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Second generation biofuels production from wastewater treatment plants

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Biofuels represent a sustainable option to fossil fuels, since they are sufficiently similar to them and derived from potentially renewable, non-food sources (biological wastes). In this perspective, wastewaters high carbohydrate content can be exploited for the biomass growth and biofuels production. Thus, classical wastewater treatments could be recast for biofuels production from waste sludge. Two microorganisms' phyla are able to convert nutrients in wastewater into biofuels: Microalgae, transforming light and carbohydrates into biofuels through a photosynthetic path, and *Clostridia*, spontaneously present in civil waste waters, which convert carbohydrates into methane and hydrogen through a solventogenic pattern. In this work, we present a study about the combination of wastewater treatment plants with biofuels production (biohydrogen and biogas by *Clostridia* activity). In this perspective, the wastewater remediation and reuse would come side by side with the production of biofuels by integrating specific devices (bioreactors for biofuels production) into the consolidated technology of biological wastewater treatment plants, with a high economical and environmental gain.

Biography

Piemonte V is an Associate Professor at the University "Campus Bio-medico" of Rome (chair on Refinery and Biorefinery Processes) and an Adjunct Professor at the Department of Chemical Engineering of University "La Sapienza" of Rome (Chair on Artificial Organs Engineering). His research activity is primarily focused on the study of Transport phenomena in the artificial and bioartificial organs; new biotreatment technology platform for the elimination of toxic pollutants from water and soil; Life Cycle Assessment (LCA) of petroleum-based plastics and bio-based plastics; extraction of valuable substances (polyphenols, tannins) from natural matrices; hydrogen production by membrane reactors for water gas shift reaction; concentrated Solar Power Plant integrated with membrane steam reforming reactor for the production of hydrogen and hydro-methane. He has about 100 publications on chemical thermodynamics, kinetics, biomedical devices modeling, Bioreactors, LCA studies, etc.

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