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## Protein improvement of banana peel through sequential solid state fermentation using mixed-culture of Phanerochaete chrysosporium and Candida utilis

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### Abstract

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 degrees 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<sub>2</sub>PO<sub>4</sub>, FeSO<sub>4</sub> center dot 7H(2)O, wheat flour and sucrose in the media contributed positively to protein synthesis, while elevated concentration of urea, peptone, K<sub>2</sub>HPO<sub>4</sub>, KCl, NH<sub>4</sub>H<sub>2</sub>PO<sub>4</sub>, and MgSO<sub>4</sub> center dot 7H(2)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% NH<sub>4</sub>H<sub>2</sub>PO<sub>4</sub>, 0.4% KCl, and 0.5% MgSO<sub>4</sub> center dot 7H(2)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).

### Keywords

**Author Keywords:** Banana peel; *Candida utilis*; Phanerochaete chrysosporium; Solid state fermentation; Protein

**KeyWords Plus:** NUTRITIONALLY ENRICHED SUBSTRATE; CELLULOLYTIC ENZYME-PRODUCTION; MICROBIAL BIOMASS PROTEIN; WHITE-ROT FUNGI; ASPERGILLUS-NIGER; CARBON SOURCE; BIOCONVERSION; OPTIMIZATION; SAPONINS; WASTES

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