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Got Fuel?

One of the biggest problems we face as human kind is the increasing demand for energy sources and the lack of sustainable options. While scientists are working with wind, solar and geothermal energy sources to create sustainable power options, we have overlooked one thing - common organic waste.

The purpose of this project was to take an organic waste material such as cow dung and see if energy can be produced from it by using a microbial fuel cell (MFC). MFCs can leverage the digestion process of anaerobic bacteria found in cow dung (and other organic materials) to produce electricity. The bacteria turn complex carbs, fats, and proteins into methane and carbon dioxide and in the process releases electrons that can be drawn to produce electricity. The anaerobic bacteria are able to achieve this complex digestion through four stages: hydrolysis, acidogenesis, acetogenesis, and methanogenesis.

By taking just a small sample of cow dung (500 grams) the MFC that I created, was able to generate up to 4.7 millivolts of electricity. When scaled, my MFC was able to generate an average of 35 millivolts with 5 Kg of dung. While this is not a large amount of voltage, cow dung based MFCs show promise for a clean, renewable energy future. For example, in Africa only 20% of the population has access to electricity. But 70% of the country's population owns livestock. With third-world countries having easy access to livestock and their waste, this project can impact generations to come.