SAVONIA

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Internship report

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Student number: 64169

Name of the internship: Internship number 3

Field of study: Environmental technology

Group number: EYY12SY

Date: 14.7.15

Name of the supervising teacher: Pasi Pajula

Study credits received from the internship: 12 cr

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1 INTRODUCTION

1.1 General information about the internship

- Name: Internship 3
- Location: Institutos Lactec, Curitiba, Paraná, Brazil
- Field: Environmental research
- Institutos de Tecnologia para o Desenvolvimento – Institutos Lactec
- Superior: Thiago Carvalho de Mello
- Phone number: +55 41 3361–6016
- Email: thiago.mello@lactec.org.br

1.2 Time and duration of the internship

- Starting on 02/03/2015 and Ending on 29.05.2015
- Working hours: 30 hours per week, 6 hours per day

2 JOB DESCRIPTION

2.1 Description of the institution

The laboratories of the Institutos Lactec which operate at five units located in the Eastern region of Curitiba, serve as technological support for a wide range of services, projects, and consultations. Trials, tests, analyses, and specialized technical services are only a few of the activities carried out within the laboratory structure of the Institutes. Institutos Lactec serve the market and society, offering innovative solutions using science and technology. The company was founded in 1959 and there are over 500 employees.

The five units of the Institutos Lactec – Cehpar, LAC, Lame, Leme and the Headquarters – are located in the city of Curitiba. This structure holds around 30 laboratories where studies, trials, tests, and qualified analyses are carried out.

In the environmental sector of Lactec the following Research and development-related studies and projects were performed:

- Alternative sources of energy
- Environmental planning and management
- Technology in Materials

There were several laboratories focused on environmental research:

- Atomic Absorption Laboratory
- Water and Effluent Laboratory
- Oil Analysis Laboratory
- Industrial Lubricant Oil Analysis Laboratory
- Chemical Analysis Laboratory
- Biology Laboratory
- Climatic Condition and Artificial Weathering Laboratory
- Vehicle Emissions Laboratory
- Geotechnics Laboratory
- Hydraulics Laboratory
- Air Quality and Atmospheric Emissions Laboratory

Specialized technical services:

- Elaboration of studies for waste and effluent management and monitoring
- Environmental studies
- Studies of biofouling – invasive aquatic species
- Studies and monitoring of water quality
- Studies and monitoring of air quality and atmospheric emissions
- Studies on climatic changes – greenhouse gases
- Hydrological and hydrodynamic studies for hydroelectric enterprises
- Geotechnics
- Environmental hydraulics and transposition of fish
- Environmental licensing
- Fauna and flora management and conservation
- Mapping by laser and photogrammetry
- Mathematical-computational modeling of flows
- Reduced models of hydroelectric plants and other hydraulic enterprises
- Solutions in geographic information systems (GIS))
- Transport of sediments and siltation of reservoirs

Consulting:

- Alternative energies
- Environmental studies
- Hydrological studies
- Geotechnics
- Waste and effluent management and monitoring
- Fauna and flora management and conservation
- Aerial laser mapping and photogrammetry
- Oils and insulating fluids for electrical equipment
- Water quality
- Air quality and atmospheric emissions

Institutos Lactec offers its' services to a big range of market segments and companies. Institutos Lactec has five associates: Commercial Association of Paraná (ACP), Paraná Power Company (Copel), Federation of the Industries of the State of Paraná (FIEP), Institute of Engineering of Paraná (IEP), and the Federal University of Paraná (UFPR). Institutos Lactec has a close relation with the scientific community. Same time the in-house researchers and technicians are inside the learning institutions as students, various professions of the institutes serve as docents in universities and at events promoted by the institutes themselves, such as seminars, courses, and the professional master's program.

2.2 Duties during the internship

During the internship I completed a project and the purpose was to study the repeatability and reliability of the BMP- equipment by performing BMP- tests with a synthetic substrate and in general to study the potential of the BMP- equipment. These BMP- tests were performed in the BPC- laboratory of Lactec. After finishing the BMP- tests the objective was to draw a degradation profile of the biogas production from the different days of the experiment.

The idea was to use the same synthetic substrate in all flasks and the same ratio of substrate and inoculum and afterwards compare the biogas production in different flasks. If there would be significant differences between different flasks conclusions had to be made if all the parts of the equipment are working correctly.

BMP- test was performed as a batch assay so there wasn't any continuous flow in the system.

