OPTIMIZING WATER QUALITY AND TREATMENT EFFICIENCY IN RECIRCULATING AQUACULTURE SYSTEMS FOR SALMON SMOLT PRODUCTION THROUGH BETTER ADJUSTMENT OF FISH FEED AND WATER TREATMENT DEVICES

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In order to supply the demand and reduce the environmental impact of salmon smolt production, at least 50% of the 400 actual flow-through plants needs to be transformed to recirculating aquaculture systems (RAS) in the next decades. RAS for salmon smolt production have several advantages compared to flow-through operation: reduced freshwater requirements and energy consumption, better control of water-quality, improved bio-security and disease prevention and in the end a cheaper and better product.

Our consortium has been granted an EU FP7 research-for-SMEs project with the acronym Feed and Treat (duration 2 years; start date 01-02-2012, end date 31-01-2014) that has the following objectives:

1) Improve treatability of fish excrements through definition of a “value added” feed and optimisation of mechanical treatment of solids;
2) Optimize existing biological water treatment concepts used for RAS for higher treatment performance and specific matching to the improved, adapted feed;
3) Revise the denitrification step inside the system in order to reduce the increased organic load from a more effective mechanical treatment by using it as carbon source for the denitrification process;
4) Reduce the freshwater intake/wastewater outflow and thus the energy consumption (heating) and the environmental impact.

The expected project results include:

1) A salmon smolt feed tested for RAS;
2) A mechanical treatment concept for RAS leading to increased treatment efficiency;
3) A biological treatment concept for RAS with reduced volume need as compared to the state of the art;
4) A moving bed based denitrification concept ready to use and adjustable for other waste water streams;
5) Design criteria/blueprint of future RAS and its commercial use.

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