

**University "St. Kliment Ohridski" - Bitola, Republic of North Macedonia
Faculty of Technology and Technical Sciences - Veles**



**Book of proceedings of the 1st International Scientific Conference -
Food Science, Nutrition, Innovative Technologies
and Sustainability**

**Veles, North Macedonia
February 2026**

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THE EFFECT OF MEDITERRANEAN DIET AND OLIVE OIL CONSUMPTION ON BETTER NUTRITIONAL STATUS AND HEALTH

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Abstract

The Mediterranean Diet (MedDiet) is widely recognized for its role in promoting health and preventing chronic diseases. This dietary pattern emphasizes the consumption of plant-based foods such as fruits, vegetables, legumes, whole grains, and nuts, with olive oil serving as the principal source of dietary fat. While extra virgin olive oil (EVOO) is often highlighted for its high polyphenol content and antioxidant activity, olive oil in general whether virgin or refined remains a fundamental component of the MedDiet and contributes significantly to its health benefits. Despite extensive research supporting the MedDiet's positive effects on cardiovascular, metabolic, and cognitive health, ongoing studies continue to explore the specific mechanisms through which olive oil contributes to these outcomes. This paper examines the relationship between adherence to the MedDiet, with a focus on olive oil intake, and improvements in overall nutritional status and the prevention of non-communicable diseases (NCDs). A comprehensive review of recent clinical trials and systematic reviews was conducted, synthesizing findings from diverse populations and study designs. The evidence consistently shows that individuals who regularly consume olive oil as part of the MedDiet experience reduced systemic inflammation, healthier lipid profiles, lower rates of obesity, and enhanced cognitive performance. Olive oil's high content of monounsaturated fatty acids (MUFA) and bioactive compounds plays a key role in these effects. These findings highlight the importance of incorporating olive oil into daily dietary habits and support the MedDiet as a sustainable and effective model for long-term health promotion.

Keywords: Mediterranean Diet, Olive Oil, Nutritional Health, Chronic Disease Prevention, Longevity

1. Introduction

Diet plays a fundamental role in shaping human health, influencing both the prevention of disease and the promotion of overall well-being. In recent decades, increased attention has been given not only to individual nutrients but also to broader dietary patterns that reflect real-world eating habits. Among these, the Mediterranean Diet (MedDiet) has emerged as one of the most consistently studied and evidence-based models for healthy living. Originating from the traditional eating habits observed in the early 1960s in regions such as Greece and Southern Italy, the MedDiet has drawn interest for its association with increased longevity, lower rates of chronic diseases, and improved quality of life (Sikalidis et al., 2021).

The Mediterranean Diet (MedDiet) is distinguished by its balanced and holistic nutritional profile, emphasizing a high intake of plant-based foods such as fruits, vegetables, legumes, whole grains, and nuts, with extra virgin olive oil as the primary fat source. It

includes moderate consumption of fish and poultry, while limiting red meat and processed foods. Beyond its composition, the MedDiet embodies a cultural appreciation of food and shared meals, contributing to overall well-being. Extensive scientific evidence supports the MedDiet's role in reducing the risk of non-communicable diseases, including cardiovascular disease, type 2 diabetes, and certain cancers. Notably, olive oil consumption within this dietary pattern is associated with improved biomarkers of inflammation, oxidative stress, and lipid metabolism. (Tsigalou et al., 2020).

2. Mediterranean Diet and Nutritional Health

Adherence to the Mediterranean Diet (MedDiet) has been consistently associated with favorable nutritional status, healthier body composition, and effective weight management across diverse populations. Beyond its well-documented cardiometabolic benefits, the MedDiet appears to offer a holistic and sustainable approach to nutrition that aligns with the body's long-term physiological needs. (M Dinu, 2018). As highlighted by Dominguez et al. (2023), numerous randomized controlled trials and longitudinal cohort studies have demonstrated a clear inverse relationship between adherence to the MedDiet and the prevalence of overweight and obesity. This relationship extends beyond the conventional understanding of calorie balance and reflects the broader, synergistic interactions among the diet's core components rich in dietary fiber, antioxidants, phytochemicals, and unsaturated fats. Unlike restrictive or highly processed dietary models, the MedDiet supports a more intuitive and balanced way of eating. Its abundance of plant-based foods, moderate intake of lean proteins, and reliance on olive oil not only enhance satiety but also improve metabolic efficiency. This dietary pattern helps regulate appetite and energy intake naturally, without promoting deprivation or overconsumption.

