

## Report on the outcomes of a Short-Term Scientific Mission<sup>1</sup>

**Action number: COST Action CA20130**

**Grantee name: Eric Deland**

### **Details of the STSM**

Title: Introduction and adaptation of the simulating industrial flow cell system

Start and end date: 17/07/2022 to 22/07/2022

### **Description of the work carried out during the STSM**

I got a nice welcome and introduction of all the people in the lab, followed by a laboratory walk. Afterwards they showed me the flow cell system and I got my first impression. They described me how the system work and how they let their system run for their experiments. We discuss the first problems that came in mind when I saw the system the first time. From pictures of the system, they sent to me before, and their publications I already knew some weak points of their system to let it run anaerobic. Therefore, I sent them a package with utensils to build up a gas station und to change the system in that way, that it can run anoxic. Because they use silicon tubes, I ordered PTFE-tubes. Here, we got the first problem. My tubes had the correct diameters as their tubes, but mine were not flexible enough to fit on the connectors of pumps, tank, and flow cell. We decided to use small pieces of the silicon tubes as a bridge between the PTFE-tubes and the connectors. After a test run with water to check if the system has a leakage, we taped all pieces of silicon tubes with PTFE-tape to avoid oxygen infusion through the silicon parts. Followed by the measurement of the maximum flow rate of the system and how much volume of water will remain in the system after we released the water. It is important to know that, because the pumps do not run dry otherwise, they will break. So, there is always remaining water, which I must mention in my concentration calculation of supplements of my media. After the flow cell system rebuild, I could install a small gas station. The gas station is important to make the media and water anaerobic. Furthermore, if it is necessary, we can gas the media in the recirculating tank during the upcoming experiments. I prepared anoxic water with resazurin. After autoclaving I gassed the water again for a few minutes before we transfer the anoxic water in the recirculating tank, where it was further gassed. Under continuously gas supply the pumps were switch on and run for 1.5 hours. The colour of the water stayed blue to purple which indicates no presence of oxygen. With an oxygen meter we could measure a oxygen concentration of 0.3 – 0.4 mg/L. The oxygen concentration of “normal” water was around 7 -8 mg/L. After another 1.5

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<sup>1</sup> This report is submitted by the grantee to the Action MC for approval and for claiming payment of the awarded grant. The Grant Awarding Coordinator coordinates the evaluation of this report on behalf of the Action MC and instructs the GH for payment of the Grant.

hours running without gassing, the oxygen concentration and the water colour did not change. The system should be gas-tight and be ready to work with it anaerobically.

### **Description of the STSM main achievements and planned follow-up activities**

This STSM was the first of two STSMs with the group of Filipe Mergulhão and their flow cell system. It was like a preparation STSM for the upcoming STSM in September to October. The goal was to find solution to make their system anaerobic and build up a small gas station. In both cases we were successful. Based on this successfully STSM, I can start right away with my flow cell experiments planned in the second STSM. For that, anaerobe microorganisms, which are able to corrode carbon steel, will inoculated with carbon steel coupons in the flow cell system for 14 days. Future plans will follow after the second STSM.