Dear Editor:

In a recent review concerning the biological relevance of direct antioxidant effects of polyphenols on cardiovascular health published in a supplement of the *Journal of Nutrition*, Hollman et al. (1) cited two papers from the Effect of Olive Oils on Oxidative Damage in European Populations (EUROLIVE) Study. These papers were cited as providing opposite results, as if they were two different trials performed in the same population. The EUROLIVE study was a large, randomized, crossover, controlled study of a European population (*n* = 200 healthy volunteers) that was aimed at assessing the effect of three similar olive oils with differences in their phenolic compound concentrations (2.7–366 mg/kg). In the first paper from the EUROLIVE study (2), changes in oxidative biomarkers after the three interventions (3-wk for each) were analyzed by a general linear mixed model adjusted for potential confounding variables. This paper was therefore aimed at assessing differences among the phenolic content of the olive oils. The results showed a dose-dependent decrease not only in circulating oxidized LDL, but also in noninduced plasma–conjugated dienes and 3-hydroxy fatty acids, with an increase in olive oil polyphenols. We did not find changes in plasma F2-isoprostanes, a systemic marker for lipid peroxidation, associated with the polyphenol concentration of the olive oil. A possible explanation for the fact that biomarkers for LDL oxidation were the best responders to olive oil phenolic ingestion has been reported in other EUROLIVE studies (3,4). For example, some report that the total antioxidant phenolic concentration of the LDL increased in a dose-dependent manner with the polyphenol concentration of the olive oil administered (3); however, we also found that the biological metabolites of hydroxytyrosol and tyrosol, the main phenolic compounds from olive oil, bind to LDL after virgin olive oil ingestion in an inverse relationship with the degree of LDL oxidation (4). Whether LDL oxidation was prevented by the direct scavenging activity of free radicals by olive oil polyphenols or through other molecular mechanisms remains to be elucidated.

In the second EUROLIVE paper cited in the review by Hollman et al (5), data from the same trial, the EUROLIVE, were analyzed considering all the intervention periods together. Data at baseline (week 0) were compared to those at the end of the study (week 15) for all participants using a Student’s *t* test. Multiple linear regression analyses were used to assess the relationship among variables at the end of the intervention period. This approach was aimed at assessing the effectiveness of the olive oil fat components, particularly the oleic acid, and not that of the olive oil polyphenols, on oxidative biomarkers. Thus, no crossover or randomized approach concerning oleic acid ingestion was used in these analyses in which data were treated as a single intervention with olive oil. Results showed that there was an inverse relationship between the oleic/linoleic ratio in LDL and the plasma total F2-isoprostanes.

Because of this, and in order to clarify the information provided in the review (1), the two papers cited are two different approaches from the same study, the EUROLIVE, and neither the results nor their strengths are comparable. The first article (2) provided scientific evidence of Level I (6), which is required to perform nutritional recommendations to the population. The strength of the randomized, crossover, controlled trial of the EUROLIVE study was a key factor for supporting the recent claim approved by the European Food Safety Authority (EFSA) concerning the effectiveness of the daily ingestion of 5 mg of olive oil polyphenols on the prevention of LDL oxidation (7). The second paper points out that the oleic acid content of olive oil could be a protective factor against F2-isoprostane formation, and further trials are warranted to support this statement.

Maria-Isabel Covas  
IMIM-Institut de Recerca del Hospital del Mar and  
CIBER de Fisiopatologia de la Obesidad y Nutricion  
Barcelona, Spain  
Antonio V. Gaddi  
Atherosclerosis and Metabolic Disease Research Unit  
University of Bologna  
Bologna, Italy

**Literature Cited**