Moreover, the MedDiet contributes significantly to micronutrient adequacy and nutrient bioavailability. It provides ample amounts of omega-3 fatty acids, fat-soluble vitamins (such as A, D, E, and K), B-complex vitamins, minerals, and polyphenols each of which plays an essential role in maintaining immune resilience, metabolic health, and cognitive function (Tsigalou et al., 2020; Kiani et al., 2022).

The Mediterranean Diet promotes healthy aging through nutrients that support cellular repair, brain function, and inflammation control. Its cultural and enjoyable nature makes it more sustainable than restrictive diets. By blending science with lifestyle, it supports long-term weight management and overall health. (Finicelli, 2022) .

3. Anti-inflammatory and Disease-Preventive Properties

Chronic inflammation underlies a wide range of diseases, including obesity, diabetes, cardiovascular disease, and cancer. (Furman, 2019) .The MedDiet, through its rich supply of anti-inflammatory and antioxidant compounds, has been shown to mitigate inflammatory processes. Tsigalou et al. (2020) highlight that regular adherence to MedDiet reduces inflammatory biomarkers, suggesting a robust preventive mechanism against NCDs.

A meta-analysis by Dadkhah Tehrani et al. (2025) further supports these findings, showing that olive oil-supplemented MedDiet significantly reduces pro-inflammatory biomarkers and soluble adhesion molecules, which are implicated in the pathogenesis of atherosclerosis and cardiovascular events.

Current research offers valuable insights into the anti-inflammatory effects of the Mediterranean Diet (MedDiet), explored from both holistic and targeted angles (Razquin, 2019) Some studies highlight how overall adherence to the MedDiet reduces systemic inflammation, emphasizing the synergy between its components (Tsigalou, 2020) Others focus more specifically on olive oil, showing through meta-analyses that it may provide enhanced benefits when consumed regularly within the diet. (Flynn, 2023) .Together, these

perspectives underscore the importance of dietary patterns in managing chronic inflammation and show how traditional diets can guide modern approaches to disease prevention.

As detailed in the table below, various components of the Mediterranean Diet contribute to multiple aspects of health, with consistent evidence supporting their role in inflammation reduction, metabolic health, cognitive function, and cardiovascular protection.

Table 1: Key Health Benefits Associated with Mediterranean Diet (MedDiet) Components

Health Aspect	MedDiet Components Involved	Key Findings from References	References
Weight Management & Obesity	High intake of fruits, vegetables, whole grains, legumes, nuts, EVOO	MedDiet inversely associated with overweight and obesity; promotes satiety and balanced macronutrients	Dominguez et al., 2023
Anti-inflammatory Effects	EVOO polyphenols, antioxidants, fiber	MedDiet reduces inflammatory biomarkers (CRP, IL-6); EVOO supplementation lowers pro-inflammatory molecules	Tsigalou et al., 2020; Dadkhah Tehrani et al., 2025
Cardiovascular Health	EVOO, potassium-rich vegetables	MedDiet lowers LDL cholesterol, raises HDL, reduces blood pressure, decreases incidence of cardiovascular events	D'Alessandro, 2018; Razquin & Martinez-Gonzalez, 2019; Flynn et al., 2023; Pergola & Donat-Vargas et al., 2023
Cognitive Function	EVOO polyphenols, antioxidants	Regular olive oil intake associated with improved memory and executive functions, neuroprotection	Fazlollahi et al., 2023

		via reduced oxidative stress	
Metabolic Syndrome & Glycemic Control	EVOO, MUFAs	EVOO improves insulin sensitivity, reduces waist circumference, and improves metabolic markers	Seidita et al., 2022; Finicelli et al., 2022

