



Cytotoxic Effects of Apple Peel Extract and Cisplatin Combination on Lung Cancer Cells

Ozlem Aleyna Un^{1*} and Sevgi Maraklı²

¹Yildiz Technical University, Graduate School of Science and Engineering, Program of Biotechnology, 34220, Istanbul, Türkiye.

²Yildiz Technical University, Faculty of Arts and Sciences, Department of Molecular Biology and Genetics, 34220, Istanbul, Türkiye.

Abstract

Lung cancer is one of the most common malignancies worldwide and remains a leading cause of cancer-related deaths. Despite advances in diagnosis and treatment, patient survival rates remain unsatisfactory. The human lung adenocarcinoma cell line A549 is widely used as an *in vitro* model in lung cancer research. Cisplatin (Cis), a commonly used chemotherapeutic agent in lung cancer treatment, exhibits strong antitumor activity but is associated with serious side effects. Therefore, plant-derived bioactive compounds have attracted increasing attention for their potential to enhance the efficacy of chemotherapeutic agents while reducing adverse effects. Apple peel is rich in phenolic compounds, polyphenols, and triterpenes with strong antioxidant properties. Amasya Misket Apple is a geographically indicated local variety known for its unique aroma and bioactive composition. This study aimed to investigate the cytotoxic effects of the combination of Amasya Misket Apple peel extract obtained via supercritical CO₂ extraction and Cis on the A549 human lung adenocarcinoma cell line. The cytotoxic effects of the extract and Cis were first evaluated separately using the MTT assay, followed by combination treatments. According to the 24 h MTT assay results, dose-dependent cytotoxic effects were observed in the groups treated with the extract and Cis alone, and combination doses were selected based on these findings. Combination treatments significantly reduced cell viability compared with the control group ($p < 0.0001$). Cell viability decreased to 47% in the 0.1 mg/mL extract + 0.02 mg/mL Cis group ($p < 0.0001$), 50% in the 0.25 mg/mL extract + 0.01 mg/mL Cis group ($p < 0.0001$), 45% in the 0.25 mg/mL extract + 0.015 mg/mL Cis group ($p < 0.01$), and 47% in the 0.5 mg/mL extract + 0.01 mg/mL Cis group ($p < 0.01$). These findings suggest that Amasya Misket Apple peel extract may enhance the cytotoxic efficacy of Cis in A549 cells.

Keywords: A549, Cisplatin, Amasya Misket Apple, Supercritical CO₂ Extraction

