Study on Human Cancer Inhibition by Bitter almond (*Prunus armeniaca LINNE var. ansu* MAXIMOWICZ.) Extracts

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INTRODUCTION

In general, almond is categorized into two types: sweet and bitter almonds. Almond is said having the functions of anti-cancer, promoting digestion, antitussive, suppressing pant, and improving one's look. It is known as one of the food materials in our daily life. The lipid content of almonds ranges from about 40% to 60%, Oleic acid, linoleic acid and linolenic acid account on a mass basis for about 70%, 20% and less than 1%, respectively. Generally speaking, sweet almond is used for food processing, whereas bitter almond is applied to the Chinese medicine. In literature, the active constituent in bitter almond reported is amygdalin, which could be hydrolyzed into hydrogen cyanide by β-glucosidase.

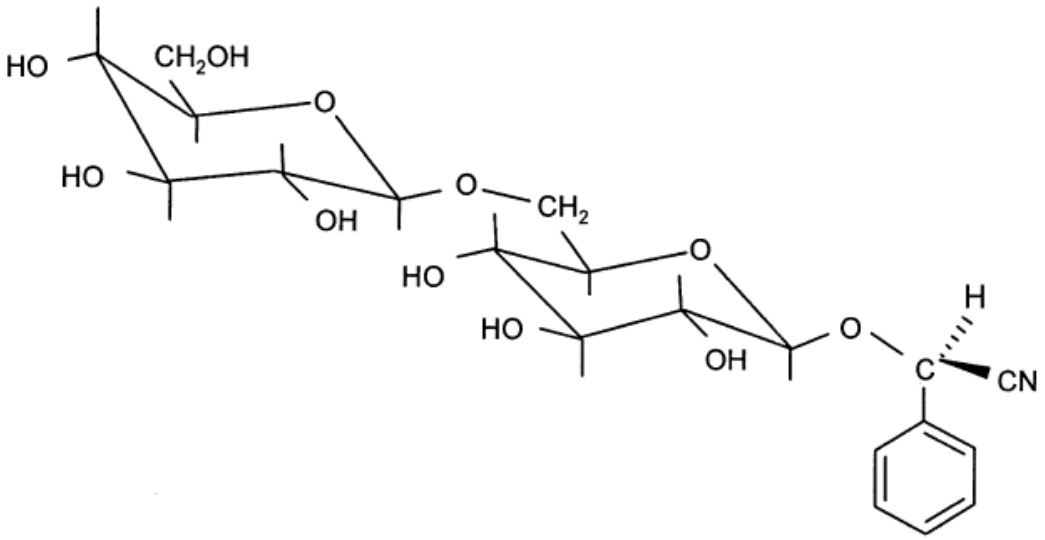

Figure 1. The chemical structure of amygdalin

METHODOLOGY

Bitter almonds were purchased from the Xing Yuan trading company (Kaohsiung, Taiwan). Human hepatoma HepG2 (BCRC 60177), human lung carcinoma A549 (BCRC 60074), and normal human embryonic kidney FL83B (BCRC 60325) cells were purchased from Bioresource Collection and Research Center (Hsinchu, Taiwan). Fetal bovine serum (FBS) and 10┐trypsin were purchased from Biological industries (Kibbutz Beit Haemek, Israel). Dulbecco's Modified Eagle's medium (DMEM), Hams F-12k medium, and 3-(4,5- cimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide (MTT) were purchased from Sigma – Aldrich (St. Louis, MO, USA).

Figure 2. The morphology of tree and seed of bitter almond

RESULTS AND DISCUSSION

In the present study, we examined the cytotoxicity of 70% ethanol extracts of bitter almonds as well as inhibition in human anti-cancer cell line (HepG2, A549and FL83B). By MTT assay, we demonstrated that bitter almond extracts reduced viability of anti-cancer cells via a dose- and time-dependent manner. Furthermore, apoptotic features such as cell shrinkage, taking together, our results show that bitter almond extracts presented cytotoxic effects.