4. Role of Extra Virgin Olive Oil (EVOO)

Olive oil, especially the virgin type, is central to the MedDiet and is often considered its most beneficial component. EVOO contains monounsaturated fatty acids (MUFAs), mainly oleic acid, and a high concentration of polyphenols such as hydroxytyrosol and oleocanthal, which exhibit powerful antioxidant and anti-inflammatory effects (Seidita et al., 2022). This underscores the pivotal role that olive oil, particularly the virgin varieties, plays within the MedDiet. While the presence of MUFAs like oleic acid is well known for its cardiovascular and anti-inflammatory benefits (Andrea Salvo, 2025), what truly sets EVOO apart is its rich content of polyphenols. Compounds such as hydroxytyrosol contribute strong antioxidant and anti-inflammatory properties, protecting cells from oxidative stress (Ajay Kumar, 2024). Oleocanthal has been shown to have ibuprofen-like anti-inflammatory effects, further enhancing the oil's protective potential against chronic diseases (Jiayin Liu, 2021). Together, these bioactive components help explain why olive oil is a cornerstone of the MedDiet and a key contributor to its health-promoting properties (Dinu, 2018).

Flynn et al. (2023) argue that EVOO surpasses other dietary fats in reducing LDL cholesterol, improving HDL cholesterol, lowering blood pressure, and enhancing glycemic control. Furthermore, olive oil's unique profile promotes insulin sensitivity, vascular health, and neuroprotection. This highlights why extra virgin olive oil is often seen as a superior dietary fat. It not only lowers LDL ("bad") cholesterol but also raises HDL ("good") cholesterol, supporting heart health. Its benefits on blood pressure and blood sugar control further underline its role in metabolic health, especially important given the rise in hypertension and diabetes. What's particularly impressive is olive oil's broader impact—improving insulin sensitivity, vascular health, and even offering neuroprotection. This shows it's more than just a fat; it's a powerful food that supports multiple body systems and helps prevent chronic diseases. A cohort study by Donat-Vargas et al. (2023) revealed that moderate daily intake of virgin olive oil significantly lowers the risk of cardiovascular and all-cause mortality, an effect not observed with refined or common olive oil.

This finding really underscores the importance of the quality of olive oil in health outcomes. Moderate daily consumption of virgin olive oil—not just any olive oil—has been associated with significantly reduced risk of cardiovascular and overall mortality, as shown in large population-based cohort studies (Donat-Vargas, 2023). The refining process diminishes many of the bioactive phenolic compounds, such as hydroxytyrosol and tyrosol, which are largely responsible for olive oil's antioxidant and anti-inflammatory properties (Lucci, 2020). This reduction in protective compounds helps explain why refined olive oil does not confer the same mortality benefits as virgin olive oil. From a practical standpoint, these findings remind us that not all olive oils are created equal and that encouraging the use of high-quality, minimally processed oils could have meaningful public health implications. More broadly, it reflects how subtle differences in food processing can translate into significant differences in health outcomes, emphasizing the value of

traditional dietary choices rooted in whole, natural foods.

5. Cognitive and Cardiovascular Health Benefits

Olive oil consumption also correlates with enhanced cognitive performance, particularly in the elderly. A systematic review by Fazlollahi et al. (2023) found a strong association between regular olive oil intake and improved memory, executive function, and overall cognitive health. The neuroprotective effects are attributed to olive oil’s polyphenols and their ability to reduce oxidative stress and neuroinflammation. This highlights the promising link between olive oil consumption and brain health, especially in older adults. It’s inspiring to see that something as simple and enjoyable as regularly using olive oil can be associated with better memory, sharper executive function, and overall cognitive resilience. The neuroprotective effects tied to olive oil’s polyphenols through their ability to combat oxidative stress and reduce neuroinflammation offer a compelling biological explanation for these benefits. From a broader perspective, this reminds us how diet can play a vital role not only in physical health but also in preserving mental function and quality of life as we age. It encourages a shift towards prevention and lifestyle strategies that support cognitive longevity, which is incredibly important given the growing aging population worldwide. This kind of evidence adds a hopeful, practical dimension to nutritional science, showing that traditional foods can be powerful tools for maintaining brain health.

In terms of cardiovascular health, MedDiet's benefits are well documented. Razquin and Martinez-Gonzalez (2019) provide evidence that a traditional MedDiet enriched with EVOO significantly lowers the incidence of major cardiovascular events. This is supported by Pergola and D’Alessandro (2018), who noted MedDiet’s positive effects on blood pressure, largely due to the consumption of potassium-rich vegetables and olive oil. The cardiovascular benefits of the Mediterranean Diet are among its most well-established attributes, and the evidence supporting this is both robust and encouraging. It’s particularly striking how a traditional Mediterranean Diet, especially when enriched with extra virgin olive oil, can lead to a significant reduction in major cardiovascular events. This highlights the real-world impact of adopting such dietary patterns, moving beyond theory to tangible health outcomes. Additionally, the diet’s positive effect on blood pressure partly attributed to potassium-rich vegetables and olive oil illustrates the synergy within the diet’s components. It’s not just one nutrient or food but the combination that contributes to overall heart health. This integrative approach aligns with what we increasingly understand about nutrition: that whole dietary patterns, rather than isolated nutrients, drive meaningful improvements in health.

