

## Pengujian kemampuan rhizopus microsporus UICC 500, 531, dan 539 memfermentasi campuran lumpur dan bungkil sawit = Fermentation of slurry and palm kernel cake mixtures by rhizopus microsporus UICC 500, 531, and 539

Fenty Prameswari, author

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### Abstrak

#### <b>ABSTRAK</b><br>

Penelitian ini bertujuan menguji kemampuan tiga strain *R. microsporus* UICC500, UICC 531, dan UICC 539 dalam memfermentasi campuran lumpur dan bungkil sawit 3:1 dan 4:1 nonsteril, serta 3:1 dan 4:1 steril, selanjutnya menganalisis perubahan komposisi karbohidrat, lemak, protein, air, dan abu campuran limbah setelah fermentasi. Konsentrasi inokulum sebesar 10 v/b ,dengan jumlah sel awal sebanyak  $1 \times 10^7$  CFU/mL digunakan dalam campuran dengan berat total 20g. Kemampuan *R. microsporus* memfermentasi campuran lumpur dan bungkil sawit ditunjukkan melalui pertumbuhan *R. microsporus* pada campuran limbah sawit, yaitu morfologi, jumlah sel/mL, kepadatan miselium, dan sporulasi; pengamatan pada campuran limbah sawit, yaitu warna, kekompakan, aroma, dan pH; serta perubahan komposisi campuran limbah sawit. Hasil pengamatan mengindikasikan *Rhizopus microsporus* UICC 500, UICC 531, dan UICC 539 tidak memfermentasi campuran lumpur dan bungkil 4:1 nonsteril yang ditunjukkan dengan tidak ada pertumbuhan ketiga strain tersebut. *Rhizopus microsporus* UICC 539 memfermentasi campuran lumpur dan bungkil sawit 3:1 nonsteril, 3:1 steril, 4:1 steril yang ditunjukkan dengan adanya pertumbuhan. *Rhizopus microsporus* UICC 500 dan UICC 531 memfermentasi campuran lumpur dan bungkil sawit 3:1 dan 4:1 steril yang ditunjukkan dengan adanya pertumbuhan. Pertumbuhan tercepat dan jumlah sel terbanyak pada campuran lumpur dan bungkil sawit 3:1 steril ditunjukkan oleh *R. microsporus* UICC 539 yaitu  $1,77 \times 10^8$  CFU/mL, selanjutnya *R. microsporus* UICC 531 yaitu  $1,35 \times 10^8$  CFU/mL, dan *R. microsporus* UICC 500 yaitu  $1,3 \times 10^8$  CFU/mL. *Rhizopus microsporus* UICC 539 dapat mengubah komposisi campuran lumpur dan bungkil 3:1 steril setelah lima hari fermentasi, yaitu dapat meningkatkan kandungan protein, karbohidrat, dan abu pada campuran limbah steril sebanyak 16 , 1,71 , dan 17,5 secara berturut-turut, serta menurunkan kandungan lemak dan air sebanyak 48 dan 0,1.

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#### <b>ABSTRACT</b><br>

This study aims to test the ability of three strains of *R. microsporus* UICC 500, 531 UICC and UICC 539 to ferment slurry and kernel cake mixtures 3 1 and 4 1 non sterile, and 3 1 and 4 1 sterile, then analyzes the composition change carbohydrates, fats, protein, water and ash of waste mixtures after fermentation. Fermentation of slurry and palm kernel cake mixtures with inoculum concentration of 10 v w of the total weight from the mixtures as much as 20 g with initial cell number  $1 \times 10^7$  CFU mL. *Rhizopus microsporus* was able to ferment slurry and kernel cake mixtures, showed by growth of *R. microsporus* on waste mixtures, includes morphology, number of cells mL, density of mycelium, and sporulation the observation of slurry and kernel cake mixtures, includes color, compactness, odor, and pH, and also the change of waste mixtures composition. The observation results indicated that *R. microsporus* UICC 500, UICC 531, and UICC 539 were unable to ferment the slurry and kernel cake 4 1 non sterile mixtures,

showed by no growth. *Rhizopus microsporus* UICC 539 was able to ferment the slurry and kernel cake mixtures 3 1 non sterile, 3 1 sterile, 4 1 sterile, indicated by growth on the mixtures. *Rhizopus microsporus* UICC 500 and UICC 531 was able to ferment slurry and kernel cake mixtures 3 1 and 4 1 sterile, showed by growth on the mixtures. The fastest growth and the highest number of cells showed by *Rhizopus microsporus* UICC 539 with  $1.77 \times 10^8$  CFU mL, then *Rhizopus microsporus* UICC 531 with  $1.35 \times 10^8$  CFU mL, and *R. microsporus* UICC 500 with  $1.3 \times 10^8$  CFU mL on slurry and kernel cake mixtures 3 1 sterile. *Rhizopus microsporus* UICC 539 was able to change the composition of slurry and kernel cake 3 1 sterile mixtures after five days fermentation. The protein, carbohydrates, and ash content increased by 16 , 1.71 , and 17.5 , respectively, whereas fats and water content decreased by 48 and 0.1 , respectively.