Butanol fermentation of the brown seaweed Laminaria digitata by Clostridium beijerinckii DSM-6422 - DTU Orbit (26/12/2018)

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Seaweed represents an abundant, renewable, and fast-growing biomass resource for 3rd generation biofuel production. This study reports an efficient butanol fermentation process carried out by Clostridium beijerinckii DSM-6422 using enzymatic hydrolysate of the sugar-rich brown seaweed Laminaria digitata harvested from the coast of the Danish North Sea as substrate. The highest butanol yield (0.42g/g-consumed-substrates) compared to literature was achieved, with a significantly higher butanol:acetone-butanol-ethanol (ABE) molar ratio (0.85) than typical (0.6). This demonstrates the possibility of using the seaweed L. digitata as a potential biomass for butanol production. For the first time, consumption of alginate components was observed by C. beijerinckii DSM-6422. The efficient utilization of sugars and lactic acid further highlighted the potential of using this strain for future development of large-scale cost-effective butanol production based on (ensiled) seaweed.

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