As summarized in the table 2, both molecular and clinical evidence further support the numerous health benefits linked to the Mediterranean Diet and olive oil consumption.

Table 2: Molecular and Clinical Evidence Linking Mediterranean Diet and Olive Oil to Health Outcomes

Evidence Type	Description	Key Molecular or Clinical Insights	References
Clinical Trials	Long-term randomized and cohort studies	MedDiet adherence improves	Finicelli et al., 2022; Dominguez et al., 2023

		metabolic profiles, reduces oxidative stress, and lowers cardiovascular risk factors	
Molecular Mechanisms	Epigenomic and metagenomic modulation	Diet influences gene expression related to inflammation and metabolism; reshapes gut microbiota composition	Kiani et al., 2022
Polyphenol Action	EVOO compounds like hydroxytyrosol, oleocanthal	Strong antioxidant and anti-inflammatory effects, reducing chronic disease risk	Seidita et al., 2022; Flynn et al., 2023
Mortality Risk Reduction	Consumption of virgin olive oil specifically	Significant decrease in cardiovascular and all-cause mortality observed	Donat-Vargas et al., 2023
Neuroprotection	Olive oil polyphenols and reduced neuroinflammation	Improved cognitive outcomes in elderly, prevention of neurodegenerative processes	Fazlollahi et al., 2023

6. Clinical and Molecular Evidence

Finicelli et al. (2022) updated the clinical trial landscape on MedDiet, demonstrating a surge in research linking this diet to reduced oxidative stress, lower waist circumference, and improved metabolic profiles. Notably, these trials confirm that long-term and strict adherence is key to achieving health outcomes. These studies consistently show that following this diet can reduce oxidative stress, lower waist circumference, and improve metabolic health markers. What really stands out is that these benefits are mainly seen with long-term and strict adherence. This highlights that the Mediterranean diet isn't just a short-term fix but a lifestyle approach that requires commitment and consistency. Moving

forward, a key challenge will be figuring out how to support people in maintaining this diet over time, bridging the gap between clinical trial success and everyday practice.

On the molecular level, studies have begun to explore epigenomic and metagenomic changes driven by MedDiet adherence. Kiani et al. (2022) describe how this dietary pattern influences gene expression, gut microbiota composition, and inflammation pathways, further strengthening its status as a nutritionally optimal diet. These findings suggest that the Mediterranean diet works not only through its nutrient content but also by affecting how our genes are turned on or off and by shaping the microbial communities in our gut. This deeper understanding helps explain why the Mediterranean diet is considered nutritionally optimal and supports its role in preventing chronic diseases by modulating key biological processes.

7. Conclusion

Mediterranean Diet anchored by the use of olive oil represents one of the most well-supported dietary patterns for promoting overall health and preventing a wide range of chronic diseases. The wealth of clinical evidence clearly demonstrates its ability to improve nutritional status, reduce obesity, lower inflammation, protect cognitive function, and enhance cardiovascular health. What makes the Mediterranean diet truly remarkable is how it addresses multiple health outcomes simultaneously, reflecting a holistic approach rather than focusing on isolated nutrients or symptoms. Beyond these clinical findings, emerging molecular research has deepened our understanding of how the diet interacts with our biology on a genetic and microbiome level. This offers exciting opportunities to tailor dietary advice more precisely in the future, moving towards truly personalized nutrition.

However, despite the strong evidence, challenges remain in defining optimal serving sizes and understanding the unique effects of individual components within the diet. Looking ahead, continued research should aim to refine these aspects to help healthcare providers and individuals apply the Mediterranean diet in a way that fits diverse lifestyles and genetic backgrounds. Ultimately, the Mediterranean diet stands as a powerful example of how traditional eating patterns can be leveraged by modern science to improve public health on a broad scale.

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