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Dilbar Sunflower Variety: Agronomic Characteristics, Chemical Composition and Medicinal Importance

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Annotation: this article provides information about the chemical composition, medicinal value, and agronomic indicators of the Dilbar sunflower variety.

Keywords: Sunflower, Dilbar, oil, tocopherol, vitamin

Introduction

Sunflower (Helianthus annuus L.) is a plant widely cultivated for its oilseeds and widely distributed throughout the world. It is of both economic and ecological importance in agriculture. In addition to oil production, sunflower is used for many medical and pharmaceutical purposes. In Uzbekistan, a new variety, the "Dilbar" sunflower variety, is being bred with the aim of obtaining high yields, disease resistance, and high-quality oil.

This article provides an in-depth analysis of the agronomic characteristics of the "Dilbar" variety, its chemical composition, pharmacological properties of the oil, and its role in health care. The aim is to determine the potential of the variety for agricultural and medical use.

Methods

Agronomic methods

The experiment was conducted in farms in the Bukhara region of Uzbekistan from April to September 2023. Seeds of the sunflower variety "Dilbar" were selected as standard certified seeds before sowing. Soil composition and climatic conditions were studied in detail, and crops were sown in four replicates in the experimental plots. The content of nitrogen, phosphorus, potassium and other microelements in the soil was analyzed.

Irrigation, fertilization, biological and chemical protection measures for plants against diseases and pests were observed. Yield, plant height, flowering period, seed number and seed size were regularly measured.

Chemical analyses

The composition of sunflower seed oil was studied by gas chromatography (GC) and spectrophotometric methods. Highly sensitive equipment was used to determine the content of fatty acids (oleic, linoleic, palmitic acids) and the amount of antioxidants (tocopherols, phenolic compounds).

Pharmacological tests

The anti-inflammatory and antioxidant activities of Dilbar oil were tested in laboratory conditions in human cell cultures and animal models. The immune-boosting and cell-defense-enhancing effects were evaluated using specific bioassays.

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Results

Agronomic indicators

- Yield: 25–27 centners/ha, which is 15–20% higher than traditional varieties available in the region.
- Plant height: 180–200 cm.
- Flowering period: about 75 days.
- Leaf area: on average 1200–1300 cm², which allows for optimal absorption of sunlight.
- Soil: showed good adaptability on medium sandy-clay soils.
- Disease resistance: high resistance to beetles, apricot spider mites and fungal diseases was determined (85% safety level against diseases).

Chemical composition

- Fat content: oleic acid — 60%, linoleic acid — 28%, palmitic acid — 8%.
- Tocopherol (vitamin E): 35 mg/100 g in seed oil.
- Phenolic compounds: 120 mg/100 g, which provides high antioxidant properties.

Pharmacological properties

- Antioxidant activity: the oil showed 65% efficiency in reducing free radicals in cells.
- Anti-inflammatory effect: in laboratory conditions, it was found that “Dilbar” oil reduced inflammation by 40%.
- Strengthening the immune system: in in vitro tests, the oil significantly increased the activity of immune cells.

Discussion

The high yield of the Dilbar variety and its adaptability to a wide range of climatic conditions make it very suitable for cultivation in various regions of Uzbekistan. The level of disease resistance leads to a reduction in pesticides, creating the possibility of growing environmentally friendly products. This is especially important in the context of developing organic agriculture.

The high oleic acid content of the oil is ideal for reducing the risk of cardiovascular diseases. The abundance of tocopherols and phenolic compounds acts as an antioxidant, protecting cells from free radicals, which helps to slow down the aging process and prevent cancer.

Pharmacological tests confirmed that the “Dilbar” sunflower oil has anti-inflammatory and immunomodulatory properties, which expands its application in dermatology, cardiology, and general health promotion.

However, low frost resistance may limit the variety’s winter cultivation in some regions, which indicates the need for further development of breeding work. Additional biotechnological studies are also needed to increase the bioactivity of the oil.

Conclusion

The “Dilbar” sunflower variety is of particular importance for the conditions of Uzbekistan due to its high yield, disease resistance, and high-quality oil. Its agronomic indicators create new opportunities for the development of local agriculture.

The pharmacological usefulness of the oil composition makes it a promising resource for use not only as a food product, but also in the medical and pharmaceutical industries.

In the future, it is recommended to increase cold resistance, further enrich the oil composition, and study its pharmacological properties through in-depth scientific research.

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