Almond Processing Study

Main Study Question

The objective of this study is to measure the effect of processing (roasting, slicing, or grinding) on the energy value of almonds in the human diet and study molecular mechanisms that may help explain the beneficial health effects of almonds.

Motivation for Research

Previous studies have demonstrated that the measured energy value of almonds (dry roasted) is lower than predicted using the Atwater factors (4 kcal/g of carbohydrate, 4 kcal/g of protein, 9 kcal/g of fat). However, data are lacking on the effect of processing (roasting, slicing, or grinding) on nutrient bioavailability of almonds. The aim of this study is to determine the energy value of 4 different forms of almonds in the human diet: whole, natural almonds, roasted whole almonds, diced almonds, and almond butter. We will also probe mechanisms by which almonds impart health benefits. The metabolizable energy value of almonds and almond butter will be calculated based on the chemical composition and energy content of the consumed diet and excreta. This will provide a better estimate of the energy value than simply calculating energy value based on Atwater factors. In addition to determining the metabolizable energy, we will evaluate the effects of almond-rich diets on plasma phytonutrient levels and on gene expression changes to determine what protective mechanisms are activated by almond consumption.

The study ran from early March to end of July 2014.