

Physical property changes in raw and roasted almonds during gastric digestion In vivo and In vitro.

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Abstract:

The rate of almond breakdown during gastric digestion may be influenced by structural changes that occur during roasting. The primary objective of this study was to investigate in vivo physical property changes of raw and roasted almonds during gastric digestion, using the growing pig as a model for an adult human. Seventy two male pigs were fed a meal of raw or roasted almonds and digested samples were taken 20, 60, 180, 300, 480, and 720 min after meal consumption from the proximal and distal stomach regions. Particle size distribution, rheological flow behavior, and textural attributes of gastric digesta were measured. Particle size distributions were fit to the Rosin-Rammler function to determine the median particle diameter (x_{50}) and distribution spread (b) parameters. Median particle diameter was statistically influenced by stomach region ($p < 0.0001$). Evidence of gastric sieving was observed by an increased median particle diameter and narrower distribution spread in the distal region. To elucidate on textural changes of diced almonds during digestion, an in vitro study was conducted in a static gastric environment. Results indicated that a majority of textural changes occurred during the first hour of digestion, a trend unobserved in the in vivo trial. No significant differences in physical property changes were observed between raw and roasted almonds during gastric digestion in vivo as measured by particle size distribution, textural attributes, and rheological flow behavior. This suggests that raw and roasted almonds break down at a similar rate in the gastric environment.