1999 **- Comparison of the effects of a hypocaloric diet enriched with almonds versus complex carbohydrates on plasma lipoproteins and body composition during weight reduction**

Title:
Comparison of the effects of a hypocaloric diet enriched with almonds versus complex carbohydrates on plasma lipoproteins and body composition during weight reduction.

Summary:
The hypocaloric regimen currently advocated for obese subjects to induce weight loss is a high-carbohydrate low-fat diet, which may produce a deleterious decrease in high-density lipoprotein cholesterol (HDL-C). The major effect of a reduction in the intake of dietary saturated fatty acids (SFAs) is a reduction in total cholesterol and low-density lipoprotein cholesterol, but there is controversy over the type of nutrient that should replace it. In contrast to monounsaturated fatty acids (MUFAs), carbohydrate or polyunsaturated fatty acid reduces high-density lipoprotein levels when exchanged for SFAs in the diet. Use of a low-carbohydrate high-fat hypocaloric diet enriched with MUFA (high-oleic acid) potentiates a neutral or favorable lipoprotein response during weight reduction and isocaloric conditions. Isocaloric feeding trials incorporating the intake of almonds have demonstrated hypocholesterolemic effects, without changing HDL-C levels significantly, among hyperholesterolemic adults.

A randomized, prospective 24-week trial with a free-living population was utilized to evaluate two distinct macronutrient interventions on obesity and metabolic syndrome-related parameters during weight reduction. Subjects were recruited from the pool of outpatients entering into a 24-week Diabetes and Cardiovascular Risk Reduction Program for medically supervised weight reduction at City of Hope National Medical Center in Duarte, California. Sixty-five subjects were recruited composed of male and female subjects with BMI ranging from 27 to 55 kg/m2 and a median age of 55 y (range 27-79 y). Subjects were randomized into the two intervention groups and 52 patients completed the 24-week study. The intervention consisted of a formula-based low-calorie diet (LCD) enriched either with 84 g/day of almonds (39% total fat, 25% MUFA and 32% carbohydrate) or with self-selected complex carbohydrates (18% total fat, 5% MUFA and 53% carbohydrate). Various anthropometric, body composition and metabolic parameters were measured at baseline, during, and after the 24 weeks.

The LCD supplementation with almonds, in contract to complex carbohydrates, was associated with greater reductions in weight/BMI (-18 vs -11%), waist circumference (WC) (-14 vs -9%), fat mass (FM) (-30 vs -20%), total body water (-8 vs -1%) and systolic blood pressure (-11 vs 0%), P=0.0001-0.05. A 62% greater reduction in weight/BMI, 50% greater reduction in WC and 56% greater reduction in FM were observed in the almond-LCD as compared to the CHO-LCD intervention. Ketone levels increased only in the almond-LCD group (+260 vs 0%, P<0.02). High-density lipoprotein cholesterol (HDL-C) increased in the CHO-LCD group and decreased in the almond-LCD group (+15 vs -6%, P=0.05). Glucose, insulin, diastolic blood pressure, total cholesterol, triglycerides, low-density lipoprotein cholesterol (LDL-C) and LDL-C to HDL-C ratio decreased significantly to a similar extent in both dietary intervenions. Homeostasis model analysis of insulin resistance (HOMA-IR) decreased in both study groups over time (almond-LCD: -66% and CHO-LCD: -35%, P<0.0001). Among subjects with type 2 diabetes, diabetes medication reductions were sustained or further reduced in a greater proportion of almond-LCD as compared to CHO-LCD subjects (96 vs 50%, respectively). Our findings suggest that an almond-enriched LCD improves a preponderance of the abnormalities associated with the metabolic syndrome.

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Publications:

Wien MA, Ikle DN, Cole SE, Saad MF, Sabaté JM, Kandeel FR. Almonds vs Complex Carbohydrates in a Weight Reduction Program. Int J Obes 2003, 27:1365-1372. full text

Presentations:

Wien Michelle, Cole SE, Ikle DN, Sabaté J, Kandeel FR. Effect of Almonds vs Complex Carbohydrate on LDL Peak Particle Size and ApoA-I and ApoE during Weight Reduction. American Heart Association 44 th Annual Conference on Cardiovascular Disease Epidemiology and Prevention, San Francisco, CA, March 2004. abstract

Wien MA, Sabate JM, Ekle DN, Cole SE, Kandeel FR. Effect of Almonds vs Complex Carbohydrates on Anthropometric Parameters and C-Reactive Protein During Weight Reduction. North American Association for the Study of Obesity Annual Scientific Meeting, Ft. Lauderdale, FL, October 2003. abstract

Wien MA, Sabaté JM, Ikle DN, Cole SE, Saad MF, Kandeel FR. Effect of Almonds vs Complex Carbohydrates on fasting ghrelin and Leptin Levels During Weight Reduction. American Dietetic Association Food & Nutrition Conference & Expo, San Antonio, TX, October 2003. abstract

Wien MA, Sabaté JM, Ikle DN, Cole SE, Kandeel FR. Almonds Enhance Weight Reduction and Imporve Anthropometric and Metabolic parameters in Obese Adults. Ninth European Nutrition Congress, Rome, Italy, October 2003. abstract

Wien MA, Sabaté JM, Ikle DN, Cole SE, Kandeel FR. Effects of Almonds vs. Complex Carbohydrates on Metabolic Syndrome and Anthropometric Parameters During Weight Reduction. American Diabetes Association 63 rd Scientific Session, New Orleans, LA, June 2003. abstract

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