

The profile of enzymes relevant to solvent production during direct fermentation of sago starch by *Clostridium saccharobutylicum* P262 utilizing different pH control strategies

ABSTRACT

The profile of enzymes relevant to solvent production during direct fermentation of sago starch by *Clostridium saccharobutylicum* P262 in a 2 L stirred tank fermenter was determined utilizing different pH control strategies. During fermentation without pH control (initial pH of 6), the specific activity of crotonase, thiolase, and β -hydroxybutyryl-CoA dehydrogenase increased proportionally with solvent production. The highest crotonase (3,450.7 kat) and phosphotransbutyrylase activity (1,475.6 kat) was observed in fermentation where pH was maintained at 5 during the acidogenic phase and corresponded to a fairly high acid accumulation but low solvent production. During fermentation with a controlled pH of 5.25 during the sol-ventogenic phase, the highest thiolase specific activity (255.7 kat) was obtained and corresponded to the highest production of acetone. On the other hand, the highest specific activities of crotonase, β -hydroxybutyryl-CoA dehydrogenase, and phosphotransbutyrylase were observed at pH 5.5 and corresponded to the highest production of ethanol and butanol. Butyryl-CoA dehydrogenase had no significance role in solvent fermentation. These results suggested that pH control strategies were important for improvement of solvent production during direct fermentation of sago starch by *C. saccharobutylicum*.

Keyword: sago starch, *Clostridium saccharobutylicum*, solventogenesis, acetogenesis, enzymes relevant to solvent fermentation