Cassava pulp as a biofuel feedstock of an enzymatic hydrolysis process

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Abstrak

Cassava pulp, a low cost solid byproduct of cassava starch industry, has been proposed as a high potential ethanolicfermentation substrate due to its high residual starch level, low ash content and small particle size of the lignocellulosic fibers. As the economic feasibility depends on complete degradation of the polysaccharides to fermentable glucose, the comparative hydrolytic potential of cassava pulp by six commercial enzymes were studied. Raw cassava pulp (12%
w/v, particle size <320 μm) hydrolyzed by both commercial pectinolytic (1) and amylolytic (2) enzymes cocktail, yielded 70.06% DE. Hydrothermal treatment of cassava pulp enhanced its susceptibility to enzymatic cleavageas compared to non-hydrothermal treatment raw cassava pulp. Hydrothermal pretreatment has shown that a glucoamylase (3) was the most effective enzyme for hydrolysis process of cassava pulp at temperature 65°C or 95°C for 10 min and
yielded approximately 86.22% and 90.18% DE, respectively. Enzymatic pretreatment increased cassava pulp vulnerability to cellulase attacks. The optimum conditions for enzymatic pretreatment of
30% (w/v) cassava pulp by a potent cellulolytic/ hemicellulolytic enzyme (4) was achieves at 50 °C for 3, meanwhile for liquefaction and
saccharification by a thermo-stable α-amylase (5) was achieved at 95°C for 1 and a glucoamylase (3) at 50°C for 24 hours, respectively, yielded a reducing sugar level up to 94,1% DE. The high yield of glucose indicates the potential use of enzymatic-hydrothermally treated cassava pulp as a cheap substrate for ethanol production.