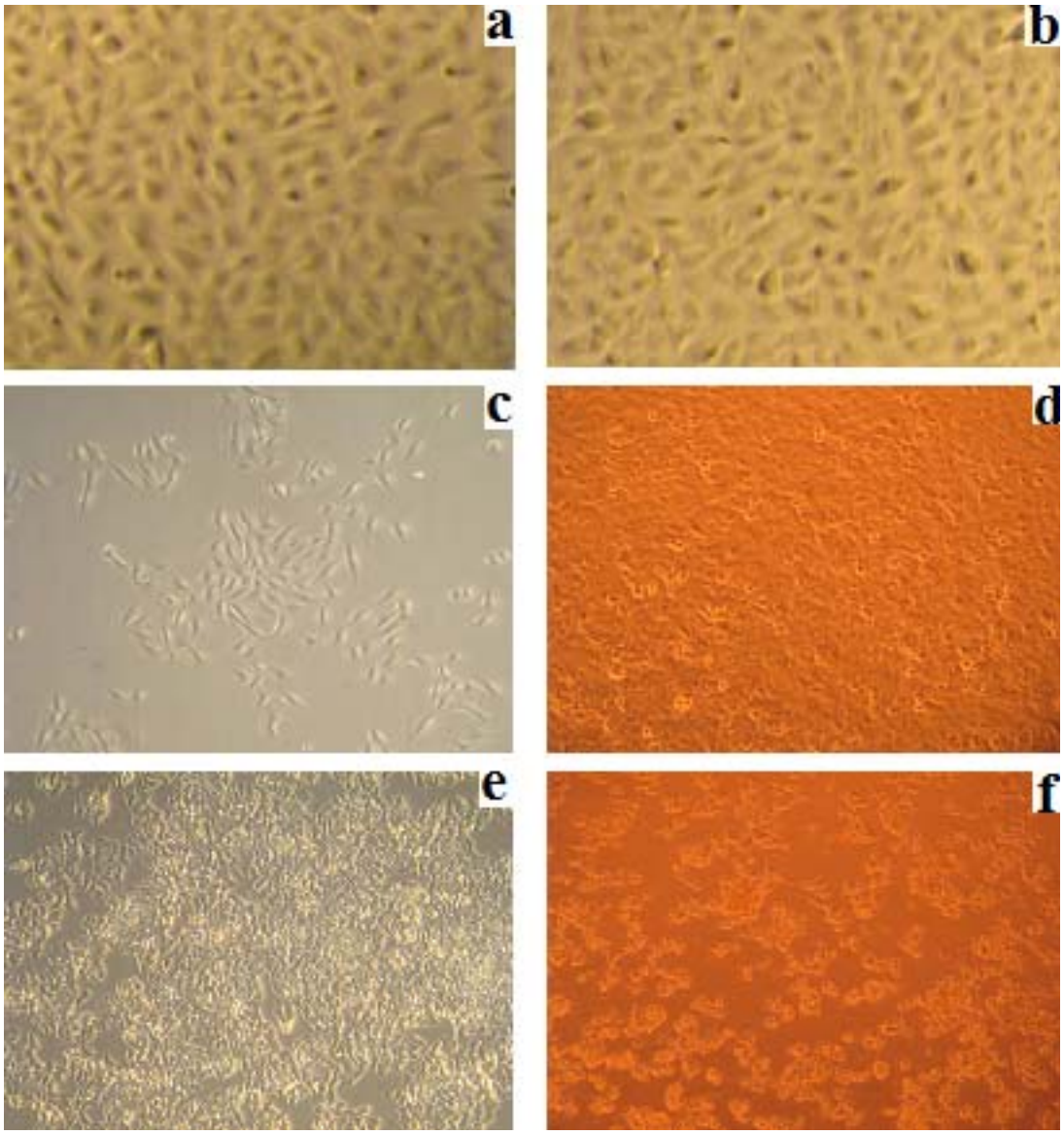

Figure 3. Microscopic images of human cancer cell line (HepG2, A549and FL83B) treated. (a) FL83B treatment Before.(b) FL83B processed. (c) A549 treatment Before.(d) A549 processed. (e) Hep G2 treatment Before.(e) Hep G2 processed. Bar = 10 μm.

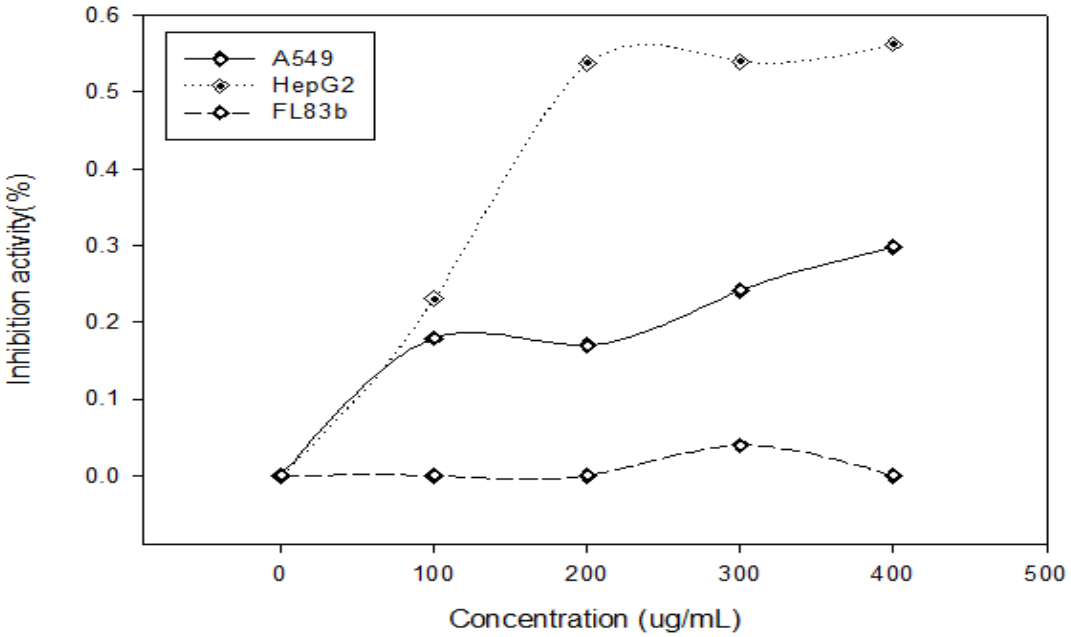

Figure 4. Inhibitory effects of **bitter almond extracts** on HepG2, A549, and FL83b cells. Cells were treated with increasing concentrations of SAMPLE for 24h, and cell viability was determined by the MTT assay. Results are expressed as percentages of MTT absorbance with respect to the untreated vehicle control wells (n=6).

CONCLUSIONS

The bitter almond extracts-induced suppression of cell viability of anti-cancer may in part be attributed to their phytochemical (amygdalin) contents and as an effective inducer of apoptosis as well.

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