Ekkarin Pattaratanawadee 2007: Ultrasound-Assisted Solvent Extraction in Thai Spices and Efficacy of Spice Extracts with EDTA to Inhibit Microorganisms in Food. Master of Science (Food Science), Major Field: Food Science, Department of Food Science and Technology. Thesis Advisor: Mrs. Warapa Mahakarnchanakul, Ph.D. 124 pages.

The antimicrobial efficacy of Thai spice extracts including fingerroot, ginger, galangal and turmeric against microorganisms were determined. The spices were immersed in 50% (v/v) ethanol then extracted either shaking or ultrasound–assisted (US) methods. The agar dilution assay was used to compare the efficacy of those extracts. Results showed that the US method was better than the shaking method, spice extracts from both methods showed similar MICs (minimum inhibitory concentrations). However, the US method consumed much less time and showed potential for application in spice extraction. US-fingerroot extract had inhibitory effect against gram positive bacteria including *Bacillus cereus* 1 strain, *Staphylococcus aureus* 1 strain and *Listeria monocytogenes* 5 strains with MICs of 0.3-0.5% (v/v), and gram negative bacteria including *Escherichia coli* O157:H7 1 strain and *Salmonella* Typhimurium 5 strains with MICs of 9-10% (v/v). US-fingerroot and US-ginger extract inhibited lactic acid bacteria (MICs ≥10%, v/v) namely *Lactobacillus plantarum* 2 strains and *L. cellobiosus* 4 strains and fungi namely *Aspergillus flavus*, *A. niger*, *A. parasiticus* and *Fusarium oxysporum* (MICs ≥10%, v/v). Whereas, both US-galangal and US-turmeric extracts had lower antimicrobial activity than the others. The microbroth dilution showed similar MICs to the agar dilution assay and was used to determine the efficiency of spice extracts combined with EDTA. The combination of EDTA and either US-fingerroot or US-ginger extracts showed synergism effect on inactivation of gram positive bacteria and on inhibition of gram negative bacteria, which gave fractional bactericidal concentration and fractional inhibitory concentration on value lower than one. In chicken broth, 5% (v/v) US-fingerroot extract eliminated mixed culture of *L. monocytogenes* within 24 hours, whereas 5% (v/v) US-fingerroot extract combined with 1000 ppm EDTA showed bactericidal effect to mixed culture of *L. monocytogenes* within 3 hours. However, 10% (v/v) US-fingerroot extract combined with 1000 ppm EDTA inhibited mixed culture of *S.* Typhimurium throughout the experimental period for 36 hours at 37°C. As the combination of fingerroot extract and EDTA showed potential for inhibiting those foodborne pathogens, thus this extract could apply in food system to enhance safety and extend shelf-life of food.

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