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Protein improvement of banana peel through sequential solid state fermentation using mixed-culture of *Phanerochaete chrysosporium* and *Candida utilis* (Article)

Olorunnisola, K.S.^{a,b} [✉](#), Jamal, P.^{a,b}, Alam, M.Z.^{a,b} [🔍](#)^aBiotechnology Engineering Department, Faculty of Engineering, Bioenvironmental Engineering Research Centre (BERC), International Islamic University Malaysia (IIUM), Jalan Gombak, P.O.Box 10, Kuala Lumpur, 50728, Malaysia^bBiological Sciences Department, Faculty of Basic and Applied Sciences, Elizade University, Ilara-Mokin, Ondo State, Nigeria

Abstract

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Banana peel (BP) is a major waste produced by fruit processing industries. Pre-treatment of BP at different temperatures led to 40% reduction in saponin at 100 °C (from 9.5 to 5.7 mg/g). Sequential mixed culture of *Phanerochaete chrysosporium* (*P. chrysosporium*) and *Candida utilis* (*C. utilis*) gave highest protein enrichment (88.93 mg/g). There is 26% increase in protein synthesis (from 88.93 to 111.78 mg/g) after media screening. Inclusion of KH_2PO_4 , $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$, wheat flour and sucrose in the media contributed positively to protein synthesis, while elevated concentration of urea, peptone, K_2HPO_4 , KCl, $\text{NH}_4\text{H}_2\text{PO}_4$, and $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ are required to reach optimum protein synthesis. Total soluble sugar (TSS), total reducing sugar (TRS) and total carbohydrate (CHO) consumption varied with respect to protein synthesis in all experimental runs. Optimum protein synthesis required 6 days and inclusion of 5% sucrose, 0.6% $\text{NH}_4\text{H}_2\text{PO}_4$, 0.4% KCl, and 0.5% $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ as concentration media constituents to reach 140.95 mg/g protein synthesis equivalent to 300% increase over the raw banana peel protein content (35.0 mg/g). © 2018, Springer-Verlag GmbH Germany, part of Springer Nature.

SciVal Topic Prominence [i](#)

Topic: Biomass | Yeast | cell protein

Prominence percentile: 79.877 [i](#)

Reaxys Database Information

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Author keywords

[Banana peel](#) [Candida utilis](#) [Phanerochaete chrysosporium](#) [Protein](#) [Solid state fermentation](#)

Indexed keywords

EMTREE drug terms: [carbohydrate](#) [magnesium sulfate](#) [peptone](#) [potassium chloride](#) [saponin](#)
[sodium dihydrogen phosphate](#) [sucrose](#) [sugar](#) [urea](#)

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Jamal, P. , Saheed, O.K. , Alam, Md.Z. (2014) *Journal of Pure and Applied Microbiology*Growth, substrate consumption, and product formation kinetics of *Phanerochaete chrysosporium* and *Schizophyllum commune* mixed culture under solid-state fermentation of fruit peelsOlorunnisola, K.S. , Jamal, P. , Alam, M.Z. (2018) *3 Biotech*

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Chemicals and CAS Registry Numbers:

magnesium sulfate, 7487-88-9; potassium chloride, 7447-40-7; saponin, 8047-15-2; sodium dihydrogen phosphate, 7558-80-7, 7632-05-5; sucrose, 122880-25-5, 57-50-1; urea, 57-13-6

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