

**Country for the project**

Brazil Belo Horizonte, UFMG

Degree programme

TKEMM

Thesis project in Brazil Belo Horizonte, UFMG

Before departure

I applied for this project largely due to the fact that I have an immense interest for the country Brazil which I had already visited twice before my exchange. I had a thesis opportunity being offered in Sweden which aligned very well with my interests work wise, as it focused on computational process simulation however, I decided to follow my heart and made the choice to try out the exchange experience as I thought would be very fulfilling. The original project was to investigate how some local seeds could be used as a coagulant to separate colloids in red mud tailings. I got a very good impression of Emily and her family, which was my originally assigned supervisor in Brazil. I also knew that my KTH professor, Fred, was terrific at what he does both when approaching his students in a pedagogical, compassionate matter and that he is a well-respected researcher.

It was a little bit stressful to apply for the visa as it is a time-consuming process which led me to having to return on multiple occasions until the documents I presented were of sufficient quality. I had very basic Portuguese skills when arriving in Brazil which I had clearly communicated to my supervisors. I was offered a place to stay at a house on the backyard of my professor in Brazil and I thought it seemed as a decent idea as I would be safe in an area that was remote and not used to receiving foreigners (Janaúba, Brazil).

Upon arrival

Upon arrival I was well received by my Brazilian supervisor. She did her best to make sure that I was comfortable, but it turned out that the living area in her yard was not adequate for living as it was quite dirty and more of a storage than a house, with water coming in from the roof where I was sleeping. I checked into a hotel as it was quite difficult to find decent accommodation in the area, but I let my supervisor know that I could not stay in a hotel for half a year as it would be very expensive and inconvenient for a longer stay. The school bus also did not leave when I was arriving as students were on summer vacation, and my supervisor only worked part time, as she was on material leave, hence I could not accompany her inside her car as I imagined which led me to being quite isolated in her house with her family rather than in a lab trying to figure out more about the project for the first 1-2 weeks. Once we arrived in the lab there was a bachelor student who only spoke Portuguese who was waiting to work with me on the project/collaborate. I had to talk to my Brazilian supervisor that she could not expect me to teach someone in Portuguese whilst working as I would have to focus much more on communication than the experiments as my language skills were not sufficient.

I tried to focus on producing the project plan in these weeks but remember feeling quite overwhelmed and started talking about moving with Fred, my KTH supervisor. The final drop was when I was in the lab preparing the coagulants/seeds for filtration and saw students laying on the floor because they had been working without masks, unsupervised with strong acids for flotation experiments and were experiencing strong sensations of nausea. Fred and I initiated contact with a professor, Sônia Rocha, in Belo Horizonte, the state capital of Minas Gerais, for me to relocate there. My former supervisor Emily informed me that I could not keep the project if I moved so Fred, Sônia and I had to come up with a new project which was a about adsorption experiments of Red mud leachates using charcoal produced from a local plant, *Luffa cylindrica*. Fred also advised another KTH student who was meant

to go to Janaúba about the situation there with lacking transportation, housing and English and the other student also chose to change her project.

Once I arrived in Belo Horizonte, I felt much more independent and consequently safe as I was able to easily access the laboratory and start working. In the capital I could easily find housing, there was both public transport and uber for me to use and I could mix English and Portuguese in my day to day, which resulted in me learning the language quite rapidly but without a lot of pressure. The work group that I met in Belo Horizonte must have been some of the friendliest people I have ever met.

Financials

I spent less money here than I would have done in Sweden even as a student. I was able to go out just as much and enjoy day to day for 60 percent of the money it would have costed in Sweden. I made sure to rent out the apartment I have in Sweden to avoid double expenses and thereafter it was not a financially stressful situation to be in what so ever.

Accommodation

Through a colleague in the work group of Sônia, he had a contact, a Brazilian PhD student who was looking for roommate. It was great cause I learned a lot of Portuguese with her, and she lived within walking distance from the university.

Project

I preformed the whole project in Brazil and aimed to investigate the adsorption capacity of charcoal produced by *Luffa cylindrica* (LC) to adsorb the metals Ti, V and Ce from a RM leachate solution, measuring adsorption efficiency and selectivity with and without the presence of pollutants iron (Fe) and aluminium (Al). The LC adsorbent was produced through pyrolysis and evaluated through charcoal yield per gram raw biomass and adsorption capacity, which was compared in terms of Iodine number using a Central Composite Model in the statistical software, Minitab. A characterization of the adsorbent pre and post adsorption was also performed using physical and chemical characterization methods; Brunauer-Emmett-Teller (BET), Scanning Electron Microscopy (SEM), Raman Spectroscopy (Raman), Fourier-Transform Infrared Spectroscopy (FTIR) and Iodine Number (IN). A typical day was mostly spent in the laboratory producing charcoal or characterizing it, or I might be preparing solutions using salts to undergo adsorption experiments. I have presented the results locally online and in person.

Country

It is an absolutely stunning place, I still as if there is no place like it. The complexity of this country goes beyond my understanding and obvious attractions as nature, food, creative artistry, music, dance and festivals. I feel touched by the people I meet here and look up to the strength I see in many. More often than not, I experience how you lift each other up in the way you greet each other and make time for connection, regardless of what your own situation is that day. Coming from a country which has increased social security and infrastructure, but which also can be quite materialistic and lonesome, as social openness is not as commonly integrated into our culture, I learn a lot about life and what I value from it in Brazil. I will cherish the memories I have made here for a lifetime.

Leisure and social activities

More or less only spent time with Brazilians once there, and largely colleagues. As we were working so much it became natural to spend time with the friendly people you already knew and spent time with day to day. I tried out many nice activities as forró (dance), music shows (Djavan, Nando Reis) and visiting waterfalls (Serra do Cipó).

Sustainability

In some ways the Brazilian lifestyle is more sustainable as they are more resourceful of the materials and properties that they have at the same time there are a lot of systems which aren't in place yet. Such

as recycling, drinkable tap water, electric charging points for cars etc. Sustainability is not a conversation that occurs often here in Brazil day to day.

The project that I had was linked to sustainability as it focuses on reutilizing a waste material which currently poses a substantial environmental risk due to the fine particle size and high alkalinity of red mud, which could lead to severe environmental degradation and social ramifications in the event of storage failure

Other recommendations and observations

I think for future trips/exchanges it is important that the projects undergo screening by FS KTH with regards to what accommodation, transportation and work environment/lab safety is offered in the exchange country.

Thank you, FS KTH for an amazing opportunity and experience. I am very glad to have gone and will cherish memories I have made here for a lifetime!