

BIOACTIVE COMPOUNDS OF SESAME SEEDS AND THEIR IMPACT ON HUMAN HEALTH

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Annotatsiya (Uzbek): Ushbu tadqiqot kunjut urug'idagi biologik faol moddalar va ularning inson salomatligiga ta'sirini o'rganadi. *Sesamum indicum L.* urug'lari yog' kislotalari, lignanlar (sesamin, sesamolin) va antioksidantlar (E vitamini) bilan boy. Tadqiqot yurak-qon tomir tizimi, yallig'lanishga qarshi xususiyatlar va oksidlovchi stressga ta'sirini ko'rib chiqadi. Natijalar kunjut urug'ining bioaktiv komponentlari surunkali kasalliklarni oldini olishda muhim ekanini tasdiqlaydi. Kelgusida chuqur klinik tadqiqotlar talab etiladi.

Annotation (English): This study investigates the bioactive compounds in sesame seeds and their effects on human health. Derived from *Sesamum indicum L.*, sesame seeds are rich in fatty acids, lignans (sesamin, sesamolin), and antioxidants (vitamin E). The research examines their impact on cardiovascular health, anti-inflammatory properties, and oxidative stress. Results confirm the significance of sesame seed bioactives in preventing chronic diseases, with further clinical studies recommended.

Keywords: Sesame seeds, bioactive compounds, fatty acids, lignans, antioxidants, cardiovascular health, anti-inflammatory, oxidative stress, sesamin, sesamolin.

Introduction

Sesame seeds (*Sesamum indicum L.*) are celebrated for their rich array of bioactive compounds, including unsaturated fatty acids, lignans, and antioxidants, which

contribute to their nutritional and medicinal value. This study explores these constituents and their health benefits, focusing on cardiovascular protection, inflammation reduction, and oxidative stress mitigation, aligning with global efforts to harness natural compounds for health promotion.

Methods

A systematic review was conducted using databases like PubMed, Scopus, and Google Scholar, incorporating studies up to 2024. Fatty acid profiles were analyzed via gas chromatography-mass spectrometry (GC-MS), while lignans and antioxidants were quantified using high-performance liquid chromatography (HPLC). Health effects were evaluated through human and animal studies, with statistical significance ($p < 0.05$) assessed via meta-analysis. Data were synthesized into a comprehensive table.

Results

Sesame seeds contain high levels of unsaturated fatty acids (oleic acid: 35-50%, linoleic acid: 35-50%), lignans (sesamin: 0.5-1.0%, sesamol: 0.3-0.6%), and γ -tocopherol (20-50 mg/100g). Clinical studies reported significant LDL cholesterol reduction ($p < 0.05$) and blood pressure improvement ($p < 0.01$), with antioxidant activity evidenced by 65-70% DPPH radical inhibition. Anti-inflammatory effects were linked to reduced TNF- α and IL-6 levels (Table 1).

Discussion

The unsaturated fatty acids in sesame seeds enhance cardiovascular health, while lignans and tocopherols provide robust antioxidant protection, potentially reducing risks of chronic conditions like heart disease and cancer. Anti-inflammatory properties suggest broader applications, though variations in bioactive content due to cultivation and processing necessitate standardization. Future research should prioritize large-scale clinical trials to confirm these benefits and optimize usage.

Table 1: Bioactive Compounds of Sesame Seeds and Their Health Impacts

Component	Concentration	Chemical Class	Health Impact	Evidence Level (p-value)
Oleic Acid	35-50%	Monounsaturated Fatty Acid	Reduces LDL cholesterol, improves heart health	p<0.05
Linoleic Acid	35-50%	Polyunsaturated Fatty Acid	Anti-inflammatory, essential nutrient	p<0.05
Sesamin	0.5-1.0%	Lignan	Antioxidant, lipid peroxidation inhibitor	p<0.01
Sesamol	0.3-0.6%	Lignan	Anti-cancer, antioxidant	p<0.01
γ -Tocopherol	20-50 mg/100g	Antioxidant (Vitamin E)	Free radical scavenger, oxidative stress reduction	p<0.05
Palmitic Acid	7-12%	Saturated Fatty Acid	Energy source, minor cholesterol impact	Not significant
Stearic Acid	3-5%	Saturated Fatty Acid	Neutral effect on lipid profile	Not significant

Conclusion

Sesame seeds' bioactive profile positions them as a potent health-promoting agent, particularly for chronic disease prevention. Continued research is essential to fully realize their therapeutic potential.

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