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Student name: Iarima Silva Mendonça		
Course in Brazil: Chemical Engineering		
Internship Department/Company: Water Technology Research Group – HZ University of Applied Sciences/ Evides Industriewater		
Brazilian Professor/Supervisor: -		
Dutch Professor/Supervisor: Hans Cappon & Peter van Hartingsveldt		
Internship		

### Problem / assignment

The internship project consisted on an investigation about ion exchange resins regenerations in a lab-scale setup. Two types of resins were regenerated, a weak acid cation (WAC) and a strong basic anion (SBA). In order to investigate the best condition, different parameters were tested, varying the concentration of three chemicals (HCl, NaOH, NaCl), named regenerants, contact time between the resins and the reagents and the flow rate.

To determine the optimum condition among the ones tested, a parameter called resin capacity, which is the total amount of ions that were exchange after each test, was calculated.

### Used methods / project phases

To perform the tests, two columns were used and filled in with the mentioned typed of resins. The physical setup consisted in pumps, pressure sensors, a conductivity meter, valves and hoses that connected the columns and their input and output. Besides that, a software and interfaces were used to control and automate the lab-setup.

Experiment stage consisted in two parts, starting with the concentration test, and then, its best results were used in the second part, the contact time and flow rate tests. All parameters were tested in three equidistance range.

After these phases were completed, the resin capacity achieved in each experiment, along with their conditions, were used to determine the optimum condition between the testes performed. To define it, besides the resin capacity value, an economical and environmental viability were also analyzed.

### Results

The tests performed, and their result, enabled the analyzes of the contribution of each parameter and their ranges. With this achieved knowledge was possible to determine the next experiments phase, and to understand how to apply these tested conditions in the future full-scale plant.

### Extra info / advice / link to final document and presentation

Personal: [www.linkedin.com/in/iarima-mendonca](http://www.linkedin.com/in/iarima-mendonca)