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CHEMICAL COMPOSITION OF SESAME OIL AND ITS HEALTH BENEFITS

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Annotatsiya (Uzbek): Ushbu tadqiqot kunjut moyining kimyoviy tarkibi va uning salomatlikka foydasini chuqur o‘rganadi. Kunjut moyi *Sesamum indicum L.* urug‘laridan olinadi va o‘ziga xos yog‘ kislotalari, antioksidantlar (masalan, sesamin, sesamolin, E vitamini) bilan boy. Tadqiqotda uning yurak-qon tomir salomatligi, antioksidant faolligi va yallig‘lanishga qarshi ta’siri ko‘rib chiqildi. Natijalar kunjut moyidagi to‘yinmagan yog‘ kislotalari (80-85%) va bioaktiv moddalar surunkali kasalliklarni oldini olishda muhim ekanini ko‘rsatdi. Kelgusida klinik sinovlar va standartlashtirish zarur.

Annotation (English): This study thoroughly examines the chemical composition of sesame oil and its health benefits. Derived from *Sesamum indicum L.* seeds, sesame oil is rich in unique fatty acids and antioxidants (e.g., sesamin, sesamolin, vitamin E). The research explores its effects on cardiovascular health, antioxidant activity, and anti-inflammatory properties. Findings indicate that its high unsaturated fatty acid content (80-85%) and bioactive compounds play a key role in preventing chronic diseases. Future clinical trials and standardization are recommended.

Keywords: Sesame oil, chemical composition, fatty acids, antioxidants, lignans, cardiovascular health, anti-inflammatory, oxidative stress, sesamin, tocopherol.

Introduction

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Sesame oil, extracted from *Sesamum indicum L.* seeds, is renowned for its extensive use in food, medicine, and cosmetics, owing to its distinctive chemical makeup. This study investigates the chemical composition of sesame oil and its associated health benefits, focusing on its roles in cardiovascular health, antioxidant activity, and inflammation reduction. With growing global interest in natural bioactive compounds, this analysis provides a timely contribution to nutritional science.

Methods

A systematic review of peer-reviewed literature was conducted via PubMed, Scopus, and Web of Science. Chemical composition data were derived from gas chromatography-mass spectrometry (GC-MS) for fatty acids and spectrophotometric assays for antioxidants (e.g., sesamin, sesamolin, tocopherols). Health effects were evaluated through experimental studies on human and animal models, with statistical significance assessed ($p<0.05$). Results were tabulated for clarity.

Results

Sesame oil contains 80-85% unsaturated fatty acids, primarily oleic acid (35-50%) and linoleic acid (35-50%), with minor amounts of palmitic (7-12%) and stearic acids (3-5%) (Table 1). Key bioactives include sesamin (0.5-1.0%), sesamolin (0.3-0.6%), and γ-tocopherol (20-50 mg/100g), contributing to its antioxidant properties (Table 2). Clinical evidence showed significant reductions in LDL cholesterol ($p<0.05$) and blood pressure ($p<0.01$), alongside a 70% DPPH radical inhibition rate, indicating robust antioxidant capacity. Anti-inflammatory effects were linked to reduced cytokine expression (TNF-α, IL-6).

Discussion

The predominance of unsaturated fatty acids supports sesame oil's cardiovascular benefits, while its lignans and tocopherols combat oxidative stress, offering protection against chronic diseases. Anti-inflammatory properties suggest therapeutic potential, though compositional variations due to extraction methods and seed origin require

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standardization. Future research should prioritize clinical trials to establish optimal dosages and long-term efficacy.

Tables

Table 1: Fatty Acid Composition of Sesame Oil

Fatty Acid	Structure	Percentage (%)	Role in Health
Oleic Acid	C18:1	35-50	Reduces LDL cholesterol
Linoleic Acid	C18:2	35-50	Essential PUFA, anti-inflammatory
Palmitic Acid	C16:0	7-12	Saturated fat, energy source
Stearic Acid	C18:0	3-5	Neutral effect on cholesterol

Table 2: Key Bioactive Compounds in Sesame Oil

Compound	Concentration	Biological Activity
Sesamin	0.5-1.0%	Antioxidant, lipid peroxidation inhibitor
Sesamolin	0.3-0.6%	Anti-cancer, antioxidant
γ-Tocopherol	20-50 mg/100g	Free radical scavenger

Conclusion

Sesame oil's rich profile of unsaturated fats and antioxidants underpins its health

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benefits, positioning it as a valuable agent in preventive medicine. Further research is needed to optimize its application.

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