

## OI-15:

# Release from catabolite repression and enhancement of butanol production in solventogenic *Clostridium beijerinckii* SBP2-HB by ammonium acetate

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The solventogenic clostridia have been received much attention in recent years, because of their ability to produce butanol, a more excellent biofuel than ethanol on its calorific value and corrosive property. Sweet sorghum is a sugar-rich plant of potential interest for several non-food uses and thus has been considered as an important fermentation feedstock. Previously, we reported the isolation of *Clostridium beijerinckii* SBP2-HB able to grow and produce high amounts of butanol from sweet sorghum juice (SSJ) in batch cultures. SBP2-HB produced 63 mM butanol in 3-fold diluted SSJ containing 0.7% glucose, 0.7% fructose and 2.5% sucrose. Although the strain is able to use sucrose, because of catabolite repression, it consumed glucose then fructose selectively but did not sucrose during the growth in SSJ. A series of screening tests for substrates stimulating butanol production showed that ammonium acetate (AA) was a significant production stimulant. When SBP2-HB was cultured in 3-fold diluted SSJ supplemented with 0 to 150 mM AA, the butanol production increased to 149 mM at 100 mM AA. Interestingly, sucrose consumption increased with increasing the amount of AA added: the ratio of sucrose consumed, 0.56 and 0.99 at 30 mM and 100 mM AA, respectively. This was also the case in cultures with peptone-yeast extract (PYGS) medium containing 3% glucose and 2% sucrose. A 1.5 times higher butanol production (122 mM) was found by the addition of 100 mM AA. In the PYGS cultures, residual glucose did not repress sucrose consumption when the amount of AA added was higher than 100 mM. The ratio of glucose and sucrose consumed was 0.81 and 0.47, respectively, in PYGS cultures containing 100 mM AA, and 0.44 and 0.94, respectively, in those with 150 mM AA. These results suggest that AA leads to the release from catabolite repression in SBP2-HB.

keywords:butanol production,sweet sorghum,ammonium acetate,sucrose