

*** Dataset of Extracellular Macromolecule Cation Complexes - Rheology and Composition Data***

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General Introduction

Excel (spreadsheet) file containing the experimental results following the purification of extracellular polymeric substances (EPS) from a full scale aerobic granular sludge (AGS) plant in Utrecht, The Netherlands. The file contains the following results:

1. Thermogravimetric Analysis (TGA).
2. Inductively Coupled Plasma – Optical Emission Spectroscopy (ICP – OES) analysis carried out on 33 analytes.
3. Intrinsic Viscosity measurements of EPS dissolved in salt solutions with different cations.
4. Herschel-Bulkley flow curves conducted using intermediate rest times of 10s, 100s, and 1000s.

The data is made available primarily through the doctoral dissertation of the corresponding author (Anand Raja). A summary of the purified EPS systems, along with the experimental results, is available on the first spreadsheet. This is consistent with the labels and information provided in the doctoral dissertation.

Methodological Information

- The TGA results were obtained using a Perkin Elmer TGA 8000 device equipped with ceramic crucibles (Perkin Elmer – part no.

N5370464). The furnace was purged with air flowing at a rate of 40 mL /min (0.67 cm³/s).

- The ICP-OES analysis was carried out using a Perkin Elmer Optima 5300 DV device, equipped with an OES detector and a Perkin Elmer ESI-SC-4 DX fast autosampler.
- The rheology data was obtained using a stress controlled TA Instruments - Discovery Hybrid Rheometer 3. The measurements were carried out using either a roughened cone on plate setup or a concentric cylinder setup. All Herschel-Bulkley measurements were carried out on EPS samples with a concentration of 3.5 g/dL. The fitting of the Herschel-Bulkley consistency index was carried out using the `scipy.optimize.curve_fit()` function on Python.

Data Specific Information

Summary Sheet: Summarises the data obtained for the untreated and purified EPS samples. This sheet also provides links to experimental results that were carried out using each analytical technique.

Untreated: Untreated acidic EPS obtained using the full scale AGS treatment facility in Utrecht, The Netherlands

Dialysed: Alkaline EPS + 0.2M KCl dialysed against MilliQ water for 48 hours. MWCO of dialysis bag = 3.5 kDa.

Washed – No Added KCl: Untreated EPS washed using an HCl solution. Washing was carried out at a fixed pH (+/- 0.1) using a centrifuge.

Washed – Added KCl: Untreated EPS washed using a HCl + KCl solution. Washing was carried out at a fixed pH (+/- 0.1) using a centrifuge.

All masses and temperatures in the case of TGA results are reported in mg and °C respectively. The units for concentration in case of ICP – OES analysis is ug/L (micro gram per litre). The concentration of the EPS for the rheology results are g/dL. The units for viscosity, shear rate and stress are Pa·s, (1/s) and Pa respectively.

Sharing and Access Information

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