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## DEMONSTRATION PROJECT: VALORIZATION OF INDUSTRIAL WASTE WATER SLUDGE BY EXTRACTION OF ALE (ALGINATE-LIKE POLYSACCHARIDES)

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### PURPOSE OF THE ABSTRACT

Waste water treatment is an important aspect of processes in different branches of industry. Many chemical companies, food companies, breweries, slaughterhouses and other types of companies have their own waste water treatment plant. In most of these plants, the activated sludge process is used, this means the plant consists of 2 main parts: an aeration tank for dissimilation and assimilation and a settling tank to separate the sludge from the clean water. Since the concentration of sludge is always increasing, sludge has to be removed from time to time. At the moment, waste sludge is dewatered, fermented (to produce biogas) and afterwards incinerated [1]. As one can see, waste sludge is already valorised, however, the production of biogas is a low-value application for a waste stream containing high-value molecules.

Micro-organisms in the sludge produce ALE (alginate-like exopolysaccharides) which can be extracted from the sludge [2]. The market price of this product is estimated at ?1-4/kg for industrial applications (textile and paper industry) or at ?10-1000 for applications in food and pharmaceuticals [3].

In a previous project the method to extract ALE from sludge was optimized and the economic feasibility of the process was studied. It was concluded that the extraction of ALE can be profitable and the investment in the installation can be regained within 4.5 years. This calculations were performed using a worst case scenario, i.e. without recuperation of ethanol and without the use of surplus heat.

In the current project, an installation on pilot scale will be built. The pilot installation is a batch installation where, during one batch, 100 kg of sludge can be extracted. The installation consists of 2 reactors, 1 filter unit and 1 pump. The amount of ALE and the purity of the extracted product will be determined on pilot scale for different kinds of waste water sludge.

Experiments will be performed to test if the extracted ALE can be used as a product to increase the lifetime of concrete. Samples of concrete which were treated with ALE will be compared with blanc samples (untreated). The concrete samples are either coated or mixed with ALE.

ALE can also be used as an absorbent since it has the capacity to remove colouring agents from waste water. Depending on the type of waste water, the amount of colouring agent which can be removed varies between 5 and 50 mg/l.

## FIGURES

FIGURE 1

FIGURE 2

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### KEYWORDS

waste water sludge | alginate | pilot-scale extraction | concrete

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### BIBLIOGRAPHY

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