



Abstract

Effects of a Plant-Based Diet with Whole Eggs or Egg Substitute on Parameters of Metabolic Syndrome, Plasma Choline, and TMAO Concentrations [†]

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Abstract: Plant-based (PB) diets typically result in a lowering of total and LDL cholesterol. Eggs could complement the PB diet by increasing HDL cholesterol. In this randomized, controlled crossover intervention, we recruited 30 participants (49.3 ± 8 year) with metabolic syndrome (MetS) who followed a PB diet for 13 weeks. A registered dietitian advised all subjects on food selection and followed them through the whole intervention to ensure compliance. Participants underwent a 2-week washout with no eggs or spinach (sources of dietary choline) for 2 week and were randomly allocated to consume spinach (70 g) with either two eggs (EGG) or the equivalent amount of egg substitute (SUB) for breakfast for 4 weeks. After a 3-week washout, they were allocated to the alternate breakfast. We hypothesized that whole egg intake (EGG) would increase plasma choline and result in better improvement in parameters of metabolic syndrome. In total, 24 participants (13 women/11 men) finished the intervention. Plasma lipids, glucose, anthropometrics, liver enzymes, insulin, plasma choline, and TMAO were assessed at baseline and the end of each intervention. Compared with the SUB breakfast, we observed a significant decrease in body weight ($p < 0.02$) and a significant increase in HDL cholesterol ($p < 0.025$) following the EGG breakfast. There were no differences in plasma LDL, triglycerides, glucose, insulin, or blood pressure. Plasma choline was higher in both treatments ($p < 0.01$), compared with baseline (8.3 ± 2.1 nmol/mL). However, choline values were higher in EGG (10.54 ± 2.8 nmol/L), compared with SUB (9.47 ± 2.7 mmol/L) $p < 0.025$. These results indicate that consuming a plant-based diet in combination with whole eggs results in increases in plasma choline and in HDL cholesterol, both of which are beneficial for individuals with MetS.

Keywords: plant-based diet; choline; eggs; HDL cholesterol; metabolic syndrome



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