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**EVALUATION OF TOTAL PHENOLIC CONTENT AND ANTIBACTERIAL  
ACTIVITY OF *Polygonum minus* leaves METHANOLIC EXTRACT  
AGAINST FOOD BORNE PATHOGENS**

**By**

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## DECLARATION

I hereby declare that this thesis is my original work and not been submitted previously or currently for any other degree at UiTM or any other institutions.



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## ABSTRACT

*Polygonum minus*, subspecies of a large medicinal genus of Polygonaceae have long provided mankind with its tremendous benefits in providing ailment for various illnesses. Despite its aromatic flavors, *P. minus* had been reported to possess high polyphenol content that responsible for its antibacterial and antioxidant activities. *P. minus* had been traditionally used to treat gastrointestinal related diseases which this property can be the answer to resolve emerging elevated multi-resistant in foodborne pathogens. This study attempts to evaluate total phenolic content and antibacterial activity of *P. minus* leaves methanolic extract against foodborne pathogens which are *Staphylococcus aureus* (ATCC 43300), *Bacillus cereus* (ATCC 14579), *Escherechia coli* (ATCC 25922) and *Salmonella typhimurium* (ATCC 13311). In this study, polyphenol contained in *P. minus* extract analyzed through Folin-Ciocalteu assay presented by  $11.67 \pm 0.77$  GAE/g. Screening of antibacterial activity was performed using disc diffusion method at two concentrations of *P. minus* extract (250mg/ml and 500mg/ml). The preliminary screening of inhibition zone depicts that the extracts were more susceptible towards gram positive bacteria contrast to gram negative bacteria. *Staphylococcus aureus* and *Bacillus cereus* were subjected to Minimum Inhibitory Concentration (MIC) using a microbroth dilution method since both bacteria showed presence of inhibition zone in the initial screening test. The most striking result is that both bacteria activity were inhibited at 31.25mg/ml *P. minus* extract. Whereas the Minimum Bactericidal Concentration (MBC) of *P. minus* methanolic extract was 3.91 mg/ml. Thus, this study proved that *P. minus* methanolic extract has emerged as an alternative for microbial growth inhibitor in foods and its significant tremendous total phenolic content has potential as a natural antioxidant agent.

Keywords: *Polygonum minus*, total phenolic content, antibacterial activity, foodborne pathogens

## CHAPTER 1

### INTRODUCTION

#### 1.1 Background of study

Since immemorial, plants have long provided mankind with their role as endeavour to provide ailment for medical problems such as infections and maintaining people's health (Narasimhulu & Mohamed, 2014). According to (Rasdi, Samah, Sule, & Ahmed, 2010), more than 70% of world's population utilized traditional herbs as their principal medicinal consumption. An interesting findings by other researchers shows that the presence of phytochemical in herbs provided excellent source of natural antioxidant such as vitamin C, flavonoids, and polyphenol that aid in preventing oxidative stress (Huda-Faujan, Noriham, Norrakiah, & Babji, 2007; Qader, Abdullah, Chua, Najim, Zain, Hamdan, 2011; Subedi, Timalsena, Duwadi, Thapa, Paudel, Parajuli, 2014).

According to (Vimala, Rohana, Rashih, & Juliza, 2011; Subedi et al., 2014), disturbance of normal biological oxidation reduction system would lead to excess free radicals such as Reactive Oxygen Species (ROS) that accumulates and gradually results in DNA damage and protein oxidation creating condition called as oxidative stress. There were many studies accentuated on diseases contributed by excess free radical such as hydroxyl radical and superoxide anion for instance carcinogenesis, inflammation, neurodegeneration disorder and ageing (Kaneria & Chanda, 2012; Dong, Fu, Yin, Li, Wang, Cao, Zhang, Zhao, Ni, 2014). Some plants that had been studied showed good antioxidant activity included 'hempedu bumi' (*Andrographis paniculata*) and ginger (*Zingiber officinale*)(Arifullah et al., 2013; Sivasothy et al., 2011).