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Impact of sodium bicarbonate as buffering agent on thermophilic biohydrogen production from water hyacinth**Alaa Wazeri and Ahmed Tawfik**

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The excessive generation of volatile fatty acids through the anaerobic decomposition of cellulose, hemicellulose and lignin contained in water hyacinth along with limited available alkalinity, rapidly inhibit this process resulting in low bio hydrogen production. Accordingly, this study investigated the impact of sodium bicarbonate (NaHCO_3) as buffering agent on bio hydrogen production from water hyacinth at fixed initial substrate-to-microorganisms (S/M) ratio of 7.1 gCOD/gVSS and varied NaHCO_3 concentrations of 0.0, 1.0, 2.0, 3.0, 4.0 and 5.0 g/L through a batch-mode experiment at 55 °C. The cumulative hydrogen production (CHP) significantly increased from 71.8 ± 4.2 to 316.7 ± 21.5 ml with increasing NaHCO_3 concentrations from 0.0 to 4.0 g/L. However, CHP decreased to 245.9 ± 16.7 ml at increasing NaHCO_3 dosage to 5.0 g/L due to the inhibitory effect of excess Na^+ ions. At changing NaHCO_3 concentrations from 0.0 to 4.0 g/L, the final pH value was increased from 4.79 to 6.36. At the optimum NaHCO_3 dose of 4.0 g/L, the maximum hydrogen yield and content of 95.4 ± 4.6 mL/gCODremoved and 58.80% were achieved. The maximum hydrogen production obtained was corresponded by the highest acetate-to-butyrate ratio of 2.64.

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