

HARMONY IN PROGRESS:

**INTEGRATING SCIENCE, TECHNOLOGY,
AND
SOCIAL INNOVATION
FOR SUSTAINABLE DEVELOPMENT GOALS**



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PST022 - RINDCHI : A ZERO-WASTE, FERMENTED DELICACY FROM WATERMELON RIND

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ABSTRACT

The white inner rind of the watermelon, an edible, nutrient-rich part that is usually discarded during fruit processing, is used to make RindChi, a novel, sustainable, plant-based kimchi that transforms food waste into a tasty, valuable fermented treat. RindChi, combines traditional kimchi-making methods with zero-waste innovation, offering a natural, flavourful and crunchy profile with no artificial additives. Natural lactic acid fermentation promotes gut health by utilising beneficial bacteria. The unique feature of this product is that it transforms an underutilised, locally available raw material into a functional food that supports resource efficiency, promotes environmental sustainability, and preserves cultural culinary traditions. This product is the preferred choice for environmentally conscious consumers looking for plant-based, health-conscious products. The product offers strong commercial potential by creating new revenue streams for micro-entrepreneurs, farmers, and food producers through upcycling initiatives. RindChi offers a scalable model for sustainable food innovation by combining strong flavour, nutritional benefits and an obvious environmental impact, focusing on creating products from waste and transforming them into a successful, profitable, and marketable product.

Keywords – watermelon rind, kimchi, food innovation, alternative ingredient

INTRODUCTION

Watermelon is a fruit that many people choose as a dessert. It contains many nutrients such as vitamins and is rich in antioxidants. Scientific studies on antioxidant content of the watermelon rind have shown that it offers various benefits. These antioxidants are important for reducing, neutralising and protecting the body's cells from free radical damage (Wakid and Harun, 2020; Wakid, 2024). The urgent need to combat food waste and promote sustainable food innovation led to the creation of RindChi. Although the white inner rind of watermelons is edible and nutrient-rich, it is often discarded during processing opportunity. Inspired by the cultural heritage of kimchi making and driven by the principles of waste minimisation, RindChi was developed to transform this unused by-product into a functional, marketable food. RindChi enhances the flavour with a zesty, spicy profile that appeals to the modern consumer, while retaining the mild taste and crunchy texture of the watermelon rind through traditional fermentation

processes. The product addresses several problems simultaneously such as reducing the agricultural waste, extending the shelf life of perishable foods, improving gut health through natural lactic acid, fermentation and opening up new revenue streams for small farmers, food processors, and business owners. This innovation not only promotes environmental sustainability but also meets the growing consumer demand for plant-based, environmentally friendly, and culturally inspired foods.

OBJECTIVE

The objectives to develop this product are:

- i. Transform food waste into value by upcycling the edible white rind of watermelon into a flavorful, fermented kimchi product.
- ii. Promote sustainable food systems through zero-waste innovation that supports environmental, economic, and community well-being.
- iii. Deliver a market-ready, health-conscious product that combines bold taste, natural fermentation benefits, and strong commercial potential

DESCRIPTION OF THE PROJECT

A summary of the product is shown in Figure 1.

Features	Functionality	Usefulness	Practicality
– Made from nutrient rich white watermelon rind – Naturally fermented with no additives – Tangy, spicy, crisp flavor – Plant-based and ecofriendly	– Upcycles agricultural by-products – Preserves freshness naturally – Supports gut health via natural probiotics	– Reduces organic waste – Generates income for small producers – Offers sustainable, nutritious side dish	– Uses low-cost raw materials – Simple equipment for production – Long shelf life for easy storage & distribution

Figure 1: Summary of product description.

NOVELTY

RindChi is the first known kimchi product made entirely from the white inner rind of the watermelon, an edible but largely neglected by-product of fruit consumption and processing. Unlike traditional kimchi, which uses cabbage or radish, RindChi transforms a nutrient-rich, moisture, -rich vegetable waste into a flavourful, crunchy, and naturally fermented delicacy, offering a zero-waste approach to food innovation. Its development combines cultural heritage with environmental responsibility, and provides a scalable model for upcycling agricultural waste into a marketable product. This combination of unique raw material, environmentally conscious production, and functional health benefits makes RindChi a distinctive product in the global fermented food market.

CONCLUSION

RindChi transforms the rind of watermelon, a frequently discarded by-product, into a flavourful, naturally fermented kimchi that combines sustainability, health benefits, and commercial potential. This innovative product is an example of zero-waste food innovation, and offers a delicious, environmentally conscious, and profitable solution for consumers and producers.

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