The equipment is divided into four units:

- Incubation unit
- Gas washing unit
- Gas measuring unit
- Data acquisition system

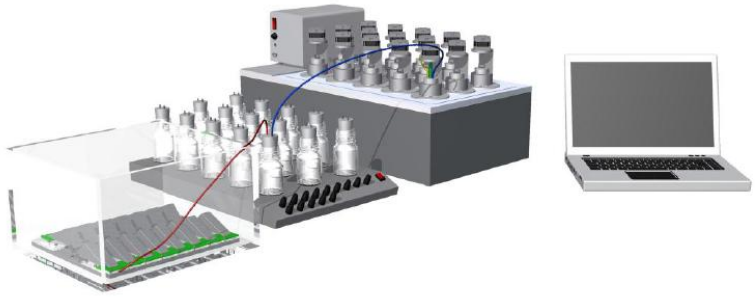

Figure 1 BMP- equipment. Starting from the left is Gas Measuring unit, Gas Washing unit, Incubation unit and Data Acquidition system.

When I got the results and had drawn the degradation profiles my final assignment was to analyze the results and write a full report. I got some tutoring from my superior and from my work colleagues but mostly I had to study the material and make my own conclusions. It was little bit hard because I didn't have a lot experience working with the biogas production tests.

My superior wasn't the one responsible from my project but another person who was working in one of the wastewater treatment plants around Curitiba. The original way to do my project was to use different kinds of substrates from the wastewater treatment plant not the synthetic substrate to determine the methane potential. But the project goal was changed due to problems with my project schedule and because the person responsible from my project didn't have time for my project. I didn't have time to finish my project properly because the goal was unclear to me in the beginning and I was able to finish the biogas production-tests but not analyzing the results.

Mostly the work was done in the office writing the report and studying. After I had started the experiment in the laboratory I only had to visit there to check the results daily. I think there should have been more tutoring due to my lack of experience in the biogas production- tests and also to understand and analyze the results.

3 THE GOALS SET TOWARDS THE INTERNSHIP

- Learn to do the working assignments and to work independently: Work in the laboratory and analyze the results
- In general to learn to work in a laboratory
- Learn how the system or process is working in the workplace if there is such
- Completing the assignments on schedule
- Learn to follow the work safety

These parameters were important to complete the project on time and with care.

4 THE DEVELOPMENT OF THE PROFESSIONAL KNOWLEDGE

4.1 How the goals of the internship plan were achieved

There was a course in my university which was related to this internship: Biomass and Energy Production in Agriculture and Forestry. In this course I learned very basically how to study methane potential from a substrate but with different equipment and partly with different methods.

4.2 The working life skills needed in this field

I learned independently to work in a BMP- laboratory of Lactec because there wasn't that much to learn. All I did in the laboratory was calibrating the pumps to discover and calculate how much biogas the collectors in the gas measuring unit generate per pulse. Also I prepared the experiment and started it but after that it was only checking the results and waiting because the experiment was estimated to take 20-30 days.

More challenging was to study analyzing the results, calculate necessary things from the results and in final to compare the results to statistics. I was able to write all the results and do the calculations to my report but I didn't have time to compare the results to statistics. I lacked the deeper analyze from the experiment so I didn't complete the project fully.

My vocabulary and English skills related to this field were greatly improved because I had to study a lot of material to understand the project better. I think it is a good skill nowadays to understand the engineering related documents and material in English and also in German. In general I got a lot of use from this internship if I were to work or to do another internship abroad in the future. I didn't have much to begin with if I think the courses from my university.

I got a lot of information about the BMP (biochemical methane potential) – tests, and about the purpose and use of the biogas because my internship was mostly studying. All in all it suited very well for my last internship. If I were to apply to this field I would need more knowledge about the biogas generating process and also I would need to work in a biogas plant to have more understanding.

Before the internship and also in my contract it is said that my R&D- project would be retaining NO_x- gas from a thermal chimney using the micro algae. This wasn't actually the case and my work didn't have nothing to do with this topic.

4.3 How was the development of personal working life skills

My own initiative was developed because I needed to study the material I was given independently and in fact I had to have my own idea how to prepare and start the experiment before go asking anyone's help. This was also a huge challenge in my internship. I also learned some flexibility because when my time to complete my project was running out I had to concentrate more important things and leave out the less important. I needed and learned to read and interpret material related to this field critically because there were a lot of methods to complete these kinds of BMP- tests and only few of those you could apply to kind of equipment that Lactec had.

5 OVERVIEW

There was a meeting in the last week where the agency in Brazil who had got me the job interviewed me and my superior. There he said he was pleased with my effort even though I didn't finish the project and was planning to take more students from abroad in the future to do an internship. I also got good feedback in my work certificate.

I felt very comfortable working there and the spirit at my workplace and in my working space was very good and all the other employees were very friendly and welcoming.

They should have proper tutoring for people who come to do an internship there and also the company should be in general more prepared to tutor and teach students, at least if it's a short working period.

This internship gives me a great advantage to have a job from abroad when I'm in the working life and also I got a lot of knowledge if I want to apply for biogas related field.

ATTACHMENTS

Internship contract and plan

Copy from a work certificate