INTERUNIVERSITY PHD COURSE

"SUSTAINABLE LAND MANAGEMENT"

Cycle XXXVI

PhD Student:	Raffaele Morello
Year of the PhD Course:	First
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Title of the Research Project	Minimization of sewage sludge production through an IFAS-OSA process
Tutor:	Prof. Danilo Spasiano

Summary of the Research Project

This research project aims to deal with the problem of sewage sludge production, proposing useful solutions to minimize its quantities.

To this end, the implementation of a Moving-Bed Biofilm Reactor (MBBR) through the adoption of the OSA (Oxic Settling Anaerobic) process will be proposed. The laboratory activity will be developed as follows:

- Operation of a pure MBBR reactor as reference test;
- Operation of a second MBBR reactor in IFAS configuration (Integrated Fixed-film Activated Sludge) in OSA cycles: the recirculating sludge, before being reintroduced into the biological tank, will be retained for a certain time in an anaerobic tank.

To verify the effectiveness of the system both in terms of depuration efficiency and in terms of reduction of sludge production, the following parameters will be monitored:

- Temperature, pH and DO (Dissolved Oxigen) in aerobic tank, attached and suspended biomass;
- Effluent characteristics;
- Sludge characteristics after its permanence in OSA tank;
- ORP (Oxidation-Reduction Potential) and pH in the anaerobic reactor;
- SRT (Sludge Retention Time) and kinetic parameters (b_H, $\mu_{H,max}$, y_H, $\nu_{H,max}$).

The process thus implemented should return a lower sludge production resulting from:

- Increase of the coefficient b (cell lysis and predation);
- Reduction of the Y coefficient (decoupling and maintenance of metabolism).

Bibliography

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