

DETERMINATION OF ORNITHINE CONTENT IN SHIMEJI MUSHROOM AND EVALUATION OF ITS ANTIMICROBIAL AND ANTIOXIDANT POTENTIAL

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**FOOD SCIENCE STUDY PROGRAM
FACULTY OF ENGINEERING AND TECHNOLOGY
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2026**



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RINGKASAN

SEBULON LAURENGIA PORIKURA: Penentuan Kandungan Ornithine pada Jamur Shimeji serta Evaluasi Potensinya sebagai Antimikroba dan Antioksidan. Dibimbing oleh DASE HUNAEFI dan DIAH CHANDRA ARYANI.

Meskipun jamur shimeji telah banyak tersedia di pasar Indonesia, informasi mengenai komposisi nutrisi, kandungan ornitin, serta sifat antimikroba dan antioksidan dari produk komersial masih terbatas. Penelitian ini mengevaluasi komposisi proksimat, konsentrasi ornithin, serta aktivitas antimikroba dan antioksidan dari empat merek jamur shimeji komersial. Analisis komposisi proksimat dilakukan menggunakan metode resmi AOAC. Ornithine diekstraksi dengan asam klorida sesuai dengan Standar Pertanian Jepang (JAS 0016) dan dianalisis menggunakan kromatografi cair kinerja tinggi (HPLC). Aktivitas antimikroba diuji dengan metode difusi sumur agar, sedangkan aktivitas antioksidan diuji menggunakan metode penangkapan radikal DPPH.

Jamur shimeji memiliki kadar air tinggi (90,74–91,54% bobot segar), kadar protein tinggi (27,71–29,48% bobot kering), kadar lemak rendah (6,07–8,42% bobot kering), serta kadar karbohidrat 45,27–55,30% bobot kering, dengan nilai energi rata-rata 33,11 kkal/100 g. Konsentrasi ornithine berbeda secara signifikan antarmerek, berkisar antara $11,0 \pm 1,4$ hingga $75,0 \pm 24,1$ mg/100 g bobot segar. Tidak ditemukan aktivitas antimikroba pada semua sampel. Jamur shimeji cokelat menunjukkan aktivitas antioksidan lebih tinggi dibandingkan jamur shimeji putih, dengan kapasitas antioksidan ekuivalen asam askorbat sebesar $3,69 \pm 0,12$ hingga $4,35 \pm 0,52$ mg/g bobot segar dan aktivitas penangkapan radikal sebesar 29,52–35,07%.

Temuan ini memberikan data dasar komparatif mengenai komposisi nutrisi, kandungan ornitin, serta sifat biologis jamur shimeji komersial yang dipasarkan di Indonesia dan dapat mendukung pengembangannya sebagai produk pangan fungsional.

Kata Kunci: Aktivitas antimikroba, antioksidan, ornitin, komposisi proksimat, Jamur shimeji

SUMMARY

SEBULON LAURENGIA PORIKURA. Determination of Ornithine Content in Shimeji Mushroom and Evaluation of its Antimicrobial and Antioxidant Potential. Supervised by DASE HUNAEFI and DIAH CHANDRA ARYANI.

Although *Hypsizygus marmoreus* (shimeji mushroom) is widely available in the Indonesian market, information on the nutritional composition, ornithine content, and antimicrobial and antioxidant properties of commercial products remains limited. This study evaluated the proximate composition, ornithine concentration, and antimicrobial and antioxidant activities of four commercial shimeji mushroom brands. Proximate composition was determined using AOAC Official Methods. Ornithine was extracted with hydrochloric acid according to Japanese Agricultural Standard JAS 0016 and quantified using high-performance liquid chromatography. Antimicrobial activity was evaluated by agar-well diffusion, and antioxidant activity was evaluated using the DPPH radical-scavenging assay. The mushrooms had high moisture contents (90.74-91.54% fresh weight), high protein contents (27.71-29.48% dry weight), low fat contents (6.07-8.42% dry weight), and carbohydrate contents of 45.27-55.30% dry weight, with an average energy value of 33.11 kcal/100 g. Ornithine concentrations differed significantly among brands and ranged from 11.0 ± 1.4 to 75.0 ± 24.1 mg/100 g fresh weight. No antimicrobial activity was detected in any sample. Brown shimeji mushrooms exhibited greater antioxidant activity than white shimeji mushrooms, with ascorbic acid equivalent antioxidant capacity values of 3.69 ± 0.12 to 4.35 ± 0.52 mg/g fresh weight and radical-scavenging activities of 29.52-35.07%. These findings provide comparative baseline data on the nutritional composition, ornithine content, and biological properties of commercial shimeji mushrooms marketed in Indonesia and may support their development as functional food products.

Keywords: Antimicrobial activity, antioxidant, ornithine, proximate composition, shimeji mushroom

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Determination of Ornithine Content in Shimeji Mushroom and Evaluation of Its Antimicrobial and Antioxidant Potential

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Thesis
as one of the requirements to obtain a degree
of Master of in
Food Science Study Program

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PREFACE

First and foremost, I would like to thank the Almighty God for all His blessings, enabling the completion of this thesis. The research was conducted from September 2025 to February 2026 with the title “Determination of Ornithine Content in Commercial Shimeji Mushroom and Evaluation of Its Antimicrobial and Antioxidant Potential.”

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Bogor, 22 July 2026

Sebulon Laurengia Porikura

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