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Review
Biohydrogen Production by the Thermophilic Bacterium Caldicellulosiruptor saccharolyticus: Current Status and Perspectives

Overall H2 yields from biomass derived substrates can be increased when the dark fermentation is coupled to a second stage like electrohydrogenesis or photofermentation [117,118]. The former system uses a microbial electrolysis cell (MEC), in which electricity is used to convert acetate or other organic acids to hydrogen. In the latter case the main end product of the dark fermentation, acetate, is further converted by an anaerobic non-sulfur purple photosynthetic bacterium, forming a maximum of 4 mol H2 per mol acetate, giving an overall ***H2 yield of 12 mol H2 per mol glucose***. The effluent of C. saccharolyticus has been successfully used as a feed for photofermentative growth and H2 production [90,119,120]. Alternatively, dark fermentation end-products H2 and acetate could serve as substrates for hydrogenothropic methanogens in a biogas generating system. The addition of C. saccharolyticus to natural biogas-producing consortia led to an improvement of biogas production and a stable co-cultivation could be maintained for several months [98].