

**PENGARUH KADAR AIR AWAL DAN UKURAN PARTIKEL
SUBSTRAT TERHADAP PRODUKSI AMILASE DAN SELULASE OLEH
Aspergillus niger DAN *Trichoderma reesei* DENGAN FERMENTASI
SUBSTRAT PADAT**

ABSTRAK

Oleh :

DINDA DARMAWAN

13/348594/TP/10712

Padi yang ada pada onggok dan selulosa yang ada pada jerami padi dapat dimanfaatkan sebagai substrat dalam produksi amilase dan selulase menggunakan fermentasi substrat padat. Digunakan mikroorganisme strain *Aspergillus niger* FNCC 6114 dan *Trichoderma reesei* PK1J2.

Dilakukan pengamatan tentang pengaruh kadar air awal media dan ukuran partikel substrat yang digunakan pada proses fermentasi. Dilakukan variasi rasio substrat dengan larutan mineral untuk mendapatkan kadar air awal media yang berbeda. Untuk onggok, rasio yang digunakan adalah 1:2; 2:5; 2:7; dan 1:4, dan didapatkan kadar air awal media berturut-turut 71,4%; 75,3%; 78%; dan 82%. Untuk jerami, rasio yang digunakan adalah 1:5; 1:7; 1:10; dan 1:12, dan didapatkan kadar air awal media untuk *Aspergillus niger* berturut-turut 84,2%; 87,1%; 88,6%; dan 90,4%, sedangkan untuk *Trichoderma reesei* berturut-turut 83,5%; 86,4%; 88,7%; dan 90,4%. Ukuran partikel substrat yang digunakan di penelitian ini adalah 6-8 mesh, 8-10 mesh, 10-12 mesh, dan 12-14 mesh.

Produksi amilase tertinggi oleh *Aspergillus niger* diperoleh pada kadar air awal 82%, yaitu 88,45 U/gram substrat kering; dan ukuran partikel substrat 6-8 mesh, yaitu 118,38 U/gram substrat kering. Produksi selulase tertinggi oleh *Trichoderma reesei* diperoleh pada kadar air awal 88,7%, yaitu 45,34 FPU/gram substrat kering; dan ukuran partikel substrat 6-8 mesh, yaitu 57 FPU/gram substrat kering. Produksi selulase tertinggi oleh *Aspergillus niger* diperoleh pada kadar air awal 84,2%, yaitu 5,48 FPU/gram substrat kering; dan ukuran partikel substrat 6-8 mesh, yaitu 6,02 FPU/gram substrat kering.

Kata kunci : Amilase, selulase, onggok, jerami padi, kadar air awal, ukuran partikel substrat, produksi enzim

**THE EFFECT OF INITIAL WATER CONTENT AND SUBSTRATE
PARTICLE SIZE ON AMYLASE AND CELLULASE PRODUCTION BY
Aspergillus niger AND *Trichoderma reesei* WITH SOLID-STATE
FERMENTATION**

ABSTRACT

By :

DINDA DARMAWAN

13/348594/TP/10712

Starch from cassava bagasse and cellulose from rice straw can be used as substrate on amylase and cellulase production using solid-state fermentation. *Aspergillus niger* FNCC 6114 and *Trichoderma reesei* PK1J2 were used as amylase and cellulase producer in this research.

The effect of initial water content on media and substrate particle size used during fermentation were assessed. Initial water content on media was done by varying the ratio between substrate and mineral solution. For cassava bagasse, the ratio used were 1:2; 2:5; 2:7; and 1:4, and the initial water content were consecutively 71,4%; 75,3%; 78%; and 82%. For wheat straw, the ratio used were 1:5; 1:7; 1:10; dan 1:12, and the initial water content for wheat straw used by *Aspergillus niger* were 84,2%; 87,1%; 88,6%; and 90,4%; and and the initial water content for wheat straw used by *Trichoderma reesei* were 83,5%; 86,4%; 88,7%; and 90,4%. Substrate particle size was varied from 6-8 mesh, 8-10 mesh, 10-12 mesh, and 12-14 mesh.

The highest amylase production produced by *Aspergillus niger* was obtained with 82% initial water content, that is 88.45 U/gram dry substrate; and 6-8 mesh substrate particle size, that is 118.38 FPU/gram dry substrate. The highest cellulase production produced by *Trichoderma reesei* was obtained with 88,7% initial water content, that is 45.34 FPU/gram dry substrate; and 6-8 mesh substrate particle size, that is 57 FPU/gram dry substrate. The highest cellulase production produced by *Aspergillus niger* was obtained with 84,2% initial water content, that is 5.48 FPU/gram dry substrate; and 6-8 mesh substrate particle size, that is 6.02 FPU/gram dry substrate.

Keyword : Amylase, cellulase, cassava bagasse, rice straw, initial water content, substrate particle size, enzyme activity