

Pilot Deployment and R & D of a Multi-feedstock Village-Scale Modularized Kits for Bioethanol Production

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ABSTRACT

The Mariano Marcos State University and Central Luzon State University have joined forces in developing multi-feedstock modular village-scale ethanol production facilities that are suitable for deployment in remote areas of the Philippines. These facilities, costing no more than PHP 120 K each to deploy, are capable of using not only sugar cane, but also alternative feedstock's such as nipa palm sap, copra waste water, and sweet sorghum juice to produce fuel-grade ethanol. With each ethanol facility capable of producing 50 L of fuel grade ethanol per day, 5,000 of these plants - scattered throughout the Philippines -can supply the current shortfall in the bioethanol needs of the country, at the fraction of the cost of building just ONE centralized, large scale bioethanol refinery.

The present study has successfully improved the conversion of sugar to ethanol by simply limiting the period of aerobic fermentation. An experiment comparing the yield of ethanol under aerobic (village traditional practice) and anaerobic storage for periods ranging from 1 to 8 days prior to distillation were conducted. Nipa sap fermented in-situ under anaerobic conditions showed optimum yield of 0.40g ETOH/g nipa sugar compared to 0.28 under aerobic conditions in 3 days. In-situ optimization of the anaerobic fermentation efficiency; isolation, identification, and assay of naturally occurring yeast from nipa sap; design of modularized and deployable bio-ethanol production facility kits; and gathering of baseline information on the socio-economic status of the target beneficiary of the technology are in progress.

KEYWORDS: Bioethanol production; distillation; fermentation