The BONUS OPTITREAT project overall goals and expected final results

This project promotes development and optimizes the efficiency of small wastewater treatment systems techniques already available on the market in the Baltic Sea region. Wastewater treatment is performed by combinations of mechanical, chemical and biological treatment. Tests will be performed of three type techniques allowed for testing from three manufacturing SME’s setup at the European test center for certified small wastewater treatment facilities in Aachen, Germany. The tests aim at a holistic assessment of reduction efficiencies of: nutrients, pathogens, pharmaceuticals, personal care products and antibiotic resistant bacteria. In addition, over 200 facility test results produced during earlier at the European test center will be included in a benchmarking synthesis of optimization of reduction efficiencies. Batch experiments will be performed on degradation of antibiotics and organic hazardous substances by bacteria. The project will further explore the policy tools to regulate the maintenance of the facilities, which is a crucial factor to optimize reduction efficiencies. The regulation and support actions recommendations will be elaborated in relation to the findings of benchmark best practice and the desktop study of the policy lessons learnt on maintenance. The project will transfer knowledge of the results to SME and governmental stakeholders in participating countries at a dialog forum.

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Work performed since the last reporting, project phase M13-24

According to the project phases the work performed during M 13-24 can be summarized as follows:

Project phase M 13-24 – Standardized test schedule and establishment of project relations to relevant stakeholders

- The SME facilities has been run for the standardized test schedule according to CE-branding of facilities at PIA RWTH test center in Aachen
- Detailed retention time test results of the facilities has been performed
- Test results of the diversity of the microbiology in the systems has been developed
- Test results of antibiotic resistance gene development in the facilities has been assessed
- Analysis and assessments results of reduction efficiencies of micropollutants in the wastewater with regard to controlling parameters during the standardized test schedule have been developed.
- Contacts to national authorities, EU DG environment and SMEs have been established.
Main results achieved during the reporting period M13-24

The project communication plan has developed well. The BONUS OPTITREAT project has had several contacts with national authorities and SMEs to spread knowledge of the project objectives and results as well as to exchange experience of challenges regarding small wastewater treatment facilities. A project stakeholder meeting was performed in Brussels meeting gathering SMEs, project researchers and DG environment. The meeting was a forum to discuss project mid-term results and to discuss challenges related to regulations of small wastewater treatment plants. The results of the meeting will be included in the benchmark report and will be an input to the society’s development of urbanization plans. The project has been interviewed for an article in a branch journal ACWA in Germany and IETU news in Poland.

Scientific results performed during the project reporting period is based on the tests performed within WP2 and analyzed and assessed within WP3 and WP4.

In WP3 two publications and one manuscript has been produced during the project period. The publications regards testing new techniques and showing the diversity of the microbiological community in the small wastewater treatment plants tested in WP2. The publications further regard testing new techniques for determining antibiotic resistant genes in selected bacteria’s in the facilities. The preliminary results show that the facilities are biologically actively working. The preliminary results further show the abundancy of bacteria’s in the outlet from facilities is less than in the inlet and that the share of antibiotic genes is the same in inlet and outlet, thus there is no increase in antibiotic resistant genes produced by the facilities. However the preliminary results show that there is a high abundancy of bacteria’s and an increase of the share of antibiotic resistant genes within the facilities biologic active chamber. These results may have possible implications on society regarding how facility materials should be handled after their lifetime.

In WP4 major work has been focused on analyzing a list of 23 pharmaceutical substances in the inlet and outlet wastewater from the facilities during the standardized test schedule performed in WP2. The preliminary results show that there is a quick response of the reduction efficiency on many substances of the micropollutants to several controlling parameters as hypothesized. Preliminary results show specifically that the reduction efficiency is dependent on the retention time. However the fully scientific assessments could not be performed until detailed retention time tests had been performed. The retention time tests have been finished at the end of this reporting period and new targeted tests have been initiated adding analysis of 13 antibiotics, organophosphates and several phenolic substances as Triclosan. The retention time is an important parameter for the facility producers regarding construction and capacity declarations.

The work within WP5 will be performed M 25-36 but has been continued already during M 13-24 to spread information about the project to the national authorities and to start gathering information which may need more calendar time than originally planned. Over 200 earlier test results have been collected in a database to improve availability for assessment during M 25-36. The Swedish, German and Polish regulations have been reviewed and a compilation of the regulations has been outlined and initiated. The project has established contact with authorities in German, Sweden and Poland.