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**QUALITATIVE PHYTOCHEMICAL ANALYSIS AND ANTIMICROBIAL  
ACTIVITY OF *Illicium verum* AGAINST FOODBORNE PATHOGENS**

**By**

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**Thesis Submitted in Partial Fulfillment for the Degree of Bachelor of Medical  
Laboratory Technology (Hons), Faculty of Health Sciences, Universiti Teknologi  
MARA**

**2015**

## DECLARATION

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



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(Siti Nasuha binti Abd Hadi)

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## ABSTRACT

*Illicium verum* or star anise was a commonly used spice with many usages especially in cooking. The usages of star anise also broaden to the entire world due to its medicinal values. Nowadays, there were increasing in the incidence of food- borne diseases caused by pathogenic microorganism thus increasing community concern on food safety. Chemical preservatives that were known to be toxic were widely used in foods. In addition, artificial antimicrobial or antibiotics that might cause side effects to the consumers were commonly used to treat food- borne diseases. The aim of this study was to evaluate antimicrobial activity of *Illicium verum* extract against food borne pathogens and to investigate phytochemical compounds found in *Illicium verum*. In order to evaluate the antimicrobial activity of *Illicium verum* extract against food borne pathogens, three methods were performed; antimicrobial susceptibility testing (AST) by disc diffusion method, determination of minimum inhibitory concentration (MIC) by using broth microdilution method and determination of minimum bactericidal concentration (MBC) by sub- culturing suspension in well onto Tryptic Soy Agar media. The phytochemical compounds were screened by using several standardized methods in which the results were interpreted basically based on colour changes and precipitation of the chemical reagents. The results showed that the sensitivity of both gram positive and gram negative bacteria towards the extract almost similar. The largest diameter zone of inhibition was shown by *S. aureus* and *E.coli* followed by *S. typhimurium*. The smallest zone of inhibition was shown by *B. cereus*. The zones of inhibition shown by all bacteria were considered significant because the *p*- value was less than 0.05. For the qualitative analysis of the phytochemical compounds, all the tested compounds; glycosides, phenols, alkaloids, tannins, and terpenoids were found present in the *Illicium verum* extract. In conclusion, the methanolic extract of *Illicium verum* had antimicrobial activity against selective food borne pathogens and had the value to become a replacement of synthetic chemical in food preservative and a new natural antimicrobial that was susceptible to food borne pathogens. Moreover, all the tested phytochemical compounds which had been reported contributed in the antimicrobial activity of the *Illicium verum* extract were present in the extract.

## CHAPTER 1

### INTRODUCTION

#### 1.1 Background of the study

Star anise or scientifically known as *Illicium verum* Hook. f. was a commonly used star-shaped spice that produced the scent of anise (Parthasarathy *et al.*, 2008). It was from family *Illiciaceae*, order *Austrobaileyales*, subclass *Magnoliidae*, class *Magnoliopsida* and division *Magnoliophyta* as stated by Wang *et al.*, 2011. Star anise was the fruit of an aromatic evergreen tree that was small to medium in size. The tree comprised of aromatic, lanceolate, leathery to thickly leathery leaves and axillary or subterminal bisexual flowers. The flowers produced a reddish to brown star-shaped fruit that consisted of six to eight boat-shaped carpels joined at the centre or in a whorl (Wang *et al.*, 2011). The cultivation area of star anise tree was in Asian countries which were south China, Japan, Vietnamese province of Lang Son and in mountainous regions of Eastern Laos (Parthasarathy *et al.*, 2008).

Apart from its usage as spice in cooking, star anise had many other contributions throughout this living. Furthermore, though star anise was grown in Asian countries, its usage was not limited in Asian yet dissipated worldwide. In China, some of the contributions of star anise in culinary included it was one of the essential spices in the five-spice powders used in Chinese cooking and it acted as flavour enhancer in Chinese stew called red cooked dishes (Wang *et al.*, 2011). In Vietnam, star anise was used in making Vietnam's famous noodle soup, which was Pho bo soup while in India, it was used in making curry and a part of Indian stews. In Western countries, star anise started to be included in their life since its introduction in seventeenth century. From that time, the usages of star anise broaden until it was used in confectionary industry and became flavour of liqueurs (Parthasarathy *et al.*, 2008).