Oscar Orlando Ortiz-Rodriguez et al., J Microb Biochem Technol 2016, 8:2(Suppl)
http://dx.doi.org/10.4172/1948-5948.C1.016

Using life cycle assessment as a tool for potable water treatment plants (U-LCA-PWTPs)

Oscar Orlando Ortiz-Rodriguez and **Raquel Amanda Villamizar Gallardo**
University of Pamplona, Colombia

Currently, there is great concern about those processes which directly or indirectly contribute to climate change and other environmental impacts. In this context, and provided that water treated constitutes a basic public utility delivered in urban centers around the world and in some rural areas, the impact of its emissions on the environment has been considered to be of great interest. Hence, the current research applied the environmental methodology of Life Cycle Assessment (LCA) to evaluate the environmental loads of four potable water treatment plants (PWTPs) located in northeastern Colombia following international guidelines of ISO 14040. The different stages of the purification process, from the catchment point through pumping to the distribution network were thoroughly assessed. The functional unit was defined as 1 m3 of water treated. The results allowed determining that in plants 1 and 2, the flocculation process has the highest environmental load, which is mostly attributable to the coagulant agent with a range between 47-73% of the total impact. In plants 3 and 4, electric power consumption was identified as the greatest impact source with percentages ranging from 67 to 85%. By concluding, treatment processes and techniques, bioclimatic conditions and culturally driven consumption behavior vary from region to region. Furthermore, changes in treatment processes and techniques are likely to affect the environment during all stages of a plant's operation cycle.

Biography

Oscar Orlando Ortiz-Rodriguez has completed his PhD from Universitat Rovira i Virgili, Spain and Master of Engineering Management from QUT, Brisbane, Australia. He is a full Professor at University of Pamplona and the Director of the research group Nanoscience and Sustainable development at the same university. He has published more than 10 papers in reputed journals and has been serving as a Member of the Colombian Red of Life Cycle Assessment.

oscarortiz@unipamplona.edu.co

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