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## ***Chlorella vulgaris* GROWTH ON DIGESTED URBAN SLUDGE**

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### **Abstract**

The aim of this research was to investigate the effect of the addition of digested urban sludge on the growth medium of the microalga *Chlorella vulgaris*. The anaerobic digestion of biomass feedstock and/or the biodegradable fraction of wastes is widely recognized as a mature and cost-effective process for producing biogas, which is a valuable renewable primary-energy source. Anaerobically digested residues are effluents still rich in inorganic nutrients, with high chemical oxygen demand, which contribute to the eutrophication phenomenon. It is therefore necessary to further treat the effluent. Microalgae could potentially offer many advantages being able to use the organic carbon (heterotrophic growth), as well as inorganic nutrients such as nitrogen and phosphorus from the wastewater for their growth without an aerobic environment. In this study, an anaerobic digester (2.5 L), placed in a thermostated water bath under mesophilic conditions ( $38 \pm 1$  °C) and pH 7.2–7.4, was employed. The mixed sludge (1.25 L) was daily fed with 30 mL of urbane sludge. Under pseudo-steady state conditions, the composition of biogas was nearly constant, and methane and carbon dioxide percentages ranged between 70.5–76.0% and 13.2–19.5%, respectively. The digested sludge was removed daily and centrifuged. The liquid phase was added in different percentages (100, 66 and 33%) into the *C. vulgaris* medium to perform batch cultivations. The microalga concentration at the end of the experiments reached 2.72, 2.34 and 1.22 g/L when 66, 33 and 100 % of digested sludge liquid phase were used, respectively. These preliminary results suggest that combining microalgae production with municipal wastewater treatment could be made in an environmentally effective as well as economically viable way in a not distant future.

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