



## Assignment internship (Chemical Engineering, Chemistry)

### Living Lab Biobased Brazil

The Living Lab Biobased Brazil is a transnational Living Lab in the field of Biobased Economy, created in 2014 by a consortium of Dutch Universities of Applied Sciences in collaboration with several Brazilian universities. The Living Lab helps students with internships and graduation projects in the Netherlands with the focus on Biobased Economy. We also help students finding accommodation, and offer buddy support and some events.

For more information please see [www.biobasedbrazil.org](http://www.biobasedbrazil.org) and [www.biobasedbrazil.org/student/the-netherlands/](http://www.biobasedbrazil.org/student/the-netherlands/) or ask the International Office of your university.

### University of Applied Sciences information:

The universities of applied sciences (in Dutch: 'hogescholen') offer programs that focus on the practical application of arts and sciences.

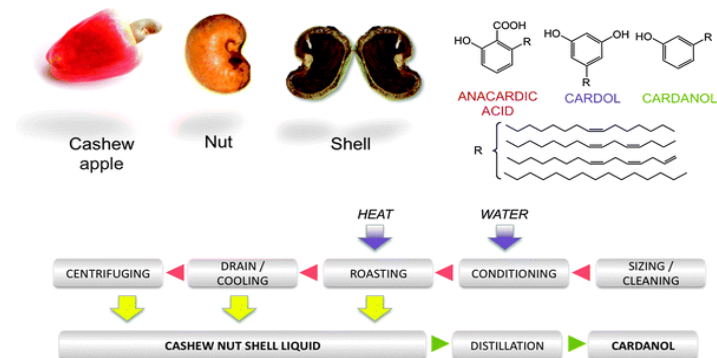
Getting practical work experience through internships is an important part of the professional study programs offered at these institutions. The largest universities of applied sciences enroll 20,000 to 40,000 students. Altogether some 446,000 students are enrolled on professional programs. University of Applied Sciences have also research groups. This groups do applied research and they are so called professorships. This internship assignment is within one of the associate professorships.

### Main research topic:

- Isolation of Cardanol from Cashew Nut Shell Liquid

### General background:

Cashew Nut Shell (CNS) is a waste generated in the production of edible cashew nut. For the 2017 the predicted cashew nuts crop yield is 3 million tons; resulting to 2 million tons of CNS waste. CNS contains circa 30-35% brown viscous liquid, called Cashew Nut Shell Liquid (CNSL), this is a natural resin containing valuable components, for example, cardanol, cardol and anacardic acid. Cardanol and its derivatives have several industrial uses as biobased additives, polymeric building blocks, and biodiesel. E.g., Various polyamines synthesized from cardanol are used as curing agents for epoxy resins. Metal xanthates of partially hydrogenated, sulfurized cardanol is used to lower the pour point of lubricating oils as well as acting as antioxidant and anticorrosive properties, and soluble metal derivatives of CNSL are used to improve the resistance to oxidation and sludge formation of lubricating oils.





Investigate the possibility of isolation of cardanol from Cashew Nut Shell Liquid to a purity > 90%.

### Activities:

The Project involves:

- ✓ Evaluate the existing methods of isolation of cardanol from Cashew Nut Shell Liquid (literature study).
- ✓ Design a process to isolate of cardanol from Cashew Nut Shell Liquid to a purity > 90% (experimental work).
- ✓ Simulation of the isolation process using Aspen.
- ✓ Economic analysis of the isolation process.

### Final product

The student will write a report that contains an overview of all activities and findings.

### Starting date

September 2019. The length of the assignment is 5-12 months. The student who will execute the assignment gets a fee of €550,- per month.

The intern will be part of a research team lead by the adviser and supervised by Qian Zhou.

### Desirable skills/qualities of the student

The student should be able to carry out independent laboratory research. The preferred background is chemical engineering or chemistry. The interest in bioenergy is a pre.

Good knowledge of the English language is required. We have set minimum language requirements for foreign students. The minimum English language prerequisite is: an academic IELTS test (or equivalent\*) with an overall band score of at least 6.0. As a foreign student you must provide evidence of your language competences in the form of an official certificate: IELTS, TOEFL, TOEIC or Cambridge ESOL. It is your responsibility to ensure that you meet these requirements.

### Information of the company:

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### Interested?

To apply for a project or multiple projects, you need to complete the survey. The Living Lab Biobased Brazil strives to give you within 5 days. Applications outside this survey will be not processed. Keep in mind the



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application deadlines. We need to receive your application before 01/04 If you do not meet the given deadlines we cannot offer you any guarantees.

<https://fd7.formdesk.com/omnismart/projectsnl>