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Biogenic Methane Production from Bowen Basin Coal Waste MaterialsHang Zheng ^{a*}, Tianyu Chen ^b, Victor Rudolph ^{b*} and Suzanne D. Golding ^{a*}^a School of Earth Sciences, ^b School of Chemical Engineering, The University of Queensland, Brisbane, QLD 4072, Australia**Abstract**

A microbial consortium derived from sewage sludge from the treatment of wastewater (Luggage Point Wastewater Treatment Plant, Brisbane, Australia) has been applied to Jameson Cell (J-cell) rejects ($R_{o,max}=0.96\pm 0.008$) of a Bowen Basin coal preparation plant to assess the potential for biogenic methane production. A maximum methane yield of 26.20 $\mu\text{mol/g}$ J-cell rejects ($0.64 \text{ m}^3 \text{ CH}_4/\text{ton}$) was observed, suggesting biogenic methane production from coal waste materials is a feasible process if yields can be improved. Molecular analysis performed on the microbial consortium showed similar microbial community compositions to those observed in natural coal bed environments. The study demonstrates that Australian coal waste materials can be used as a viable feedstock for biogenic methane production using microorganisms that are not native within the coal beds.

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