UNIVERSITI TEKNOLOGI MARA

CYTOTOXICITY STUDIES OF *VITEX TRIFOLIA* EXTRACTS

AFNAN SH. AHMAD

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ABSTRACT

An *in vitro* cytotoxicity study is used as a standardized, rapid test to determine the toxic effect of the extracts on the cell lines. The purpose of this research was to find out the effects of *Vitex trifolia* methanol leaf and chloroform stem extract (1000, 100, 10, 1, 0.1 µM) on five cell lines which are CHO (Normal Chinese hamster ovary cell line), Vero (Normal Monkey Kidney), WRL68 (human hepatic cell line), HCT116 (human colon carcinoma) and HepG2 (human hepatocellular carcinoma) by using MTS cytotoxicity assay. The IC_{50} were established for the two extracts and the five cell lines. The IC_{50} for *V. trifolia* methanol leaf extract were 35.64±4.10 µg/mL for CHO cell, 131.01±8.87 µg/mL for Vero cell, 90.87±10.12 µg/mL for WRL68 cell, 37.29±6.76 µg/mL for HCT116 cell and 40.52±9.27 µg/mL for HepG2 cell. While the IC_{50} values for *V. trifolia* chloroform stem extracts were 51.13±5.90 µg/mL for CHO cell, 131.01±10.27 µg/mL for Vero cell, 51.01±11.67 µg/mL for WRL68 cell, 28.99±13.16 µg/mL for HCT116 cell and 64.83±15.27 µg/mL for HepG2 cell. From the results, for *Vitex trifolia* methanol leaf extract Vero cell line exhibited the highest IC_{50} followed by WRL68, HepG2, HCT116 and CHO cells. For *Vitex trifolia* chloroform stem extract the Vero cell lines showed the highest IC_{50} followed by HepG2, CHO, WRL68, and HCT116. In conclusion, both extracts seemed to be cytotoxic to cancerous cells more than the normal cells. This may be a beginning in the search for new anticancer agents.

CHAPTER 1

INTRODUCTION

1.1 Introduction

Cytotoxicity is the ability to toxify and kill the cells which will lead to two distinguishable mechanisms of cell death: necrosis and apoptosis. Apoptosis is a programmed cell death in multicellular organisms which is induced by signals either intrinsic or extrinsic. This will lead to condensation of nuclear chromatin, then the loss of plasma membrane phospholipid asymmetry, followed by activation of proteases and endonucleases, enzymatic cleavage of the DNA into oligonucleosomal fragments and segmentation of the cells into membrane-bound apoptotic bodies (Kidd, 2000). The cells which undergo necrosis will rapidly swell, lose membrane integrity, shut down metabolism and release their contents into the environment.

There are many cytotoxic agents available for the treatment of diseases and lots of studies involving the extraction of cytotoxic agents. However, problems can arise in developing a successful selective, rationally targeted cytotoxic agent in which it is only harmful for the infected cell. *Vitex trifolia* was targeted for this research due to the cytotoxic activity shown by some of its compounds. *Vitex trifolia* is a shrubby tree which grows fast, that can grow up to 20 feet. It belongs to the Verbenaceae family which found throughout many countries, while the genera *Vitex trifolia* is