Innovative Food Science and Emerging Technologies 95 (2024) 103742

Contents lists available at ScienceDirect

Innovative Food Science and Emerging Technologies

journal homepage: www.elsevier.com/locate/ifset

Chemical properties, sensory characteristics, and antibacterial activity to *Staphylococcus aureus* of tempeh gembus fermented with Mosaccha inocula

Samsul Rizal [a,*], Maria Erna Kustyawati [a], Zulferiyenni [a], Murhadi [a], Defina Zulfa [b], Firda Rosida [b], Fairuzsita Naura Amalia Syifani [b], Ayu Dian Pratiwi Permatahati [c]

[a] *Department of Agricultural Product Technology, Faculty of Agriculture, University of Lampung, Jl. Prof. Dr. Ir. Sumantri Brojonegoro No. 1, Bandar Lampung, Indonesia*

[b] *Graduated of Department of Agricultural Product Technology, Faculty of Agriculture, University of Lampung, Jl. Prof. Dr. Ir. Sumantri Brojonegoro No. 1, Bandar Lampung, Indonesia*

[c] *Department Agribisnis, Institute of Technology and Science Nahdlatul Ulama Lampung, Indonesia*

ARTICLE INFO

Keywords:
Tempeh gembus
Saccharomyces cerevisiae
Mosaccha inoculum
Nutritional content of tempeh
And β-glucan

ABSTRACT

The study examined the impact of varying concentrations of Mosaccha inocula (0, 0.1, 0.2, 0.3, 0.4, and 0.5% *w*/w) on the chemical properties, sensory characteristics, and antibacterial activity of tempe gembus. Employing a Complete Randomized Block Design with four replications, the research used 0.2% Raprima inoculum (tempeh inoculum commonly used in making tempeh in Indonesia) as a control. The best treatment was determined using Least Significant Difference analysis and the de Garmo weighting effectiveness test. Results revealed that Mosaccha inocula concentration significantly influenced the chemical properties (excluding fat content), sensory attributes, and antimicrobial efficacy of tempe gembus. Optimal outcomes were achieved with 0.3% Mosaccha inoculum, yielding tempe gembus that was favorably received by sensory panelists. Specifically, this formulation produces tempeh with β-glucan content (0.62%), antibacterial activity against *Staphylococcus aureus* (inhibition diameter 9.42 mm), protein content (8.75%), and crude fiber content (4.36%) higher than controls (0.07%, 8.52 mm, 5.03%, and 3.33% respectively).

1. Industrial relevance

This study underscores the potential of Mosaccha inocula in improving the nutritional quality, sensory appeal, and antimicrobial properties of gembus tempeh. Through the results of this research, researchers recommend the use of Mosaccha inocula of 0.2%–0.3% (*w*/w) to tempeh producers to produce tempeh gembus. The presence of *S. cerevisiae* in the Mosaccha inocula produces tempeh gembus with high β-glucan content, white in color, and mycelium covering the entire tempeh gembus. Apart from that, the tempeh gembus produced with Mosaccha inocula was sensorially preferred by the panelists compared to tempeh gembus in general, so this product is economically promising.

2. Introduction

Tempeh gembus, made from tofu dregs, is a popular food in Javanese society, particularly in East Java (Wijaya & Yunianta, 2014). Unlike traditional tempeh made from soybeans, tempeh gembus uses the solid by-product of tofu production (Nurhayati, Berliana, & Nelwida, 2019). These tofu dregs still contain valuable nutrients, as not all the protein is extracted during tofu production, making them ideal for creating nutritious foods like tempeh gembus (Rahayu, Sudrajat, & dan Rinihapsari, 2016).

According to Afifah et al. (2019), the nutritional content of tempeh gembus consists of 1.87% fat, 11.09% dietary fiber, 4.90% protein, 63.76% water, and 0.55% ash content. Although the protein content of tempeh gembus is lower than soybean tempeh (18–22%), tempeh gembus contains three times more fiber (Astawan, Wresdiyati, Widowati, & Bintari, 2013; Sulchan & Rukmi, 2007). Fiber treated with fermentation can be beneficial for the body to improve digestion and prevent constipation (Murdiati, & Sardjono, & Amaliah., 2000). Tempeh gembus also has other health benefits, including antioxidants (Agustina, Dieny, Rustanti, Anjani, & Afifah, 2018), antimicrobial activity (Noviana, Dieny, Rustanti, Anjani, & Afifah, 2018), ability to decrease LDL-C and total cholesterol (Afifah, Nabilah, Supraba, Pratiwi, & Sulchan, 2020), and potential as a source of microbial fibrinolytic proteases

* Corresponding author.
E-mail addresses: samsul.rizal@fp.unila.ac.id (S. Rizal), definazulfa15@gmail.com (D. Zulfa), marrizal@yahoo.com (F. Rosida).

https://doi.org/10.1016/j.ifset.2024.103742
Received 4 May 2024; Received in revised form 27 June 2024; Accepted 2 July 2024
Available online 4 July 2024
1466-8564/© 2024 Elsevier Ltd. All rights are reserved, including those for text and data mining, AI training, and similar technologies.