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## Growth, substrate consumption, and product formation kinetics of *Phanerochaete chrysosporium* and *Schizophyllum commune* mixed culture under solid-state fermentation of fruit peels

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### Abstract

Kinetic analysis of solid-state fermentation (SSF) of fruit peels with *Phanerochaete chrysosporium* and *Schizophyllum commune* mixed culture was studied in flask and 7 kg capacity reactor. Modified Monod kinetic model suggested by Haldane sufficiently described microbial growth with co-efficient of determination (R-2) reaching 0.908 at increased substrate concentration than the classical Monod model (R-2 = 0.932). Leudeking-Piret model adequately described product synthesis in non-growth-dependent manner (R-2 = 0.989), while substrate consumption by *P. chrysosporium* and *S. commune* fungal mixed culture was growth-dependent (R-2 = 0.938). Hanes-Woolf model sufficiently represented a-amylase and cellulase enzymes synthesis (R-2 = 0.911 and 0.988); alpha-amylase had enzyme maximum velocity (V-max) of 25.19 IU/gds/day and rate constant (K-m) of 11.55 IU/gds/day, while cellulase enzyme had V-max of 3.05 IU/gds/day and K-m of 57.47 IU/gds/day. Product yield in the reactor increased to 32.65 mg/g/day compared with 28.15 mg/g/day in shake flask. 2.5 cm media thickness was adequate for product formation within a 6 day SSF in the tray reactor.

### Keywords

**Author Keywords:** Kinetics; Leudekin-Piret; Monod model; Growth rate; Fermentation

**KeyWords Plus:** ENZYME-PRODUCTION; COTTON STALKS; FUNGAL GROWTH; PROTEIN; WASTES; OPTIMIZATION; MUTANT; MODEL; CULTIVATION; STRAINS

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