

BAB V KESIMPULAN

1. Onggok (12 %, b/v) yang diberi perlakuan hidrothermal 65°C (10 menit) dihidrolisis dengan Dextrozyme[®] GA (5,63 mL/kg substrat, 50°C, 24 jam) menghasilkan 86,2% DE. DE paling tinggi (90,18 %) dicapai jika onggok diberi perlakuan hidrothermal 90°C.
2. Onggok (ukuran partikel <177µm) yang dinaikan konsentrasinya sampai 23% (b/v), dengan *slurry* yang sangat kental ini diberi perlakuan enzimatik Cellulclast[®] 1.5 L (16,7 mL/kg substrat, 50°C, 3 jam) sebelum perlakuan hidrothermal tidak hanya meningkatkan akumulasi gula pereduksi (96,6% DE) setelah likuifikasi dan sakarifikasi masing-masing dengan Thermamyl[®] 120 L (29,25 mL/kg substrat) dan Viscozyme[®] L (5,62 mL/kg substrat) tapi juga menurunkan viskositas sampai 150cP.
3. Hidrolisis *raw* onggok dengan campuran Viscozyme[®] L (85,8 ml/kg substrat) dan Cellobiase[®] (5,63 ml/kg substrat) menghasilkan 70,10% DE. Kuantitas *fermentable sugar* yang dihasilkannya pada percobaan ini sudah hampir setara dengan proses konvensional dengan keunggulan tanpa perlakuan panas (hidrothermal) sehingga konsumsi energi lebih hemat. Hidrolisis *raw* onggok dengan enzim tunggal Viscozyme[®] L menghasilkan 64,02 % DE, juga patut menjadi perhatian karena prosesnya lebih sederhana.
4. Konversi onggok menjadi bioethanol sangat ditentukan oleh DE dan kualitas onggok, makin besar kandungan airnya makin banyak onggok yang dibutuhkan. Diperlukan 3,93kg onggok (kadar air 15%) untuk menghasilkan 1 kg bioethanol jika DE hidrolisisnya 90,18% dan perlakuan hidrothermal selama 10 menit pada 90°C. Dengan kondisi yang sama, 5,56kg dan 6,68kg onggok basah masing-masing dengan kadar air 40% dan 50%, dibutuhkan untuk menghasilkan 1 kg ethanol. Diperlukan lebih banyak onggok jika DE hidrolisis lebih rendah dan kadar air lebih tinggi.
5. Semua enzim komersial (Cellobiase[®], Cellulclast[®] 1.5L, Dextrozyme[®] GA, Pektinex[™] Ultra SP-L, Termamyl[®] 120L dan Viscozyme[®] L) terbukti memiliki aktivitas multi-enzim, seperti amilolitik, selulolitik, hemiselulolitik/ xylanolitik, dan pektinolitik.

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