

The Effect of Polyphenols in Olive Oil on Heart Disease Risk Factors

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FROM ABSTRACT:

Background:

Virgin olive oils are richer in phenolic content than refined olive oil.

Objective:

To evaluate whether the phenolic content of olive oil further benefits plasma lipid levels and lipid oxidative damage compared with monounsaturated acid content.

Design: Randomized, crossover, controlled trial.

Setting: 6 research centers from 5 European countries.

Participants: 200 healthy male volunteers.

Measurements:

Glucose levels, plasma lipid levels, oxidative damage to lipid levels, and endogenous and exogenous antioxidants at baseline and before and after each intervention.

Intervention:

In a crossover study, participants were randomly assigned to daily administration of 25 mL [about 2 tablespoons] of 3 olive oils.

- 1) Low phenolic content (2.7 mg/kg of olive oil)
- 2) Medium phenolic content (164 mg/kg)
- 3) High phenolic content (366 mg/kg)

Intervention periods were 3 weeks preceded by 2-week washout periods.

Results:

A linear increase in high-density lipoprotein (HDL) cholesterol levels was observed for low-, medium-, and high-polyphenol olive oil.

Total cholesterol–HDL cholesterol ratio decreased linearly with the phenolic content of the olive oil.

Triglyceride levels decreased by an average of 0.05 mmol/L for all olive oils.

Oxidative stress markers decreased linearly with increasing phenolic content.

Mean changes for oxidized low-density lipoprotein levels were 1.21 U/L, –1.48 U/L, and –3.21 U/L for the low-, medium-, and high-polyphenol olive oil, respectively.

Conclusions:

Olive oil is more than a monounsaturated fat. Its phenolic content can also provide benefits for plasma lipid levels and oxidative damage.

KEY POINTS FROM THE EDITORS:

- 1) Olive oil, the main fat in the Mediterranean diet, contains polyphenols, which have antioxidant properties and may affect serum lipid levels.
- 2) The authors studied virgin olive oil (high in polyphenols), refined olive oil (low in polyphenols), and a mixture of the 2 oils in equal parts.
- 3) Two hundred healthy young men consumed 25 mL [about 2 tablespoons] of an olive oil daily for 3 weeks followed by the other olive oils in a randomly assigned sequence.
- 4) Olive oils with greater polyphenol content increased high-density lipoprotein (HDL) cholesterol levels and decreased serum markers of oxidation.
- 5) Virgin olive oil has greater health benefits than refined olive oil.

THESE AUTHORS ALSO NOTE:

“Polyphenol intake has been associated with low cancer and coronary heart disease (CHD) mortality rates.”

“Antioxidant and anti-inflammatory properties and improvements in endothelial dysfunction and the lipid profile have been reported for dietary polyphenols.”

The Mediterranean diet health benefits may be due to a synergistic combination of phytochemicals and fatty acids.

Olive oil, rich in oleic acid (a monounsaturated fatty acid), is the main fat of the Mediterranean diet.

The phenolic compounds in olive oil may contribute to the health benefits derived from the Mediterranean diet.

Virgin olive oil is produced by direct-press or centrifugation methods and have higher phenolic content (150 to 350 mg/kg of olive oil).

The phenolic compounds in olive oil have strong antioxidant properties.

Oxidized low-density lipoprotein (LDL) is more damaging to the arterial wall than non-oxidized LDL cholesterol.

These authors observed a linear decrease in oxidative biomarkers in association with the increasing phenolic content of the olive oils.

“Regardless of its phenolic content, olive oil contributes to improving the endogenous antioxidant status.” **[Important]**

“A daily 25-mL [about 2 tablespoons] dose of all types of olive oil, similar to the daily consumption recommended by the U.S. Food and Drug Administration, reduced lipid cardiovascular risk factors and improved glutathione antioxidant status.”

“Daily consumption of high- and medium-polyphenol olive oil decreased oxidative damage on lipids.”

“Consumption of olive oil with high phenolic content provided the greatest benefits by increasing HDL cholesterol levels and reducing the oxidative damage on lipids.” **[Important]**

“Oxidative damage to lipids decreased in a linear manner with the phenolic content of the olive oil, particularly in markers that are directly associated with LDL oxidation.”

“All olive oils improved the balance between reduced and oxidized glutathione. Reduced glutathione is a major mechanism for cellular protection against oxidative stress. Depletion of reduced glutathione precedes lipid oxidation and atherogenesis in vivo.”

“In conclusion, our study shows that olive oil is more than a monounsaturated fat. The polyphenol content of an olive oil can account for further benefits on HDL cholesterol levels and oxidative damage in addition to those from its monounsaturated fatty acid content.”

“Our study provides evidence to recommend the use of polyphenol-rich olive oil, that is, virgin olive oil, as a source of fat to achieve additional benefits against cardiovascular risk factors.” **[Important]**

KEY POINTS FROM DAN MURPHY

- 1) "Polyphenol intake has been associated with low cancer and coronary heart disease (CHD) mortality rates."
- 2) "Antioxidant and anti-inflammatory properties and improvements in endothelial dysfunction and the lipid profile have been reported for dietary polyphenols."
- 3) The Mediterranean diet health benefits may be due to a synergistic combination of phytochemicals and fatty acids.
- 4) Olive oil is the main fat in the Mediterranean diet. It contains polyphenols, which have antioxidant properties.
- 5) Virgin olive oils are richer in phenolic content than refined olive oil.
- 6) This study showed that virgin olive oil with its higher phenolic content is superior to other grades of olive oil at:
 - A)) Increasing high-density lipoprotein [good] cholesterol levels.
 - B)) Decreasing bad cholesterol levels.
 - C)) Reducing oxidative stress markers [a measure of free radical damage, which means the phenols in virgin olive oil are powerfully antioxidant].
- 7) Olive oil is more than a monounsaturated fat. Its phenolic content can also provide benefits for plasma lipid levels and oxidative damage.
- 8) The phenolic compounds in olive oil have strong antioxidant properties.
- 9) "Olive oil contributes to improving the endogenous antioxidant status."
- 10) "Daily consumption of olive oil decreased oxidative damage on lipids."
[Very Important]
- 11) "All olive oils improved the balance between reduced and oxidized glutathione. Reduced glutathione is a major mechanism for cellular protection against oxidative stress. Depletion of reduced glutathione precedes lipid oxidation and atherogenesis in vivo."
- 12) "Our study provides evidence to recommend the use of polyphenol-rich olive oil, that is, virgin olive oil, as a source of fat to achieve additional benefits against cardiovascular risk factors." **[Important]**
- 13) Virgin olive oil has greater health benefits than refined olive oil.