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Operation description and physicochemical characteristics of influent, effluent and the tertiary treatment from a sewage treatment plant of the Eastern Region of Cyprus under warm climates

Antonis A. Zorpas[a]*, Chryso Coumi[b], Miloslav Drtil[c], Irene Voukalli[a], Petros Samaras[d]

[a]*Laboratory of Environmental Friendly Technology, Department of Research and Development, Institute of Environmental Technology and Sustainable Development, P.O. Box 34073, 5309, Paralimni, Cyprus Tel. +357 23743440, +357 99532025 (mobile); Fax +357 23743441; email: antoniszorpas@yahoo.com, antoniszorpas@envitech.org, envitech@cytanet.com.cy*
[b]*Wastewater Treatment Plant of Paralimni—Ayia Napa Sewerage Boards, CYBARCO DBO, P.O. Box 33766, 5317, Paralimni, Cyprus*
[c]*Department of Environmental Engineering, Slovak University of Technology, Radlinského 9, SK - 812 37 Bratislava, Slovakia*
[d]*Department of Pollution Control Technology, School of Applied Technology, T.E.I W. Macedonia Kozanis, Greece*

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ABSTRACT

Urban wastewater systems, having sewer system, wastewater treatment plant and receiving water as their main elements, can be found throughout the world. Many of them are operated with little or no control. Characterization of municipal wastewaters has been the subject, or the indispensable starting point, of many studies. This paper (as there are a few studies available in the literature) deals with the operation description and characterization of the phases of influent (municipal and mainly domestic liquid waste), the secondary treated sample (effluent) and the tertiary as well as the characterization of the sewage sludge from the sewage treatment plant (STP) of the Municipalities of Paralimni and Ayia Napa in the eastern of Cyprus. The area presented with a long period of warm and high temperature conditions (> 27°C, and during summer > 33°C). The BOD_5 and the COD presented to increase from year to year. The tertiary sample does not have any pathogens bacteria, while the COD and BOD_5 presented less than 75 and 5 ppm respectively and is suitable for agricultural purposes. The average monthly flow of influent varies from 88,625 m^3 to 382,153 m^3. The sludge almost 4,200 t/y does not present with signifi cant consecration of have metals. However, the sewage sludge contains high concentration of organics and phosphorus and with further treatment like composting may be used in agriculture purposes. From year to year the average treated kg BOD_5 per month is from 27,093 to 120,859 the average kWh per month from year to year is from 90,124 to 332,037 (total kWh/y 2.12–2.25 million), the total kWh/kg BOD_5 per month is from 1.97 to 3.13, while the total kWh/m^3 of waste ranges from 0.62 to 1.36. The efficiency of the STP is for BOD_5 98.5–100%, for SS is from 97.99–98.98%, the TN from 72.46–94.69%, the NH_4 99.98% and the TP from 15.17–99.12%. At the same time, the total chemical consumption chlorine, polymer, and lime were 641–2,675 kg/m, 1,064–4,586 kg/m and 20–5,400 kg/m respectively. Wastewaters characterization is essential for the optimization of the operation of such systems as well as for the design of wastewater treatment systems in rural areas under warm climate conditions.

Keywords: Wastewater treatment plant; STP; Liquid and solid characteristics; Energy consumption; Chemicals consumption; Sludge

* Corresponding author.