

# Glycine-rich peptides from fermented *Chenopodium formosandum* sprout as an antioxidant to modulate the oxidative stress

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## Abstract

*Rhizopus oligosporus* was used to ferment *Chenopodium formosandum* sprouts (FCS), yielding a glycine-rich peptide (GGGGGKP) from <2 kDa proteins. This peptide showed antioxidant activity and was confirmed to be safe, non-toxic, and non-allergenic via SwissADME and other tools. In silico and in vitro studies revealed that it inhibits v-rel phosphorylation in the NF- $\kappa$ B pathway, reducing oxidative stress and inflammation, indicating potential biomedical applications.



**Winpact Model: FS-V-SA05P**

## Introduction

Fermentation is known to enhance the bioactivity of plant-based proteins. *Chenopodium formosandum* sprouts are nutrient-rich and contain bioactive compounds. Prior research has highlighted their antioxidant and anti-inflammatory potential. This study focuses on isolating <2 kDa peptides, identifying glycine-rich sequences (GGGGGKP), and evaluating their biological properties and safety through both computational and experimental assays.

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## Materials and Methods

### *Fermentation Process:*

1.5 kg of *Chenopodium formosanum* sprouts were inoculated with 75 mL of *Rhizopus oligosporus* spore suspension ( $10^6$  spores/mL). Solid-state fermentation was carried out in a bioreactor model FSeV-SA05P (Winpact FS-V-SA05P) at 35°C, with aeration at 0.4 vvm and rotation at 5 rpm, for 4 days.

## Results

- Bioreactor fermentation (BF) produced significantly higher free peptide content and enzyme activities compared to plate fermentation (PF).
- Identified peptides potentially act as DPP-IV and ACE inhibitors.
- Over twenty new metabolites, including aromatics, amines, fatty acids, and carboxylic acids, were generated specifically in BF.
- Enhanced antioxidant capacity was demonstrated in BF-derived products..

## References

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