

# Anti-Atherogenic Properties of Extra Virgin Olive Oil

Hidekatsu Yanai

Extra virgin olive oil (EVOO) is an important constituent of the Mediterranean diet as well as whole grains, vegetables, fruits and nuts. Recent meta-analysis showed that compared to low polyphenol olive oil, high polyphenol EVOO significantly improved measures of malondialdehyde, oxidized low-density lipoprotein (LDL), high-density lipoprotein-cholesterol (HDL-C), inflammatory markers and blood pressure [1], suggesting significant anti-atherogenic effects of EVOO.

In a randomized, double-blinded, placebo-controlled clinical trial (RCT), 41 adult women with excess body fat received daily high-fat breakfasts containing 25 mL of soybean oil (control group, n = 20) or EVOO (EVOO group, n = 21) during nine consecutive weeks [2]. Fat loss was about 80% higher on EVOO compared to the control group ( $-2.4 \pm 0.3$  kg vs.  $-1.3 \pm 0.4$  kg,  $P = 0.037$ ). EVOO also reduced diastolic blood pressure when compared to control ( $-5.1 \pm 1.6$  mm Hg vs.  $+0.3 \pm 1.2$  mm Hg,  $P = 0.011$ ).

The RCT was conducted on 60 already diagnosed cases of type 2 diabetes and dyslipidemia [3]. EVOO showed 8-12% increase in HDL-C. EVOO has been also reported to promote cholesterol efflux by HDL, improving HDL functionality [4]. EVOO consumption reduced the age-related decrease in HDL and paraoxonase-1 anti-inflammatory activities [5]. EVOO intake increased HDL-C and decreased total cholesterol (TC)/HDL-C and triglyceride (TG)/HDL-C in postmenopausal women [6].

Thirty impaired fasting glucose (IFG) patients were randomly allocated to a meal containing or not 10 g of EVOO in a cross-over design [7]. Before, 60 min and 120 min after lunch, a blood sample was taken. EVOO was associated with a reduction of glucose ( $P = 0.009$ ) and dipeptidyl-peptidase-4 (DPP4) activity ( $P < 0.001$ ) and a significant increase of insulin ( $P < 0.001$ ) and glucagon-like peptide-1 (GLP-1) ( $P < 0.001$ ). Furthermore, the meal containing EVOO showed a significant decrease of TG ( $P = 0.002$ ) and Apo B-48 ( $P = 0.002$ ) compared with the meal without EVOO. EVOO use was also associated with improved post-prandial blood glucose and LDL-C in healthy subjects [8].

Habitual consumption of EVOO has been also reported to improve endothelial function in patients with prediabetes and diabetes [9]. Further, the systematic review on beneficial

effects of EVOO, and in conjunction with the Mediterranean style diets, reported that EVOO improved inflammation, oxidative stress, coagulation, platelet aggregation, fibrinolysis, and endothelial function [10].

In conclusion, although EVOO may have possible anti-atherogenic properties, the real beneficial effects of EVOO on human health need to be clarified in new well-designed clinical studies.

## Conflict of Interest

The author declares that he has no conflict of interest concerning this article.

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Department of Internal Medicine, National Center for Global Health and Medicine Kohnodai Hospital, 1-7-1 Kohnodai, Ichikawa, Chiba 272-8516, Japan.  
Email: dyanai@hospk.ncgm.go.jp

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