CHEMICAL CHARACTERISTICS AND ANTIOXIDANT POTENTIAL OF "BO'STONLIQ" ALMOND BLOSSOMS

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This research focuses on evaluating the chemical profile and antioxidant (antiradical) properties of almond (Prunus amygdalus) flowers belonging to the "Bo'stonliq" cultivar. Ethanolic and aqueous extracts were comparatively analyzed using the DPPH radical scavenging method.

Plant material was dried and subjected to ultrasonic-assisted extraction with 96% ethanol and distilled water. Antioxidant activity was assessed spectrophotometrically at 517 nm, and IC_{50} values were calculated using regression analysis.

The results indicated that the ethanol-based extract exhibited stronger radical scavenging activity (IC_{50} = 338.66 µL) than the water-based extract (IC_{50} = 718.2 µL). This outcome is associated with the enhanced extraction efficiency of phenolic compounds in ethanol.

The findings confirm that almond flowers are a valuable natural antioxidant source with potential applications in pharmaceuticals, food preservation, and biotechnology.

Almond (Prunus amygdalus), belonging to the Rosaceae family, is widely recognized for its nutritional and medicinal importance. It is native to regions of Central Asia and the Middle East, where it has long been utilized in traditional medicine.

Recently, plant-derived bioactive compounds have gained attention due to their role in preventing oxidative stress-related diseases. Phenolic compounds and flavonoids are particularly important as natural antioxidants.

Although almond seeds have been extensively studied, the flowers remain less explored despite their significant phenolic content, which can reach up to 1.5% of dry weight. These compounds act as electron or hydrogen donors, neutralizing free radicals.

Oxidative stress is linked to various chronic diseases such as cardiovascular disorders, cancer, and neurodegenerative conditions. Therefore, identifying new natural antioxidant sources is of great importance.

The "Bo'stonliq" almond variety, cultivated under local conditions, has not been sufficiently investigated. This study aims to evaluate its antioxidant potential using modern extraction and analytical techniques.

The study revealed that antioxidant activity depends on both extract concentration and reaction time.

The ethanolic extract consistently showed higher activity compared to the aqueous extract. At the highest tested volume (100 µL), inhibition reached 15.11% for ethanol extract and 6.88% for water extract.

IC_{50} values:

- Ethanol extract: 338.66 µL
- Water extract: 718.2 µL

These findings demonstrate that ethanol is more effective for extracting antioxidant compounds from almond flowers.

The superior activity of the ethanolic extract can be explained by its ability to dissolve a broader range of phenolic and flavonoid compounds.

Water, being highly polar, extracts mainly hydrophilic compounds and may not efficiently extract certain antioxidant molecules.

The results align with previous studies, which also reported higher antioxidant activity in alcohol-based extracts. Additionally, ultrasonic extraction likely improved yield and efficiency.

The relatively low IC_{50} value of the ethanol extract indicates strong antioxidant potential, making it suitable for industrial applications such as pharmaceuticals and functional foods.

The research confirms that "Bo'stonliq" almond flowers are a promising natural antioxidant source. Ethanolic extracts demonstrated significantly higher activity compared to aqueous extracts.

These results highlight the importance of utilizing plant-based materials, including agricultural by-products, for developing high-value bioactive products.

Future studies should focus on isolating individual phenolic compounds and evaluating their biological effects in vivo.

References

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