

ANTIMICROBIAL ACTIVITY OF *Citrus hystrix* AND *Citrus aurantifolia* ESSENTIAL OILS

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ABSTRACT

ANTIMICROBIAL ACTIVITY OF *CITRUS HYSTRIX* AND *CITRUS AURANTIFOLIA* ESSENTIAL OILS

The composition of the essential oils extracted by solvent extraction from leaves and peels of *Citrus hystrix* (limau purut), was analyzed by gas chromatography-mass spectrometry (GC-MS). The major compounds in leaves extract of *Citrus hystrix* were citronellal (31.16%), (R)-citronellol (7.67%), and β -linalool (1.88%) meanwhile the major compounds in peels extract were limonene (12.43%), β -citronellal (4.87%), β -citronellol (4.23%) and linalool (1.49 %). The percentage yield of essential oil from leaves and peels of *Citrus hystrix* was 7.03% and 8.81% (w/v), respectively. Extracts of *Citrus hystrix* and *Citrus aurantifolia* were investigated for its antimicrobial activity against microorganisms: *Escherichia coli* (25922), *Staphylococcus aureus* (29213), *Saccharomyces cerevisiae* (itm: 3005) and *Candida albicans* (10231) using disc diffusion method. Moderate antimicrobial activity has been observed by using the hexane extract of leaf against *Staphylococcus aureus*, and *Escherichia coli* with zone inhibition of 25 mm and 20 mm, respectively. Antimicrobial inhibition was absent against *Candida albicans* and *Saccharomyces cerevisiae* species. Mild antimicrobial activity against *Staphylococcus aureus* and *Escherichia coli* has been observed in *Citrus aurantifolia* extract with zone inhibition of 8 mm and 9 mm, respectively. Antimicrobial activity was absent against *Candida albicans* and *Saccharomyces cerevisiae* species.

CHAPTER 1

INTRODUCTION

Herbs and spices have been used for generations by humans as food condiments and treat ailments due to being less toxic and generally free from side effects (Valiathan, 1998). Herbs and spices are invaluable resources, useful in daily life as food additives, flavors, fragrances, pharmaceuticals, colors or directly in medicine (Lucchesi *et al.*, 2004). A spice is a dried seed, fruit, root, bark or vegetative substance used in nutritionally insignificant quantities as a food additive for the purpose of flavoring. For example, the rhizomes of turmeric (*Curcuma longa* L.) is also used as a preservative; licorice as a medicine; garlic as a vegetable and nutmeg as a recreational drug. Spices can be grouped into three basic classifications. The first group includes leaves and/or branches of aromatic plants, all or part of the plant can be used one please. The second group includes ripened fruits or seeds of plants. The third group includes roots or bulbs of certain plants, for example garlic and ginger (Gerard, 1975).

Citrus hystrix can be categorized as herbs and spices which provide many benefits in daily life. The leaves are widely used in Thai cuisine for dishes such as tom yum as astringent flavor. The leaves can be used fresh or dried and can be stored