Chenopodium formosanum CULTURE TECHNIQUE

Development of High-Glucosinolate-Retaining Lactic-Acid-Bacteria-Co-Fermented Cabbage Products

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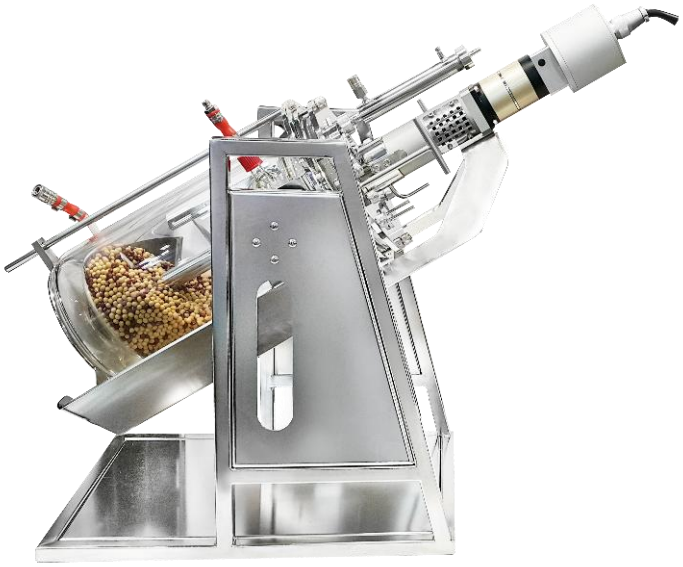
Abstract

This study investigates the effects of glycine-rich peptides (GRP) derived from tempeh-like fermented *Chenopodium formosanum* on cellular senescence and antioxidant capacity in non-replicative aging models. The results demonstrate that GRP effectively mitigates senescence markers and enhances antioxidant enzyme activities, suggesting its potential as a functional ingredient for promoting healthy aging.



Winpact Model: FS-V-SA05P

Introduction

Cabbage (Brassica oleracea var. capitata) is valued for its health-promoting glucosinolates, phenolic compounds, and antioxidant capacity. However, traditional processing often reduces these bioactives. Lactic acid fermentation has been recognized for enhancing nutritional and functional properties in vegetables. This study aims to develop a lactic-acid-bacteria-co-fermented cabbage using a bioreactor, optimizing both production scale and retention of bioactive compounds, with a particular focus on glucosinolates.

Materials and Methods

Fresh cabbage was fermented with a bacterial consortium composed of Lactiplantibacillus plantarum, Lactobacillus acidophilus, and Bifidobacterium longum. Fermentation was carried out in a 5 L solid-state bioreactor (FS-V-SA05P) at 35 °C for 24 hours with inoculum sizes ranging from 0.3% to 3.0% (w/w). Analytical evaluations included antioxidant assays (DPPH, ABTS), glucosinolate quantification, and measurement of phenolic and flavonoid contents. Storage stability was assessed over 21 days at 4 °C..

Results

Bioreactor fermentation improved DPPH radical scavenging activity by 16.32% and increased free phenolic and flavonoid content by 41.13% and 24.44%, respectively. Glucosinolate retention in bioreactor-fermented cabbage reached 89.16%, with no significant loss even when the inoculum was reduced to 0.3%. Storage tests showed that antioxidant activity and glucosinolate content remained relatively stable after 14–21 days under refrigeration, validating the product's shelf-life and nutritional viability.

References

Hsieh, C.-C. et al. Development of High-Glucosinolate-Retaining Lactic-Acid-Bacteria-Co-Fermented Cabbage Products. *Fermentation* 2024, 10, 635.

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