

Comparison in physicochemical attributes changes between soy pretzel made with various saturated lipids at 10% or 40% oil concentration

Author: Fangjun Liu

Co-Presenters:

Major: Food Science and Technology

Research Advisor: Yael Vodovotz

Pretzels, traditionally made with 3-6% shortening, is a popular snack in America resulting in over 500 million in sales in 2010. Incorporating ingredients shown to decrease biomarkers of obesity in this popular snack food may provide an excellent means of enhancing nutrition. In previous studies, diets rich in safflower oil induced fat-mass reduction by influencing lipogenesis and lipid metabolism; while thermogenesis was mediated by saturation of fatty-acids. Many studies indicated soy protein have anti-obesity, anti-lipogenic and cholesterol-lowering impact. The objective was to select a type and amount of lipid that will least affect the texture and water distribution of an optimized soy pretzel. Changes in amount, composition (chain-length, degree of saturation) and crystalline polymorph of added lipid affect the pretzels physicochemically and may lead to undesirable food products. Therefore, we hypothesized that higher concentration and degree of saturation of lipids will significantly decrease the physical structure of soy pretzels, and change their water distribution. Soy pretzels were formulated with 4 types of lipids: Ghee, shortening, coconut-oil, and high oleic safflower-oil(SO) at concentrations of 10% and 40%. Instrumental analysis was conducted in triplicate for “freezable” water and textural attributes (hardness, springiness and chewiness). Significant decrease in all 3 textural attributes were observed between 10% and 40% with coconut-oil had the lowest values, followed by ghee and shortening having the most whereas safflower oil concentration did not affect texture. The effects of lipid composition was observed at 40% where significant difference segregated into 3 groups (CO, SO, and G and S). Safflower oil, rich in mono-unsaturated triglycerides, changed the least in texture properties compared to saturated fats, and showed a reduction of percent “freezable” water in soy pretzel. Thus a safflower oil/soy pretzel will be utilized in future human clinical trials.