

**UNIVERSITI TEKNOLOGI MARA**

**ANTIMICROBIAL ACTIVITY OF MALAYSIAN  
HONEYs AGAINST *ESCHERICHIA COLI* AND  
*BACILLUS SUBTILIS***

**MUHAMMAD AFFIQ BIN MUHAMMAD**

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## ABSTRACT

The antibacterial activity of honey against pathogens of the gastrointestinal system has been widely studied. However, not many reports considered the efficacy of the Malaysian honey against enteropathogenic species. Thus, this study is designed to understand the potential impact of the antibacterial activity of selected Malaysian honey in comparison with Manuka honey on the pathogens of the digestive system. Five honey samples (Gelang, Tualang, Nenas, Acacia and Manuka) with 8 different concentrations (3 - 45 %) (v/v) were tested against *E. coli* and *B. subtilis* using broth dilution method. Minimum inhibitory concentration (MIC) of honey was determined by visual inspection after incubated for 24 hour. Minimum bactericidal concentration (MBC) also was determined by culturing on agar plates and incubated for 24 hour. The results showed that the MIC of Manuka honey is 9 %, Gelam and Acacia (21 %) while Nenas and Tualang (27 %) against *E. coli*. The MIC of Manuka honey is 15 %, Gelam and Tualang (21 %) while Nenas and Acacia (27 %) against *B. subtilis*. Selected Malaysian honeys exhibited variable antibacterial activity against *E. coli* and *B. subtilis* species with Gelam honey demonstrated good antibacterial activity against both bacteria. However, selected Malaysian honeys have less efficacy as compare to the proprietary Manuka honey in modulating *E. coli* and *B. subtilis* species. Although our local honey may not be as good as Manuka honey, further research is required to assess the true potential of these honeys.

# CHAPTER 1

## INTRODUCTION

### 1.1 Background

Honey is being used around the world for many years not only as a sweetener in foods but also as a natural cure for ailments due to its therapeutic properties (Haddadin *et al.*, 2007). Natural honey is a sweet liquid (semi-solid) formed mostly by honeybees from the nectar of flowers (Kucuk *et al.*, 2007; Gomes *et al.*, 2010). It contains high complex mixture of sugar including glucose, maltose, sucrose and fructose which is a large source of carbohydrate to supply energy and strength to our bodies (Alvarez-Suarez *et al.*, 2010). In addition, honey also contains small amounts of minerals, proteins, vitamins, flavonoids, phenolics acids, organic acids, free amino acids and enzymes (Khalil *et al.*, 2010). Many researchers considered honey as a source of natural antioxidant that can decrease the risk of getting heart disease, cancers as well as slowing the aging process. This is mainly due to the component of phenolic acids and flavonoids in honey (Bertoncelj *et al.*, 2007).

Honey also act as an antibacterial agent which has been proven effective to treat wide range of wounds of different etiology including surgical wounds, gastric ulcers and burns (Cooper *et al.*, 1999). Scientific studies have shown that honey has broad-