Feasibility of Bioethanol Production from Tubers of Dioscorea Sansibarensis and Pyrenacantha Kaurabassana

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Abstract

Inedible tubers from *Dioscorea sansibarensis* (DS) and *Pyrenacantha kaurabassana*(PK) were found to be suitable feedstock for bioethanol production. Important composition parameters for bioethanol production for DS and PK are dry matter (% fresh tubers) ca. 20 and 6, total carbohydrates % dry weight base (db) ca. 68 and 47 and total protein (% db) ca. 16 and 10, respectively. DS and PK were found to contain inulin and galactomannan as principal polysaccharides (% of total carbohydrate) ca. 90 and 70, respectively.

Diluted acid hydrolysis yielded ca. 100% of total reducing sugars. Ethanol yield ca. 56 and 35 g/L was obtained at high efficiency through batch fermentation of acid hydrolysate (25% w/v) of DS and PK, respectively. A simple technique of recording and monitoring ethanol through CO_2 generated during fermentation correlated strongly with HPLC measurement $R^2 = 0.99$. Thus, tubers from these plants are potential feedstocks for bioethanol production with no competing uses.

Keywords

Dioscorea sansibarensis;
Pyrenacantha kaurabassana;
Feedstock composition;
Bioethanol;
Carbon dioxide measurement