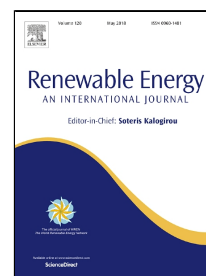


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Microbial Pretreatment of Water Hyacinth for Enhanced Hydrolysis followed by Biogas Production

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1 **Microbial Pretreatment of Water Hyacinth for Enhanced Hydrolysis** 2 **followed by Biogas Production**

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11 **ABSTRACT**

12 Biological pretreatment with novel isolated microbial pure culture was utilised to pretreat
13 water hyacinth to enhance its solubilisation followed by biogas production. Lignocellulose
14 degrading bacterial strains isolated from soil (*Bordetella muralis* VKVVG5) (UN3d2), the gut
15 of silverfish (*Citrobacter werkmanii* VKVVG4) (SFa2) and millipede (*Paenibacillus* sp.
16 VKVVG1) (BrB2) were employed to optimise the ideal bacterial strain illustrating accelerated
17 hydrolysis of water hyacinth. *Citrobacter werkmanii* VKVVG4 pretreatment of water hyacinth
18 with an optimum dosage of 10^9 CFU/mL and time of 4 days helped in achieving the highest
19 solubilisation of 33.3%. Biochemical methane potential (BMP) test was conducted between
20 untreated and *Citrobacter werkmanii* VKVVG4 pretreated water hyacinth. Biochemical
21 methane potential (BMP) test of pretreated water hyacinth illustrated faster start up period
22 than the untreated water hyacinth. *Citrobacter werkmanii* VKVVG4 (SFa2) pretreated water
23 hyacinth illustrated a cumulative biogas production of 3737 ± 21 mL whereas untreated water
24 hyacinth illustrated a cumulative biogas production of 3038 ± 13 mL on the 50th day. Scaled
25 up batch (20 L) study demonstrated a three times increase in the cumulative biogas
26 generation of the microbial pretreated water hyacinth than the untreated water hyacinth.

27 **Keywords:** Water hyacinth; lignocellulose; microbial pretreatment; hydrolysis; biogas.

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