UNIVERSITI TEKNOLOGI MARA

DETERMINATION OF BIOACTIVE COMPOUNDS IN PUNICA GRANATUM SEEDS USING SOLVENT EXTRACTION

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ABSTRACT

The potent pomegranate (*Punica granatum* L.) seeds are expected waste from the pomegranate juice industry as well as in domestic use. The seeds oil holds tremendous potential in having bioactive components that are useful for medicinal purposes. The evaluation of solvent extraction using different solvents in Soxhlet apparatus showed that the highest amount of pomegranate seeds oil (PSO) yield was recorded by n-hexane (25.25%) followed by acetone (14.31%) and methanol (13.79%). The qualitative identification of bioactive constituents of obtained oil was carried out by Gas Chromatography - Mass Spectrometry (GC-MS) technique. The result showed that PSO is prime source of desired conjugated linolenic acids. Other fatty acid were arachidonic, oleic and palmitoleic acid. Furthermore, some terpenes that were classified as triterpene, sesquiterpene and monoterpene such as squalene, ç-elemene and β-linalool, respectively were also identified. FT-IR analysis showed PSO contained expected main functional groups such as alkanes, alkenes, ether, ester and carboxylic acid.

Keywords— **Bioactive Compounds, Conjugated fatty acid, Pomegranate Seed Oils, Solvent Extraction.**

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INTRODUCTION

1.1 Research Background

Pomegranate *(Punica granatum* L.) is an Iranian indigenous fruit that belongs to the *Punicacea* family. An ancient shrub that is a member of the *Lythraceae* family, is vastly naturalized in the Mediterranean region and Northern India (Ahangari & Sargolzaei, 2012). In some countries, it is known as the fruit of *Eden* as stated in the Al-Quran for its sublime medicinal properties and charming taste. Researchers over the decade had found that *Punica granatum* and its extract retain protective compounds against illness such as cancer, atherosclerosis and cardiovascular diseases (Akhtar et al., 2015). Pleasingly, pomegranate has been evaluated as pharmacologically active on the grounds of its numerous phytochemical contents that are anti-inflammatory, antimicrobial, antioxidants and neuroprotective (Wu & Tian, 2017). According to Goula (2013), pomegranate was found to have the highest amount of polyphenols amongst the other fruits studied. The important bioactive phytochemical groups are the phenolic compounds, flavonoids, tannins and anthocyanins on account of their free radical scavenging activities (Al Juhaimi et al., 2017).

Interestingly, the health benefiting components mentioned above are not only bounded to the edible part of the fruit, veritably the non-edibles (i.e. seeds and peels) contain even higher quantity of nutraceutical properties as comparison to the former (Orgil et al., 2014). The fruit constitutes three portions which are the peels, the juice and the seeds (Çam & Hışıl, 2010). The fruit peel has abundant of unique polyphenol with potential antioxidant property called punicalagin and anti-tumour elements like corilagin and pseudopelletierine (Khwairakpam et al., 2018). Correspondingly, pomegranate seeds contain high amount of conjugated fatty acids, vitamin E, sterols, anti-inflammatory, antioxidants and natural estrogens like estrone and estradiol (Basiri, 2015). Verardo et al. (2014) reported that the seed mainly composed of punicic acid that has been discovered experimentally in vivo to have anti-inflammatory and anti-metabolic syndrome component. Punicic acid in structure is conjugated octadecatrienoic with cis-9, trans-11, and cis-13 double bonds (Jing et al., 2012).