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File: ■ Olive (*Olea europaea*, Oleaceae) Oil
■ Inflammation
■ Endothelial Function
■ Systematic Review/Meta-analysis

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RE: Systematic Review and Meta-analysis of the Effects of Olive Oil on Biomarkers of Inflammation and Endothelial Function

Schwingshackl L, Christoph M, Hoffmann G. Effects of olive oil on markers of inflammation and endothelial function—a systematic review and meta-analysis. *Nutrients*. 2015;7(9):7651-7675.

The lower incidence of cardiovascular disease (CVD) in the Mediterranean has been linked to the Mediterranean diet (MedD). Olive (*Olea europaea*, Oleaceae) oil is a major component of the MedD and may contribute to these effects. The aim of this systematic review and meta-analysis was to assess data from randomized, controlled trials (RCTs) that evaluated the effects of olive oil on markers of inflammation and endothelial function.

Literature evaluating the effect of olive oil on endothelial function and/or inflammation was searched in PubMed (1966 until June 2015), EMBASE (1980 until June 2015), and the Cochrane Trial Register (until June 2015) electronic databases. Studies were included if olive oil was consumed in a pure form or as a supplement (capsules), RCTs with either parallel or crossover design were performed, subjects were ≥19 years of age, a minimum intervention period of four weeks was used, no other supplements were included, inflammation or endothelial function outcomes were evaluated, and post-intervention values or change from baseline were reported.

The literature search was performed by two of the authors, and any disagreements were resolved by discussion with all three authors. Data extracted from the studies included author information, subject information, duration of the study, description of the intervention and controls, and outcome measurements. Pooled effects of the interventions were evaluated as mean difference (MD). Heterogeneity among trial results and risk of bias of the studies also were evaluated. The authors also contacted some study authors to obtain any missing data.

A total of 30 studies including 3106 subjects fulfilled the selection criteria. Study duration varied from four to 208 weeks. Some studies compared olive oil with a control diet, while

others compared olive oil capsules with supplements containing other fats. Due to these differences, the studies were classified into different subgroups. Overall, it was found that olive oil interventions significantly reduced the inflammatory markers C-reactive protein (CRP) (MD, -0.64 mg/L; 95% confidence interval [CI], -0.96 to -0.31 ; $P < 0.0001$; $I^2 = 66\%$) and interleukin-6 (IL-6) (MD, -0.29 ; 95% CI, -0.7 to -0.02 ; $P < 0.04$; $I^2 = 62\%$) compared to controls. Most of the studies compared olive oil with omega-3 fatty acids. A funnel plot evaluating study precision against MDs with the CRP data (this was the only parameter that was assessed in more than ten trials) indicated moderate asymmetry, suggesting a publication bias could not be excluded.

The effects of olive oil on flow-mediated dilation were significantly increased (MD, 0.76 ; 95% CI, 0.27 to 1.24 ; $P < 0.002$; $I^2 = 26\%$) compared to controls. Additionally, subgroup analysis of studies that compared olive oil with omega-3 fatty acids also indicated similar results (MD, 0.63 ; 95% CI, 0.22 to 1.04 ; $P < 0.003$; $I^2 = 0\%$).

Although the results of this study indicate that olive oil may have beneficial effects on biomarkers of inflammation and endothelial function, the authors urge caution when interpreting this data as there were not enough studies to sufficiently assess the risk of study bias for most of the parameters evaluated, with the exception of CRP, and the amount of heterogeneity among the studies was high. However, this systematic review provides some evidence that olive oil might represent a key ingredient of the MedD to mediate favorable effects on the previously mentioned parameters.

—*Laura M. Bystrom, PhD*

Referenced article can be accessed at <http://www.mdpi.com/2072-6643/7/9/7651>.

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