

Kriangkrai Phattayakorn 2011: Antimicrobial and Antioxidant Activities of Thai Herb Extracts in Coconut Milk. Doctor of Philosophy (Biotechnology), Major Field: Biotechnology, Department of Biotechnology. Thesis Advisor: Associate Professor Penkhae Wanchaitanawong, Ph.D. 143 pages.

Antimicrobial and antioxidant activities of twenty five Thai herb extracts were screened for their antioxidant capacity and growth inhibition of coconut milk spoilage microorganisms. The results indicated that ethanol extract from the selected plants showed different degree of growth inhibition of the test microorganisms and antioxidant capacities which were determined by 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radical scavenging and reducing power methods. Among crude ethanol extracts of all plants, the extract of cassod tree exhibited a significant ($P < 0.05$) high antimicrobial activity with inhibition zone ranging from 16.17 ± 0.29 to 25.00 ± 1.00 mm and high levels of total phenolic contents (345.64 ± 6.24 mg GAE/g), IC_{50} values of 1.86 ± 0.03 μ g/ml and reducing power values of 0.40 ± 0.00 . Its MIC and MBC values were 0.3-1.2 mg/ml and 0.6-3.0 mg/ml, respectively, depending on the strain type. The inhibitory action of the extract against *B. licheniformis* KUB1 was also confirmed in nutrient broth and its antimicrobial efficiency was found to be affected by coconut oil concentration and pH. In model food, it displayed bacteriostatic effect in coconut milk and coconut milk cream for 12 h of incubation with total viable counts of ca. 6 log CFU/ml which was ca. 2 log CFU/ml lower than that in control. Furthermore, transmission electron microscopy clearly demonstrated that the cassod tree extract showed localized disintegration of cell envelope and cell wall, leaking of cytoplasm and irregular aggregation in the cytoplasm. Additionally, the major compound of the extract identified by HPLC-PDA, LC-TOF-MS and NMR spectroscopy was piceatannol at the amount of 722.88 μ g/g of crude extract. This study suggests that cassod tree extract and its bioactive components have potential for application as natural food preservatives.

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