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**Project title: Flocculation/coagulation: a suitable combination of water treatment and value-addition for a more circular aquaculture?**

Chemical flocculants and coagulants are part of the toolkit of wastewater treatment plants all over the world for many decades. The main purpose of their application is the reduction of phosphate loads in the water, but they can also be efficient in the removal of other substances such as nitrogenous compounds, metals, and organic matter. They are thus an important tool to control aqueous anthropogenic emissions into nature and reduce environmental pollution.

In aquaculture, the mentioned substances accumulate within the system due to the incomplete uptake and metabolization of nutrients originating from aquafeeds. Thus, dilution of these substances is necessary to ensure they are not reaching concentrations that are harmful for the livestock. The downside of the continuous water exchange is that discharging the nutrient-rich water is a potential cause of eutrophication, leads to discharge costs and comes with the danger of a possible decline in trust and image of the consumer. Flocculation/coagulation technology might be a solution for this problem.

One benefit of its application is obviously the removal of potentially harmful substances, improving the water reuse efficiency. However, flocculation/coagulation could also be seen as extraction of excess nutrients by conversion into solid matter. Considering the number of available flocculants/coagulants, it might be possible to manipulate the sludge composition by choosing the “extraction tool” wisely. Very nutritious sludge might be suitable as substrate for several purposes, for instance the production of single-cell protein, biogas, valuable volatile fatty acids, or insects. Very dense sludge with lower water content might be suitable for cost-efficient transport. It might thus be possible to turn the waste into a commodity.

During your stay, we will test different flocculants/coagulants with respect to their optimum floc formation performance and analyze obtained sludge samples with respect to their nutrient loads. This will yield sufficient data for your final presentation. External partners will eventually conduct further experiments, evaluating the suitability of sludge for different purposes.

**Possible learnings and outcomes**

* Theory, application, evaluation of flocculants/coagulants in an aquaculture context
* Sample analysis using microwave digestion/flame-atomic absorption spectroscopy
* Collaborative data analysis using Excel, R, and Git
* Possible collaboration in a joint publication