2022 Grant Recipient

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Project Title: Parboiling of Pigmented Waxy Cereals to Enhance Viscosity Development in a Simulated Gastric Environment

Project Summary: Obesity, a major public health concern in the U.S., increases the risk of coronary heart disease, type 2 diabetes, and severe COVID-19 outcomes. Among many other factors, the overconsumption of food is one of the main causes of obesity. Thus, it is important to develop food products that provide early satiation and long-term satiety to prevent caloric imbalances and weight-gain. Physicochemical food properties including viscosity and macro- and micro-nutrient composition can modulate satiation and satiety. High-viscosity foods are known to reduce food intake, suppress appetite and increase the perception of satiety primarily due to the delay of gastric emptying and increased tactile stimulation. Therefore, food viscosity is considered a reliable predictor for the sensation of satiety. Whole grains are highly satiating as they confer a bulky texture and high viscosity due to their high starch and protein content. Waxy cereals could lead to greater satiety than common cereals because of their high amylopectin content, which develops high viscosity upon cooking. Bioactive phytochemicals, including polyphenols, are another source to increase satiety ratings by interacting with other food macronutrients and by inhibiting digestive enzymes. Recent studies show that high molecular-weight polyphenols, such as tannins, cross-link gluten protein, thus strengthening the network of proteins and starch and increasing the viscosity and stability of dough matrices. Thermal processing, such as parboiling, may enhance this polyphenol-protein interaction through protein denaturation and thus increase the viscosity development of pigmented waxy cereals in a gastric environment, consequently stimulating the perception of satiety to prevent overeating.