

3rd International Conference
Sustainable Agriculture, Food and Energy

Conference Programme
Papers Abstracts

Fostering Multi-Stakeholder Collaboration on Sustainable Agriculture, Food and Energy

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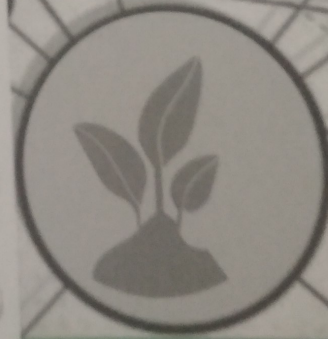
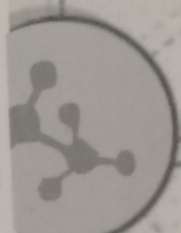
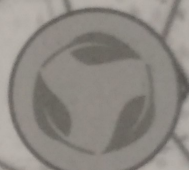
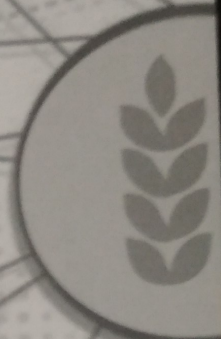
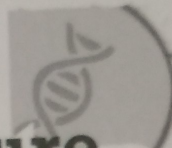
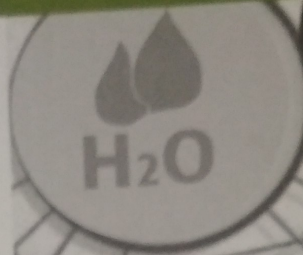
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“Fostering Multi-stakeholder Collaboration on Sustainable
Agriculture, Food and Energy”

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Boiler Retrofit for the Utilization of Biodiesel

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Abstract: Fuel oil used in the boiler is able to substitute with biodiesel. In lower blends, there are no engine modification needed, but some researchers recommended some technical adjustments in order to maintain the boiler's performance and equipment durability. This study is performed a comparison between the performance of boiler before and after retrofitting on the use of biodiesel. The diesel oil was introduced in biodiesel blends of 10%(B10), 20% (B20) and 25% (B25). The tests was carried out on a fire tube boiler with pressure of 3 bar and heat input capacity of 60,000 kcal. The boiler retrofit is conducted by fine tuning the fan damper scale (FDS) and adding a heating feature on fuel system. It was specifically intended to maintain the quality of combustion and boiler efficiency as well as to avoid an increase in fuel consumption. The combustion behaviour was monitored by exhaust emissions of CO, NO_x, and SO₂. The fan damper scale (FDS) and fuel temperature was adjusted by the increasing portion of biodiesel used. The fuel heating apparatus was set at temperature of 40 °C for the use of B10, and 60°C for B20 and B25. The FDS adjustment was successfully resulted a reduction in rate of combustion air by average of 9.2%. The boiler retrofitting for the utilization of B10, B20 and B25 showed an increase in boiler efficiency by 0.64%, 0.42% and 2.6% respectively. The retrofitting was surprisingly reduced the fuel consumption by average of 11.2%.

Keywords : biodiesel, boiler retrofit, fan damper scale, fuel temperature, fuel consumption

Development and Evaluation of Solar-Powered Instrument for Hydroponic System in Limapuluh Kota, Indonesia.

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Abstract: This solar-powered instrument utilized in plant cultivation in hydroponic system was developed to minimize operational cost, to maintain continuity of electrical source and to release dependency from electric utility. The instrument consist of solar tracker to adjust photovoltaic panel position, aquarium pump to distribute the nutrition, humidity and temperature meter to measure humidity and temperature, respectively. To support the function of this instrument 40 watt energy should be provided per hour in average. Following power measurement conducted in 50 Kota, 200WP of solar panel will produce roughly 70 watt at peak hour. The solar energy is stored to a couple of 100AH deep cycle battery, Arduino board microcontroller as brain of the system plays roles to control dc motor and timer and to calculate data signal from RTC, humidity and temperature sensor. The data are then sent to LCD matrix 2x16 which will display the measurement. This instrument is expected to be used by hydroponics farmer in remote area.

Keywords : Solar-powered instrument, Hydroponics system.