

## Production of Biogas Using Dairy Manure as Feedstock and Rumen Fluid as Inoculum

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### Abstract

*Methane gas is a valuable gas that can be used as a source of energy, either used for cooking fuel or small-scale electricity production. The most suitable application of the methane gas is in rural areas which rarely have the source of energy. It can reduce the dependency of using diesel or gasoline in order to obtain electricity. This study focused on the use of dairy manure as the feedstock and the rumen fluid as the inoculant to improve the production of biogas in rural areas application. The amount of rumen fluid and water added were varied to prepare 0 %, 12.5 %, 25 %, 37.5 % and 50 % rumen fluid. Besides that, the pH level was monitored and its effects towards biogas production was discussed. From the experiment, sample with 37.5 % rumen fluid gave the highest biogas production, followed by 50 %, 25 %, 12.5 % and 0 % rumen fluid. The presence Rumen fluids have improved the biogas production for the anaerobic digestion.*

*Keywords: Anaerobic digestion, biogas, rumen fluid, manure*

### 1. Introduction

There are two different sources of energy production, which are non-renewable and renewable. The energy production slowly is changing its focus to the renewable energy which is more green. Energy is the most important in human daily life as the source of electricity and the challenges that have been critical in this modern age is to meet the rapid increment of energy demand for the citizen. The challenge also comes in supplying the electricity to rural areas with difficult routes of communication and development. Table 1 shows the electricity supply to the rural area by state in Malaysia.

This electricity supply in Malaysia is mostly contributed from oil, natural gas and coal power generation which is non-renewable energy source. From Table 1, the lowest electric supply to the rural area is Sarawak followed by Sabah with 66.91 % and 67.05 % respectively. Sabah and Sarawak are one of the largest area states in Malaysia where most of the rural area is uncovered with modern technology. Rural areas are lived by various ethnics who are not exposed to the real world due to distance and transportation constraint. In Sarawak, most of the rural areas are located in deep forest and at high mountain. These problems have caused difficulties in construsting grid lines to supply electricity to the specific area.

As alternative, biogas energy which is categorized as renewable energy can be used as the power generation in the rural areas. The term biogas is referring to gas which is produced by the biological breakdown of organic matter in the absence of oxygen [2].

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