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Chemical and Fatty Acid Compositions of Crude and Purified Extracts Obtained from *Datura innoxia* Seeds Extracted with Different Solvents

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Abstract: Oils play a key role as raw materials in a variety of industries. The aim of this study was to evaluate the potential of *Datura innoxia* seed oil cultivated in Saudi Arabia for industrial purpose and to study the effects of hexane, chloroform, and isopropanol as extraction solvents on the compositions of the extracts. The results showed that the hexane and chloroform extracts were mainly neutral oils which were rich in linoleic (≈46%) and oleic (≈31%) acids. However, the isopropanol extract contained large amount of neutral oil and organic acids. Neutral oil contained mainly palmitic acid (40.2%) and some important and valuable epoxy (15.4%) and cyclopropane (13.2%) fatty acids. Analysis of the sterol and tocopherol levels of the crude and purified oil extracted revealed that they were significantly affected by the extraction solvent used.

Key words: *Datura innoxia* seeds, extraction solvent, seed oil, unusual fatty acids, tocopherols, sterols

1 Introduction

In recent years, there has been increasing interest in the manufacture and use of non-edible and edible oils. They are an important subject in a wide range of scientific and industrial disciplines. For instance, non-edible and edible oils are widely used in the production of biofuels, especially biodiesel, and other non-food industrial uses[1].

To date, the demands for oils of both edible and non-edible oils purpose are ever increasing and conventional sources are enable to meet these demands owing to the increasing world population. The world market is largely dominated by palm, canola, coconut, and soybean oils. Furthermore, other vegetable oils are widely used for industrial applications including castor and Tung oils. In recent years, there has been an increasing interest in the use of unexploited plant species as a secondary source of oils. Many of them contain large quantities of oils and a high proportion of industrially fatty acids. Moreover, no oil from any source has been found to be suitable for all purposes since oil from different sources has different range of chemical compositions[2].

Several studies have demonstrated that non-edible and edible oils are rich sources of valuable lipophilic compounds such as sterols, squalene, tocopherols, carotenoids, and essential fatty acids[1]. Furthermore, polyunsaturated fatty acids are in high demand in cosmetic sectors. These essential fatty acids are required for skin treatment and hair growth.

Shahidi[2] reported that four type of process have been generally used to extract oil from fruits or seeds: hydraulic press, expeller or screen press extraction, prepress solvent extraction, and direct solvent extraction. These oil extraction processes have no effect on fatty acid composition, whereas the solvent extraction process has the benefit of significantly higher oil yield compared to mechanical press processes. In addition, Akoh[3] showed that solvent extraction process gave 11.5% more oil yield than the screw press method did, and less oil remained in the meal. Selection of the oil extraction process is related to the yield of the starting materials. When the oil yield is higher than

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