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Wastewater treatment plant for urban wastes: Technical and economic analysis

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In this research a process analysis of waste treatment plant for urban wastes is carried out to find the better operation conditions and to estimate the costs of the process. The potential of real plant is equal to 9000 equivalent people and has a grilling, an oil separator, a biological oxidation reactor, an anoxic reactor, a sedimentator to obtain purified water and a treatment sludge line with stabilization and drying. Simulations of the process are carried out with Super Pro design software. Results show that biological oxidation and anoxic reactors are important to have values of COD, BOD5 according the normative and to avoid that in sedimentator nitrates become gaseous nitrogen. In the winter season, the plant has no operation problems, even if the lower temperatures do not promote the kinetic purification. The inlet flow rate is 50 m³/h and the temperature is 278 K with values of recycling at sedimentator between 70-90%. During the summer season, the effluent of the plant does not respect the normative only in the evening, when the inlet flow rate is 150 m³/h and the temperature is 298 K (in the morning, the temperature is 303 K). To solve this problem, the thickener in the sludge line is used as biological oxidation reactor: Recycling also the 80% of sludge from sedimentator, the operation of the plant is according the normative. An economic analysis shows that the investment, revenues, operating costs are 1713000 €/year, 364000 €/year, 891000 €/year, respectively. Also net present value and payback period are 549000 € and 5 years, respectively.

Biography

Grazia Leonzio is currently a PhD student from L'Aquila University, Italy. She has published several articles and participated to several international and national congresses about environmental and energy aspect of chemical processes. She wrote an article about waste management in Italian regions and published in Columbia University website. She is a Member of several associations: AIDIC (Italian Association of Chemical Engineering), SCI (Italian Chemical Society), ISSNAF (Italian Scientists and Scholars in North America) and ECAS (European Commission Authentication Service). She is a Referee of several journals.

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