

UNIVERSITI TEKNOLOGI MARA

**INVESTIGATION ON THE CYTOTOXIC
EFFECTS OF THE METHANOL EXTRACT OF
Clinacanthus Nutans (Burm.F.), *Mentha Piperita*
(Linn.) AND SEEDS OF *Nigella Sativa* (Linn.) ON
HepG2 and CHANG LIVER CELL LINE**

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ABSTRACT

Cancer is still a major public health problem around the globe with current therapies which lack selectivity and account for the other serious side effects. Plants play important roles as remedies even from centuries ago and plant derived secondary metabolites possess anticancer property. The *in vitro* anticancer activity of the methanol extract of the *Clinacanthus nutans*, *Mentha piperita* and seeds of *Nigella sativa* were evaluated against liver hepatocellular carcinoma (HepG2) and Chang liver cell lines. The fresh leaves of *C. nutans*, *M. piperita* and the seeds of *N. sativa* were air-dried and then soaked with methanol in ratio of 1:20 (w/v) for 72 hours followed by subsequent evaporation to dryness process. The crude dried extracts were prepared in the concentration of 10 mg/ml by redissolving them in dimethyl sulfoxide (DMSO) and the extract were tested on the HepG2 and Chang liver cell line which then subjected to the 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay for anticancer activity. Based on the results, *M. piperita* extracts showed the best anticancer activity against the HepG2 cell line which followed by *C. nutans* extract and seeds of *N. sativa* extract with IC₅₀ of 9.9 µg/ml, 10.0 µg/ml and 66.0 µg/ml respectively. IC₅₀ was not observed in any of the extracts when tested on Chang liver cell line indicates selectivity only to cancer cells but not normal cells. It can be concluded that methanol extract of all of the plants contain active ingredient with potential selective anticancer property.

Keywords: anticancer, *Clinacanthus nutans*, *Mentha piperita* and seeds of *Nigella sativa*

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Cancer is a major public health problem around the globe in which one of four deaths in the United States were reported to be due to cancer (Siegel *et al.*, 2012). Cancer is a disease characterized by uncontrolled cellular growth with frequent cancer cells metastasized to different part of body parts. Cancer which begins from genetic alteration (mutation) of a cell within a tissue can be due to specific influence of environmental factors such as radiation, smoking and diet (Kintzios & Barberaki, 2004). Based on data from previous years, a total of 1,638,910 new cancer cases and 577,190 deaths due to cancer are anticipated to occur in United States in 2012 (Siegel *et al.*, 2012). National Cancer Registry reported the Age-Standardised Incidence Rate (ASR) for all type of cancers among Malaysians in Peninsular Malaysia in 2006 was 131.3 per 100, 000; in which the most common cancers were breast, colorectal, lung, cervix and nasopharynx (Registry, 2006).