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Effects of solid-state fermentation using Aspergillus niger on yield, total phenolic content, and antioxidant activity of defatted rice bran extract

(2025) *Food Chemistry Advances*, 7, art. no. 100957, .

DOI: 10.1016/j.focha.2025.100957

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Abstract
This study aimed to determine the effects of defatted rice bran fermentation using A. niger towards extract yield and bioactivity against various solvents. Solid-state fermentation of defatted rice bran using A. niger was carried out in dark conditions at 27 °C for 7 d. The results showed that the fermentation process reduced the hemicellulose, cellulose, and lignin content by 22.36 %, 42.47 %, and 22.96 % after 7 d of fermentation. Extraction of phenolic compounds from the fermented defatted rice bran was carried out by a maceration at 40 °C for 180 min using methanol (80 %), ethanol (80 %), and acetone (40 %). The fermentation increased the yield of defatted rice bran extract by up to 81 % (when using ethanol (80 %) as the extracting solvent) as compared to without fermentation. The total phenolic content and ferulic acid of the defatted rice bran extract also increased upon fermentation up to 339 % and 58 times when the extraction was carried out using ethanol (80 %). The antioxidant activity of the defatted rice bran extracts also increased upon fermentation with the lowest value of IC50 (102.19 ppm) obtained when the extraction was carried out using ethanol (80 %). © 2025

Author Keywords
Antioxidant activity; Aspergillus niger; Defatted rice bran; Ferulic acid; Total phenolic content

Index Keywords
antioxidant, cellulose, ferulic acid, flavonoid, gallic acid, hemicellulose, lignin, lignocellulose, methanol, phenol; antioxidant activity, Article, Aspergillus niger, biological activity, DPPH radical scavenging assay, enzyme activity, fermentation, high performance liquid chromatography, IC50, moisture, nonhuman, rice, rice bran, solid state fermentation, Soxhlet extraction

Chemicals/CAS
cellulose, 61991-22-8, 68073-05-2, 9004-34-6; ferulic acid, 1135-24-6, 24276-84-4; gallic acid, 149-91-7; hemicellulose, 63100-39-0, 63100-40-3, 9034-32-6; lignin, 9005-53-2; lignocellulose, 11132-73-3; methanol, 67-56-1; phenol, 108-95-2, 3229-70-7

Tradenames
SPSS Statistics 26 software

Funding details
Institut Teknologi BandungITBLPPM.PN-8-37-2023
Institut Teknologi BandungITB

This research financially supported by Institut Teknologi Bandung (LPPM.PN-8-37-2023).

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Publisher: Elsevier Ltd

ISSN: 2772753X
Language of Original Document: English
Abbreviated Source Title: Food Chem. Adv.
2-s2.0-105000665751
Document Type: Article
Publication Stage: Final
Source: Scopus