



Sustainable Water Effluent Recovery from Solvent Recovery

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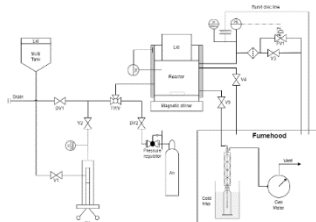
Helix Lab

Introduction

Novo Nordisk (NN) insulin production includes purification processes that require ethanol. This ethanol is then recovered, separating it from other organics. A wastewater stream is produced as a result, which is currently not re-utilised into NN production processes. This opens up the prospect of methods to clean this wastewater for reusability. The opportunity for internal recycling is beneficial for NN as it improves both the environmental and economic sustainability of the overall production process.

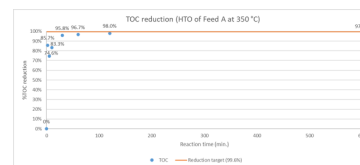
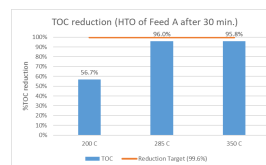
Methods

Hydrothermal oxidation (HTO) was explored as a flexible method for treating wastewater. HTO involves processes of heating (200-350°C) and pressurising with the addition of an oxidant. These conditions cause the organic pollutants to decompose into harmless compounds such as carbon dioxide, nitrogen, nitrates, ammonium, and sulphates etc.



Outcome

A reduction of 98% in total organic carbon (TOC) was achieved as seen below. Other requirements of cleanliness were also met such as pH, conductivity and sulphate concentration. From the data collected, the design and size of reactors were proposed with their associated energy and cost analysis.



Perspectives

The prospect of utilising multiple reactors in series may improve both the effectiveness of the HTO as well as reduce overall costs. The implementation of membrane technology to re-concentrate the fluid in between the reactors and the addition of a catalyst could also be beneficial. Further research on other types of wastewater in NN and a more detailed, in-depth cost analysis would also be valuable.

