

## Production efficiency and functional characteristics of dietary fiber and peptides from potato processing waste

Potato is the fourth most important food crop worldwide. In China, potatoes are mainly used for starch production, which generates large amounts of waste. For every ton of starch produced, 4.5-5.0 tons of wet peel residues and 10-20 tons of wastewater are generated. These by-products contain valuable dietary fiber and nutrients, yet only a small portion is used as animal feed and the rest is discarded, resulting in wasted resources and environmental pollution. The AgriLoop project is developing green extraction technologies to recover high-value food components from potato processing waste.

### Project activity

The effects of different pretreatments including ultrasound, microwaves, and ultrafine grinding on the extraction efficiency and composition of active compounds were investigated. Advanced methods such as Natural Deep Eutectic Solvents (NADES), high-hydrostatic pressure, enzymatic hydrolysis, and ultrasound/microwave-assisted extraction were assessed to identify optimal strategies for extracting dietary fiber, peptides, and polysaccharides.

Analytical techniques, including ion chromatography, Fourier Transform Infrared Spectroscopy (FTIR), and nuclear magnetic resonance (NMR) were used to identify the correlation between chemical composition, physicochemical properties, structural characteristics, and biological function (e.g. lipid-lowering, sugar regulation, modulation of gut microbiota).

# Key findings and recommendations

Potato residues are a rich source of dietary fiber and peptides and could be valorized through enzymatic and physical modification to produce high-value functional ingredients.

- >90% purity potato dietary fiber can be obtained via enzymatic hydrolysis.
- High-hydrostatic pressure (400 MPa) combined with cellulase (270 U/g) increased soluble dietary fiber yield by 59.3%.
- Modified potato dietary fiber showed strong adsorption of cholesterol, glucose, and amylase.
- The optimal protease combination for peptide production was ALC (4%) + NEU (4%) + FLA (4%), with EGU-40 ultrasound as the most effective treatment.
- Potato peptides exhibited high antioxidant activity (82.24  $\mu\text{g TE/mL}$ ) with a recovery rate of 69.09%.



## References

1. **Nutritional composition, antioxidant activity, volatile compounds, and stability properties of sweet potato residues fermented with selected lactic acid bacteria and bifidobacteria.** Food Chemistry, 2022, 374, 131500.
2. **Effect of high hydrostatic pressure-assisted pectinase modification on the  $\text{Pb}^{2+}$  adsorption capacity of pectin isolated from sweet potato residue.** Chemosphere, 2021, 262, 128102.

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For more information about the AgriLoop Project, visit:

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