

Natural Antimicrobial Activity of Thai Red Curry's Herbs on *Salmonella* Typhimurium DT104b

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Abstract

The outbreaks of Salmonella spp. have been reported as the major cause of food-borne illnesses worldwide. Thai red curry paste is an important ingredient of cultural foods and consists of herbs that have potential natural antibacterial activity. The objective of this experimental study was to measure the individual antibacterial activity of Thai red curry herbs on Salmonella under three different extraction methods (Kaeng Kathi - oil using fresh coconut milk, Kaeng Kathi - oil using UHT coconut milk, and Kaeng Pa - water). During the conducted experiments, the individual activities of the extracted herbs on Salmonella enterica serovar Typhimurium U302 (DT104b) were investigated by agar diffusion method using SS agar followed by MIC and MBC assay using broth dilution method. Among the three extraction methods, the extraction using fresh coconut milk gave the highest antibacterial activity in all herbs, followed by UHT coconut milk and water. Fresh coconut milk extracted cumin (Cuminum cyminum) and lemongrass (Citronella citrate) gave the highest antibacterial activity, 1.6 ± 0.22 cm and 1.4 ± 0.24 cm, respectively. The MIC assay showed 125 μ l/ml and 100 μ l/ml, while the MBC showed 125 μ l/ml and >150 μ l/ml, respectively. Thai red curry paste ingredients possess a significantly promising antibacterial activity against the food-borne pathogen S. enterica Typhimurium U302 (DT104b).

Keywords: Kaeng Kathi, Kaeng Pa, *Salmonella enterica Typhimurium*.

1. Introduction

In recent years, food safety concerns have been focused on pathogens, such as *Salmonella*, which are recognized as a primary cause of food poisoning worldwide and massive outbreaks have occurred in several parts of the world (Van Immweseel *et al.* 2005).

It is estimated that globally around 86% of salmonellosis cases are food-borne (Majowicz *et al.* 2010). *Salmonella* Typhimurium is one type of *Salmonella* serovars that has a remarkable ability to survive and becomes the major cause of salmonellosis food-borne illness. This is reflected by the fact

that 6.6% of food-borne outbreaks were attributable to this serotype in an international study (Greig and Ravel 2009).

One type of food ingredients with the potential to be the natural source of antibiotics is Thai red curry paste. Thai red curry paste is a very important ingredient for different kinds of Thai curries: Kaeng Pa (water base) and Kaeng Kathi (coconut-milk base), and contains various kinds of herbs and spices that are rich sources of biologically active antimicrobial compounds. The inhibitory effect of these herbs and spices on a variety of microorganisms was described by Arora and Kaur (1999).

As these herbs and spices are contained in Thai red curry paste, it became worthwhile to investigate their potential as a natural antibacterial compound in order to fight against *Salmonella* Typhimurium DT104b. Therefore, the objective of this experimental study is to

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