

# Renewable Energy and Resources & Energy Materials and Fuel Cell Research

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## The development of Sorghum bran based bio-refinery process

Oyenike Makanjuola and Chenyu Du  
University of Huddersfield, UK

The project aims to develop a sorghum waste biomass-based bio-refinery process to convert sorghum bran into value-added products. Sorghum bran is a food waste rich in starch and cellulose, making it a suitable substrate for bio-refinery process development. Solid state and submerged fungal fermentations were carried out first to culture *A. awamori* for the production of glucoamylase and alpha-amylase. Then the enzyme solutions were used for the enzymatic hydrolysis of sorghum bran for the production of a glucose-rich fermentation medium. The impact of pH, temperature, yeast extract, mineral content and inoculation ratio on enzyme activities were investigated in both solid-state fermentation and submerged fermentation. Response Surface Methodology (RSM) was used to further optimize the glucoamylase activity. The hydrolysis efficiency of sorghum bran using the enzyme solution was evaluated and sorghum bran hydrolysate was used as the substrate for the production of bio-ethanol and itaconic acid, demonstrating the feasibility of converting a sorghum waste biomass to value-added products via a sustainable and environmentally friendly process.

### Biography

Oyenike Makanjuola obtained her B.Sc from Bowen University, Nigeria in 2011 and obtained her M.Sc at the University of Huddersfield in 2014 with a Distinction. As a result, she was awarded the Vice-chancellor Scholarship for her Ph.D. programme at the University of Huddersfield. Oyenike is currently a 3rd year Ph.D. student in the School of Applied Sciences, the University Of Huddersfield. Her research area focuses on the conversion of sorghum waste biomass and wheat straw into value-added products.

Oyenike.Makanjuola@hud.ac.uk

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