

OPTIMASI DIMENSI FERMENTOR DAN BERAT SUBSTRAT PADA FERMENTASI AMPAS KELAPA MENGGUNAKAN KAPANG *Mucor irregularis* JR 1.1

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INTISARI

Biaya pakan merupakan komponen terbesar dalam budidaya ternak unggas, yaitu sekitar 60–70% dari total biaya produksi, sehingga diperlukan bahan pakan alternatif lokal yang terjangkau. Salah satu limbah pertanian yang berpotensi namun belum dimanfaatkan secara optimal sebagai pakan unggas adalah ampas kelapa. Penelitian sebelumnya menunjukkan prediksi kadar protein sebesar 44% pada pakan hasil fermentasi ampas kelapa skala kecil. Penelitian ini bertujuan menganalisis pengaruh berat substrat dan panjang sisi wadah terhadap hasil fermentasi ampas kelapa menggunakan kapang *Mucor irregularis* JR 1.1. Metode yang digunakan adalah *Response Surface Methodology Central Composite Design* dengan dua variabel yaitu berat substrat dan panjang sisi wadah fermentasi. Optimasi dilakukan dengan 9 perlakuan berbeda. Dimulai dengan pembuatan wadah, suspensi spora diinokulasi ke medium kelapa. Fermentasi dilakukan selama 5 hari pada suhu 30°C, kemudian dianalisis kadar protein dan lemak kasar. Data dianalisis menggunakan perangkat lunak Minitab 21 untuk menghasilkan output berupa data ANOVA, uji kesesuaian model, persamaan regresi, grafik *contour plot* dan *surface plot*, serta optimasi desain RSM. Hasil penelitian menunjukkan kondisi optimal pada berat substrat 200 g dan panjang sisi wadah 22,9 cm² menghasilkan prediksi kandungan protein kasar 9,28% dan hasil validasi sebesar 8,065%. Terdapat peningkatan sebesar 1,56% dibandingkan dengan protein kontrol sebesar 6,51%, serta penurunan lemak kasar dari 57,26% menjadi 34,43% atau sebesar 22,83%. Hasil ini menunjukkan bahwa dimensi wadah dan berat substrat berpengaruh terhadap peningkatan kualitas fermentasi ampas kelapa, sehingga berpotensi diaplikasikan pada proses fermentasi ampas kelapa menjadi pakan ayam.

KATA KUNCI: *Mucor irregularis*, CCD, Protein, Fermentor, Ampas kelapa

**OPTIMIZATION OF FERMENTOR DIMENSIONS AND SUBSTRATE
WEIGHT ON THE FERMENTATION OF COCONUT PULP USING THE
FUNGUS *Mucor irregularis* JR 1.1**

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ABSTRACT

Feed cost is the largest component in poultry production, accounting for approximately 60–70% of total production costs; therefore, affordable local alternative feed ingredients are required. One agricultural by-product with potential but not yet optimally utilized as poultry feed is coconut pulp. Previous studies reported a predicted protein content of 44% in fermented coconut pulp produced at a small scale. This study aimed to analyze the effect of substrate weight and container side length on the fermentation yield of coconut pulp using the mold *Mucor irregularis* JR 1.1. The method used was Response Surface Methodology with a Central Composite Design involving two variables, namely substrate weight and fermentation container side length, with optimization conducted through nine different treatments. The process began with container preparation, followed by inoculation of spore suspension into the coconut substrate, and fermentation was carried out for five days at 30°C, after which crude protein and crude fat contents were analyzed. Data were processed using Minitab 21 to generate ANOVA results, model adequacy tests, regression equations, contour plots, surface plots, and RSM optimization outputs. The results showed that the optimal conditions were achieved at a substrate weight of 200 g and a container side length of 22.9 cm², yielding a predicted crude protein content of 9.28% and a validation result of 8.065%, representing an increase of 1.56% compared to the control protein content of 6.51%, along with a reduction in crude fat content from 57.26% to 34.43% or a decrease of 22.83%. These findings indicate that container dimensions and substrate weight significantly influence the improvement of coconut pulp fermentation quality, demonstrating its potential application in the production of fermented coconut pulp as poultry feed.

KEYWORDS: *Mucor irregularis*, CCD, Protein, Fermenter, Coconut dregs