

13th Biotechnology Congress

November 28-30, 2016 San Francisco, USA

A combined salt and acid pretreatment for enhanced enzymatic saccharification of waste sugarcane leaves

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Zinc chloride and sulfuric acid were employed as chemical catalysts to enhance enzymatic pretreatment of waste sugarcane leaves. The effects of salt and acid concentration on the enzymatic digestibility using Novozymes Cellic Ctec 2 were examined at a lab scale. Leaves were pretreated using a combination of 3M ZnCl₂ and 1.55% H₂SO₄ (v/v) with a solid loading of 10% (w/v) at 121°C for 60 min. After washing, enzymatic saccharification was conducted with an enzyme and solid loading of 10 FPU and 10% respectively. Preliminary results indicated a glucose yield of 9.5 g/L per gram of dry weight sugarcane leaves. This yield showed an improvement over salt treatment and water treatment by 22% and 98% respectively. The next stage in this work will be to optimize the chemical (salt concentration, acid concentration and solid loading) and enzymatic (enzyme loading, solid loading) pretreatment conditions. These findings illustrate the potential of low-cost chemical pretreatment to enhance glucose recovery from lignocellulosic materials such as sugarcane leaves.

Biography

Preshanthan Moodley has completed his Master's degree from the University of KwaZulu-Natal in South Africa. His Master's research entailed exploring acidic pretreatment of waste sugarcane leaves for biohydrogen production by dark fermentation. He is currently studying towards his PhD degree with his research focusing on enhancing enzymatic saccharification of lignocellulosic waste towards bioethanol and biodiesel production.

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