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In-situ Multiphase Compartmentalised Substrate Shuttle Bioreactor for Protein and Platform Chemicals

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Traditional microbial biotechnology processes can produce a wide range of suitable products ranging from foodstuffs such as lipids and proteins, pharmaceuticals, platform chemicals and biomaterials such as bioplastics. However, these products are dependent on high grade carbon and energy substrates such as molasses which can be used for human food consumption. To prevent the competition with food supply and possibly supplement traditional food sources, it is possible that hydrogen from renewable energy production could be used in these processes. However there are substantial explosion risks in using hydrogen in aerobic processes. The project here presents a novel bioreactor design the substrate shuttle bioreactor which would enable these aerobic processes to utilize hydrogen as an energy substrate. This hydrogen could be provided by renewable energy sources such as wind power and provide an alternative market to the traditional electrical supply sector.