

## **Antidiabetic Property Optimization from Green Leafy Vegetables Using Ultrasound-Assisted Extraction to Improve Cracker Production**

### **ABSTRACT**

Here we test a method of incorporating of plant extracts into popular snack foods to help control diabetes. Since some fresh vegetables contain antidiabetic compounds, ultrasound-assisted extraction was used to optimize their extraction of from spring onions, bunching onions, and celery for later incorporation into crackers. We compared various concentrations of ethanol used during extraction, after which they were exposed to an ultrasound processor whose amplitude and sonication time were also varied. The optimal extraction conditions were found to be an ethanol concentration of 44.08%, an amplitude of 80%, and a sonication time of 30 min. This resulted in the highest level of  $\alpha$ -glucosidase inhibitory activity (i.e., 1,449.73 mmol ACE/g) and the highest extraction yield (i.e., 24.16%). The extract produced from these optimum conditions was then used as a constituent component of crackers at 0.625%, 1.25%, or 2.5% w/w. These biscuits were then produced at baking temperatures of 140°C, 150°C, or 160°C. We then measured the physical characteristics and bioactivities of sample biscuits from each treatment. We found that biscuits containing 2.5% vegetable combination extract and baked at 140°C had the highest total phenolic content, the strongest antioxidant performance, and showed the most substantial antidiabetic and antiobesity effects. Here we establish conditions for the effective extraction of antidiabetic functional ingredients via ultrasound from green leafy vegetables. We also provide a method of using these ingredients to prepare crackers with the aim of developing a functional antidiabetic snack food.