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Influence of Solvent Polarity and Conditions on Extraction of Antioxidant, Flavonoids and Phenolic Content from *Averrhoa bilimbi*

Norlia Muhamad^{1,2}, Siti Aishah Muhmed², Mashitah M. Yusoff³ and Jolius Gimibun^{2,4}

1. Faculty of Bioresources & Food Industry, Universiti Sultan Zainal Abidin, Tembila Campus, Besut 22200, Terengganu, Malaysia

2. Faculty of Chemical and Natural Resources Engineering, Univ. Malaysia Pahang, Gambang 26300, Malaysia

3. Faculty of Industrial Science and Technology, Univ. Malaysia Pahang, Gambang 26300, Malaysia

4. Centre of Excellence for Advanced Research in Fluid Flow (CARIFF), Univ. Malaysia Pahang, Gambang 26300, Malaysia

Abstract: This paper presents the influence of solvent polarity and extraction conditions on the extraction of total flavonoid, total phenolic and antioxidants from *Averrhoa bilimbi*. The experiment was performed using a different solvent at different extraction conditions, including extraction time (15-240 min), temperature (30-70 °C) and agitation speed (50-300 rpm). Results showed that yields of extraction varies with solvent polarity. Extraction using 50% aqueous methanol gives the highest antioxidant activity and flavonoid content. The highest total flavonoid content (193.3 µg quercetin equivalent/g dry weight), total phenolic content (717.8 µg gallic acid equivalent/g dry weight) and antioxidant activity (77%) was achieved using 50% methanol, at 70 °C and agitation speed of 300 rpm. This work may be useful for obtaining higher bioactive compounds during the extraction process of *A. bilimbi*.

Key words: Extraction, flavonoid, belimbing buluh, phenolic, antioxidant.

1. Introduction

Averrhoa bilimbi (vernacular name: belimbing buluh) is traditionally used in Malaysia for treatment of cough, cold, itches, boils, rheumatism, syphilis, diabetes, whooping cough and hypertension [1]. Previous scientific studies revealed that extract of *A. bilimbi* contained many useful bioactive compounds such as amino acids, citric acid, cyaniding-3-O-β-D-glucoside, phenolics, potassium ion, sugars and vitamin A [2-4]. It is known to have excellent source in bioactive components with different medically useful functional properties. *A. bilimbi* is known to have high antioxidant content, although, the physicochemical characteristics of *A. bilimbi* depend on its maturity stage [3].

Effectiveness of functional food derived from *A.*

bilimbi in preventing diseases depends on the bioavailability of the active ingredients. The first step to recover and purify bioactive compound from plant materials involves an extraction process. The yield of bioactive compound in the extract is dependent on the solvent used, extraction method and condition. Successful extraction of bioactive compounds from plant material is largely dependent on the type of solvent used. During extraction, solvent diffuses into the solid plant material and solubilize compounds with similar polarity [5]. It is known that extracts from the same plant material may vary widely with respect to their antioxidant, phenolic and flavonoids concentrations and activities. The maceration technique was employed by several researchers [2, 3, 6] to extract the polyphenol and antioxidant from *A. bilimbi*. However, none of these studies considered the effect of varying solvent polarity and operating conditions to the yield of polyphenol and antioxidant

Corresponding author: Norlia Muhamad, M.Sc., research fields: food technology and chemical engineering. E-mail: norliamd@unisza.edu.my.