

P047 Production of renewable biogas using a microbial fuel cell
Chitvan Bochiwal and James Chong

*Department of Biology, University of York, York, YO10 5YW,
UK.*

Methane is the major flammable component in natural gas, produced in nature by methanogens. As a fuel, methane has some advantages: infrastructure already exists for transport and utilisation, it is not spontaneously explosive in air, and is easily stored compared to hydrogen or electricity. Methanogens are microbes belonging to the domain Archaea and produce methane via methanogenesis. Methanogenesis is essential for energy production and growth. Currently, methane-containing biogas is produced by the anaerobic digestion of organic waste by consortia of microbes. Due to unknown interactions among the species in these microbial communities, it is difficult to determine conditions that will increase the efficiency of methane production. We are working with *Methanothermobacter thermoautotrophicus*, a thermophilic methanogen that utilises carbon dioxide and hydrogen for growth. Hydrogen has a key role as the electron donor for ATP production in the electron transport chain of this organism. Our work focuses on the use of alternative electron sources for methanogenesis. Previous studies have shown that hydrogen can be replaced by using electricity as an electron source and neutral red as an electron mediator in a microbial fuel cell (MFC). We have designed a MFC where methanogens are grown in the cathodic compartment using phenazine dyes as electron mediators for methane production.