

USING



**THE EFFECT OF USING DIFFERENT TYPES OF
SOLVENT TOWARDS THE QUALITY
OF *PIPER BETEL* CRUDE EXTRACT**

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ABSTRACT

Piper betel or widely known as *Daun Sireh* has been widely used traditionally to treat various disease since ancient time. Its therapeutic properties such as antibacterial, anti-inflammatory and antioxidant activities was believed to be contributed by its bioactive compounds. The extracting solvent is crucial to extract its bioactive compound which contribute to its therapeutic activities. The effects of various solvents on the antioxidant and antibacterial activity of *Piper Betel* leaf extract have not been well studied. Therefore, this study was conducted to determine the effect of using different types of solvents (acetone, n-hexane, ethyl acetate) towards the percentage of extraction yield and the amount of Gallic acid in *Piper betel* leaf crude extract. The extraction of *Piper betel* leaf was done by using Soxhlet extraction technique and the determination and quantification of Gallic acid was implemented by using High Performance Liquid Chromatography (HPLC). The result showed that the percentage of extraction yield was ranging from 1% - 58 %. The highest percentage extraction yield was exhibited by ethyl acetate with the value of 58%. Furthermore, all extracts showed the presence of Gallic acid with the range of 40.89ppm-58.85ppm. The highest value of Gallic acid was exhibited by the extraction using n-hexane as a solvent which is 58.85ppm. However, taking into consideration on the safety and environmental aspects, the extraction of *Piper betel* leaf using acetone was chosen as the best extracting solvents to extract Gallic acid and its extract has a potential to be developed as a future herbal-based products. In a nutshell, the extracting solvents which are acetone, n-hexane and ethyl acetate gives a significant effect on the percentages of extraction yield and the amount of Gallic acid presence in the *Piper betel* leaf crude extract.

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CHAPTER ONE

BACKGROUND

1.1 Introduction

Herbal and natural raw materials have attracted enormous attention in cosmetics, food additives, medical formulations, fragrances and nutrition due to the complex mixtures of several compound in their matrices exhibiting synergistic and additive properties. *Piper betel* also known as Betel or Sireh belongs to *Piperaceae* family which appear with glossy, heart shaped leaves and the spicy and fragrant in flavour are most often utilized plant portion. This plant is mostly grown for its leaves which originated from South and South East Asia (Azahar *et al.*,2020). It is considered a lucky plant by Indians, Nepalis, Singhalese, Thais and Vietnamese, and is used in auspicious functions, festivals, ceremonies and sacred rituals. In some countries like Malaysia, India, Sri Lanka, Indonesia, Philippine Islands and East Africa, it can easily be found as those country cultivated the plant locally. In Malaysia, it locally called as Sireh. Traditionally, *Piper betel* used as mouth refresher. *Piper betel* chewed with combination of lime betel, hard fruit, areca nuts and gambier and the chewing contains lots of benefits of helping to strengthen the teeth and refreshing the mouth. *Piper betel* paste also is widely used to cleanse hair and private areas in addition to being consumed. In medicine aspect, the medical properties possessed by *Piper Betel* is utilized to treat wounds and cuts by crushing and spreading its paste on the injured area. Due to presence of many bio constituents or bioactive compound throughout the plant, the plant is able to cure disease (Madhumita *et al.*,2019).

The majority of earlier studies on *Piper betel* leaves focused more on the elements found in the extract. In general, solvents like methanol, ethanol, acetone, propanol, and ethyl acetate have been often employed for the extraction of phenolics from fresh products. The choice of solvent is a crucial component of any extraction (Muruganandam *et al.*,2017).

Several investigations have been conducted on the phytochemical components of *Piper Betel* leaves, as well as the extraction and isolation of intriguing chemicals from *betel* plants. However, the content of the plant extracts varied greatly depending on geographical origin and extraction processes (Nawaz *et al.*,2020). As a result, the conditions of chromatographic analysis varied depending on the phytochemical groups

of interest in the extract matrix. Gallic acid is a polyphenolic molecule found in many medicinal plants that has anti-inflammatory, antimutagenic, and antioxidative properties (Karamac et al., 2006). The existence of Gallic acid in betel leaf was not definitely proven, however, because the qualitative and quantitative detection of Gallic acid in *betel* plant extracts has been rarely reported (Nguyen *et al*,2020). The aims of this study were to determine the presence of Gallic acid in *Piper betel* leaves extracts produced by different type of solvents, as well as to investigate the effects of different extracting solvents on the percentage yield of Piper betel leaves crude extract. The presence of Gallic acid was carried out using a high-performance liquid chromatography (HPLC) system and the extraction process was done by using Soxhlet technique.