Augmentation of bacterial homeostasis by regulating *in situ* buffer capacity: Significance of total dissolved salts over acidogenic metabolism

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PII: S0960-8524(16)31532-2
DOI: http://dx.doi.org/10.1016/j.biortech.2016.11.027
Reference: BITE 17273

To appear in: *Bioresource Technology*

Received Date: 17 August 2016
Revised Date: 4 November 2016
Accepted Date: 5 November 2016

Please cite this article as: Venkata Mohan, S., Srikanth, S., Nikhil, G.N., Augmentation of bacterial homeostasis by regulating *in situ* buffer capacity: Significance of total dissolved salts over acidogenic metabolism, *Bioresource Technology* (2016), doi: http://dx.doi.org/10.1016/j.biortech.2016.11.027

Augmentation of bacterial homeostasis by regulating *in situ* buffer capacity: Significance of total dissolved salts over acidogenic metabolism

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Abstract

During anaerobic fermentation, consequent accumulation acidic fermented products leads to the failure of pH homeostasis. The present study aimed to comprehend the changes in buffering capacity with addition of sodium salts of hydroxide, bicarbonate and phosphate. The results showed notable augmentation in buffer capacity and cumulative hydrogen production (CHP) compared to control. The influential factor is the amount of undissociated volatile fatty acids released that affected the cell metabolism and consequently biohydrogen generation. It is inferred that among the tested salts, sodium bicarbonate has substantial buffering capacity (β, 0.035± mol) ensuing maximum CHP (468± mL). Besides, bioelectrochemical analysis revealed variations in redox currents that aligned with biohydrogen production results. The results of this study provide valuable information on the role of inorganic dissolved salts that would be required to regulate H_2 generation and acidogenesis in the aspects of acid–gas phase system.

Keywords: acidogenesis; biohydrogen; buffer capacity; bioelectrochemistry; dehydrogenases