

Evaluation of Anti-Cancer and Antioxidant Activity of Bioactive Components of *Prunus dulcis* Against A549 Lung Cancer Cell Line

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Abstract

Background: Lung cancer is still one of the most common causes of cancer-related death worldwide highlighting the need for novel treatments. Lung adenocarcinoma (LUAD), the most prevalent subtype of non-small cell lung cancer (NSCLC), is characterised by high metastatic potential and frequent drug resistance, leading to poor patient prognosis. Standard treatments such as chemotherapy, radiation, and surgery can have unwanted side effects and become less effective over time. These challenges have encouraged the growing interest in natural compounds with anticancer potential. *Prunus dulcis* (sweet almond) belonging to the family Rosaceae is rich in bioactive phytochemicals such as polyphenols, flavonoids and terpenoids having antioxidant, anti-inflammatory and cytotoxic properties. However, its anticancer effects against A549 lung cancer cells are poorly explored in the literature.

Objective: The objective of this study was to evaluate the cytotoxic activity of methanolic extract of *Prunus dulcis* on A549 human lung adenocarcinoma cells by MTT assay and to determine the antioxidant capacity by DPPH free radical scavenging assay.

Methods: The cytotoxicity of the extract was determined in A549 cells by the MTT assay after 24 hrs treatment with concentrations of the extract from 7.8 to 1000 µg/mL. The antioxidant activity was measured by DPPH assay at 200–1000 µg/mL and the absorbance was measured at 515 nm.

Results: Cell viability was decreased in a dose-dependent manner from 92.18% (7.8 µg/mL) to 50.44% (1000 µg/mL) with an estimated IC₅₀ near the highest concentration tested. DPPH scavenging activity increased from 47.28% to 71.31% with an IC₅₀ of about 290 µg/mL.

Conclusion: The extract showed dose-dependent cytotoxic and antioxidant activities on A549 cells, indicating its potential as a natural anticancer agent for further mechanistic study.

Index Terms

Prunus Dulcis; A549 Cell Line; MTT Assay; DPPH Assay; IC₅₀; Antioxidant Activity; Anticancer Activity