

Nongnuch Utakud 2012: Antimicrobial and Antioxidant Properties of Some Essential Oils. Master of Science (Bioproducts Science), Major Field: Bioproducts Science, Division of Science. Thesis Advisor: Mr. Kritchaya Issakul, Dr.sc.agr. 116 pages.

Extraction of essential oils by Clevenger hydro – distillation of 15 plants i.e. fennel, coriander nutmeg, aromatic ginger, calamus, clove, betel, lime, Chinese cinnamon, lemon grass, citronella, vetiver, eucalyptus, kaffir lime and pine showed that clove gave the highest yield of 13.68 % (v/w). Essential oils were investigated for their inhibitory effect against pathogenic microorganisms by Agar disc diffusion method, Agar well diffusion method and Vapor diffusion method. Similar results were found between Agar disc diffusion and Agar well diffusion methods where essential oil extracted from Chinese cinnamon demonstrated the highest inhibitory efficiency against tested microorganisms. Vapor diffusion method was showed that only essential oil extracted from Chinese cinnamon had the inhibiting efficiency against *Candida albicans*. Whereas no inhibitory effect was found in all tested gram negative and positive bacteria. Ninety-six well micro plate dilution method was used for determine of minimal inhibitory concentration (MIC), minimal bactericidal concentration (MBC) and minimal fungicidal concentration (MFC) of essential oil from Chinese cinnamon. The experiment showed that *C. albicans* was the most sensitive microorganism with MIC and MFC values of 0.075 µl/ml. While, *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Staphylococcus epidermidis* expressed the MIC and MBC values ranging from 0.60 - 5.00 µl/ml. The antioxidant activities of 15 plants essential oils were evaluated by DPPH radical scavenging assay (DPPH), ABTS radical scavenging assay (ABTS), Ferric reducing antioxidant power assay (FRAP) and Hydrogen peroxide (H₂O₂) scavenging assay. Results found that clove nutmeg and betel showed the highest percentage inhibition of DPPH, ABTS radical. Furthermore, essential oils from these 3 plants also gave the highest reducing power activity. For the H₂O₂ scavenging assay, lemongrass revealed the strongest H₂O₂ scavenging activity. The correlation among antioxidant activity measured in essential oil based on DPPH, ABTS, FRAP and H₂O₂ scavenging assay determined by Person's correlation coefficient found that DPPH, ABTS and FRAP assay gave a high correlation with correlation coefficient (r) ranged between 0.86 - 0.99. While, H₂O₂ scavenging assay had no correlation with other assay.

Student's signature

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