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Enhancement of biohydrogen production from waste of *Benincasa hispida* using microwave pretreatment process at optimum power

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Hydrogen was produced successfully from the solid waste generated during sweet produced from *Benincasa hispida* using enriched mixed microbial culture. Solid waste was first characterized and chemical oxygen demand was found to be 3000 mg/L having neutral pH. For better hydrogen production and to stop the methanogenesis, microbial culture was pretreated using microwave irradiation having power of 320 W with a frequency of 2450 MHz. Pretreatment was done for different time intervals (1, 3, 5, 7 and 9 min) to optimize the pretreatment conditions. In present study pretreated reactors were compared with a normal or untreated reactor. Maximum hydrogen production was observed when inoculum was pretreated for 7 min (76.4% of total gas produced). SEM analysis was also done to study the effect of pretreatment on microbial culture.

Biography

Yogita Singhal has done MPhil in 2011 from DEI University, Agra and presently pursuing PhD on the topic entitled "Optimization of process parameters for biohydrogen production petha industry waste". She has attended 13 seminars and conferences in her research period till now and has published 5 papers in reputed journals and co-authored a chapter in a book. She has also been awarded with Junior Research Fellowship in 2013.

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Tillage and vegetative barriers in a sub-humid region of Central Kenya: Soil conservation and economic benefits

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Tillage and anti-erosion barriers can reduce the degradation of soil and water resources in the steeply sloping highlands of East Africa but adoption by smallholder farmers has been slow. Trade-offs between soil conservation efficiency and economic benefits for tillage and anti-erosion barriers were assessed over four cropping seasons to understand benefits of soil and water conservation strategies under local farming conditions. Minimum tillage was compared with regular tillage and vegetative barriers (leucaena and Napier) with no anti-erosion barriers. Between the tillage and anti-erosion barriers, grain yields were greater with than without vegetative barriers, except with Napier barriers when minimum tillage was practiced. Napier barriers with regular tillage conserved most soil (72%) followed by Napier with minimum tillage (53%) while minimum tillage without anti-erosion barriers conserved least soil (1%) with leucaena barriers having intermediate conservation efficiency. Across tillage practices, negative economic returns were realized in the first cropping season with vegetative barriers whereas without barriers, economic returns were also negative with minimum tillage but slightly positive with regular tillage. Considering economic returns and the soil conserved, minimum tillage without anti-erosion barriers or adequate soil cover was inefficient in soil conservation and had poor economic returns making it an unsuitable option for the local farming system. Leucaena barriers had attractive economic returns across tillage practices but conserved less soil. But for leucaena barriers with minimum tillage, labour price should be below US$ 0.36 hour-1 and herbicide price below US$ 20 litre-1 to guarantee attractive economic returns to the farmers. Napier barriers with regular tillage presented a win-win scenario for farmers and environmental impacts because of the simultaneous attractive economic returns and efficient soil conservation. However, the price of labour should be below US$ 0.30 hour-1 for acceptable economic returns given current input-output prices. Further studies are necessary to ascertain the performance of minimum tillage without barriers due to the influence of one extreme rain season on its performance. Additionally, long-term multi-locational studies are neccessary to assess the feasibility of tillage and vegetative barriers across the diverse conditions that prevail on smallholder farms in the African highlands.

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