Combined Production of Bioethanol and Biogas from Peels of Wild Cassava Manihot Glaziovii

Author(s)
Anselm P. Moshi, Stella G. Temu, Ivo Achu Nges, Gashaw Malmo, Ken M.M. Hosea, Emrode Elisante, Bo Mattiasson

Abstract
Cassava peels were pre-treated with alkali, enzyme and in sequential combination of alkali and enzyme, and used for production of bioethanol or biogas, or both (in sequence, bioethanol followed by biogas). The Biogas Endeavour and Automatic Methane Potential Test Systems were used for production of bioethanol and biogas, respectively. The bioethanol yield and volumetric productivity achieved with alkali pre-treatment combined in sequence with enzyme pre-treatment were 1.9 mol/mol and 1.3 g/L/h which was higher than the yield (1.6 mol/mol) and volumetric productivity (0.5 g/L/h) obtained from only enzyme pre-treated peels. Alkali combined in sequence with enzyme was proven to be the best treatment showing a 56% improvement in methane yield compared to the yield from untreated sample. Combined ethanol and methane production resulted in 1.2–1.3-fold fuel energy yield compared to only methane and 3–4-fold compared to only ethanol production. This study therefore provides practical data on the scenario best suited for the harnessing of energy from cassava peels.

Keywords
Anaerobic digestion;
Bioethanol;
Gas Endeavour System;
Manihot glaziovii;
Bioenergy