

## Energy condition affects fermentation rate of *Streptococcus bovis* without changing fermentation pattern

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Other than hydrogen partial pressure, the factors affecting fermentation patterns are unclear. *Streptococcus bovis* is a major ruminal bacteria, produces acetate, lactate and ethanol from glucose. Only the production of acetate generates ATP. In cases of energy short age, *S. bovis* increases acetate production to obtain more ATP. This study was conducted to ascertain whether energy condition would affect the fermentation pattern by *S. bovis*. Carbonylcyanide m-chlorophenylhydrazone (CCCP) is a protonophore which dissipates the proton gradient across cell membranes. In conditions of proton influx, *S. bovis* may have to use ATP to expel protons. In this study, 600 mM CCCP was added to deprive *S. bovis* of energy. *S. bovis* was grown anaerobically in medium (pH 6.8) containing 2 g/l glucose, 1 g/l

trypticase and 0.5 g/l yeast extract. Incubation was performed at 39°C in 500 ml serum bottles. Cell growth, fermentation products, intracellular ATP were quantified. ATP production was estimated from the fermentation products. The estimated ATP production was increased by CCCP, though the cell growth was depressed. Therefore, *S. bovis* produced approximately 15 % more ATP per cell. However, increased ATP was wasted, because intracellular ATP level was not affected by CCCP. The amount of fermentation products was increased without changes in fermentation pattern. These results suggest that *S. bovis* adapts to energy depletion by increasing the fermentation rate rather than by changing the fermentation products.

