UNIVERSITI TEKNOLOGI MARA

INHIBITORY EFFECTS OF FRUIT PEEL EXTRACTS ON FREE RADICALS AND PROLIFERATION OF LUNG CANCER CELLS

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ABSTRACT

Fruits contain minerals and vitamins that are important for the body. Fruits are usually peeled off before consuming and the peels are thrown away. Instead of being thrown away, it was used in this study to explore the potential biological ability. In this study, the fruit peels were tested to determine the free radicals scavenging potential using DPPH and nitric oxide scavenging assay as well as anti proliferative on A549 lung cancer cells. Three types of fruit peel namely mangoes, papayas and honeydews were collected and extracted using 95% ethanol. In nitric oxide scavenging assay, gallic acid and quercetin were used as positive control and ultrapure water was used as negative control. Extracts showed potential scavenging activity against nitric oxide as the IC_{50} was 67.93μg/ml. The nitric oxide scavenging activity of extracts (IC_{50} = 67.93μg/ml) was higher than quercetin (IC_{50} = 95.04μg/ml) but lower than gallic acid (IC_{50} = 55.30μg/ml). The extract also showed scavenging activity against DPPH with the IC_{50} equals to 183.84μg/ml. The DPPH free radical scavenging activity of extract was the highest compared to quercetin (IC_{50} = 267.91μg/ml) and gallic acid (IC_{50} = 186.06μg/ml). MTT assay was carried out to determinate the anti proliferative activity of the extract. Two types of cell lines were used, which were A549 lung cancer cell and CRL2522 normal skin cell. Quercetin was used as positive control. Extracts show high anti proliferative activity on cancer cells with the average IC_{50} is 57.96μg/ml ± 36.01 but low on normal skin cells with the average IC_{50} is 108.84μg/ml ± 69.64. Compared to quercetin, extracts have lower activity on cancer cells but higher activity on normal cells. In conclusion, fruit peels extract consists of honeydew, mango and papaya showed potential free radicals scavenging and anti proliferative activity on cancer cells.

Keywords: Fruit peels, free radicals, nitric oxide, A549.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF STUDY

Fruits are always being consumed as it is known to be beneficial to health as they have various vitamins and minerals that the body needs. Many people will peel the fruits to eat and the peels will be discarded. Some people make use of the peels such as citrus fruits and processed them into jams, dried products, pickles, etc. Despite that, not many people know how beneficial the peels are to health. Main role of fruit peels are as a protector to the fruits from direct contact with air and can prevent the fruit from dehydration and oxidation.

The protective role possessed by the fruit peels is aided by phytonutrients such as carotenoids, flavonoids and resveratrol. Phytonutrients are abundant in the fruit skin or the fruit peel (H. S. Parmar & A. Kar, 2009). Some phytonutrients such as flavonoids and carotenoids are related to antioxidant. Antioxidants are compounds that have the ability to delay or prevent oxidations by blocking free radical productions and radical-chained reaction (Ismail, Chan, Mariod, & Ismail, 2009). Free radicals are unstable atoms with unpaired electrons which are formed during the normal energy production and metabolism process. However, in high amount, free radicals have been implicated with DNA damage thus resulting in cancer, ageing and