DESIGN OF ANAEROBIC DIGESTER HOUSEHOLD SCALE FOR TREATMENT OF DOMESTIC WASTEWATER AND COW DUNG FOR OBTAINING ALTERNATIVE ENERGY

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Abstract
In daily life activity, people produce domestic wastewater. Domestic wastewater is categorized into two: greywater, which consists of any wastewater generated from kitchen, bathroom, and laundry activity, and blackwater which consists of any wastewater generated from water closet, contains urine, feces, cleaning material and flush water. In breeder community, it does not only produce domestic wastewater but also cow dung. Appropriate treatment that can be used to treat blackwater, greywater, and cow dung in household level is anaerobic digester. Anaerobic digester has some advantages which are minimum sludge production and biogas production from anaerobic process. Biogas itself is an alternative energy for poor community for cooking. Nowadays, digester that is commonly used by the people is not effective because it is used to treat waste from different number of livestock which causes the different amount of biogas produced that caused by different time detention. A short time detention will not make the biogas produced. Therefore, digester with effective time detention is needed to treat some amount of wastewater.

In this design of anaerobic digester for household level, will be designed an anaerobic digester with intermittent system in 4 various blackwater and cow dung composition: 1 household with 2 cows, 1 household with 3 cows, 1 household with 4 cows,
and 1 household with 5 cows. Data needed in this design process is secondary data from literature study. Digester design started from calculating wastewater flow, biogas required for household needed, anaerobic process, volume and dimension of digester. The Standard Operating Procedure is also designed for each type of digester.

There are four types of design in this anaerobic digester for household level based on the composition. Digester is designed with floating type drum and intermittent system. Digester volume is 3 m$^3$, 4.1 m$^3$, 5.2 m$^3$, dan 8 m$^3$ and made from polyethylene tank that is reliable in countering the temperature change, strong, and stainless. The digester itself is good to be used for ten years. The prize for each digester model is relatively high, but have a long time of usage.

Keyword: Blackwater, greywater, cow dung, anaerobic digester, biogas