic ; analysis

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