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HYDROTHERMAL CARBONIZATION – A MATHEMATICAL APPROACH FOR THE PREDICTION OF MASS YIELDS BY PROCESS SEVERITY

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PROBLEM

Lack of data in hydrothermal carbonization to predict product mass yields (solid, liquids, and gases) and hydrochar quality under alternating process conditions (retention time, process temperature, and catalyst concentration).

OBJECTIVE

Development of statistical models for the prediction of product phase yields and hydrochar quality of HTC of different biomass based on data gathered by lab experiments using a severity approach.

SUMMARY

- product yields of HTC of digestate as well as the degree of carbonization of hydrochar are quantified as functions of process parameters using a severity approach
- by these models basing on few selected reaction conditions, a wide range of process conditions can be covered and the yields for the solid, liquid and gaseous product phase can be predicted

REFERENCES

[1] Suwelack, Kay; Wüst, Dominik; Fleischmann, Philipp; Kruse, Andrea (2016): Prediction of gaseous, liquid and solid mass yields from hydrothermal carbonization of biogas digestate by severity parameter. Biomass Conv. Bioref. (6), S. 151–160. DOI: 10.1007/s13399-015-0172-8.
[2] Suwelack, Kay; Wüst, Dominik; Zeller; Meret; Kruse, Andrea; Krümpel, Johannes (2015): Hydrothermal carbonization of wheat straw – Prediction of product mass yields and degree of carbonization by severity parameter. Biomass Conv. Bioref. DOI: 10.1007/s13399-015-0192-4.

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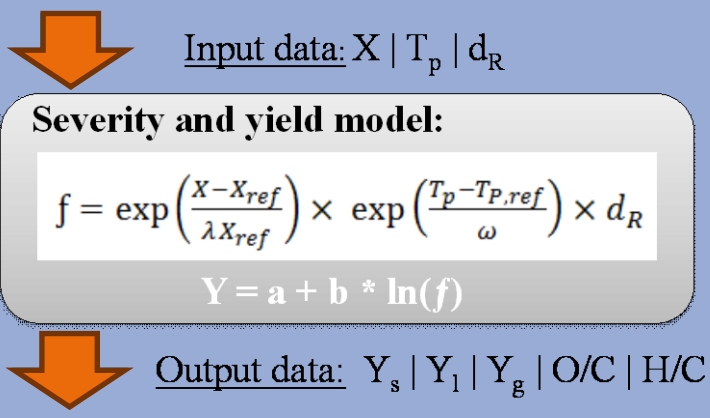
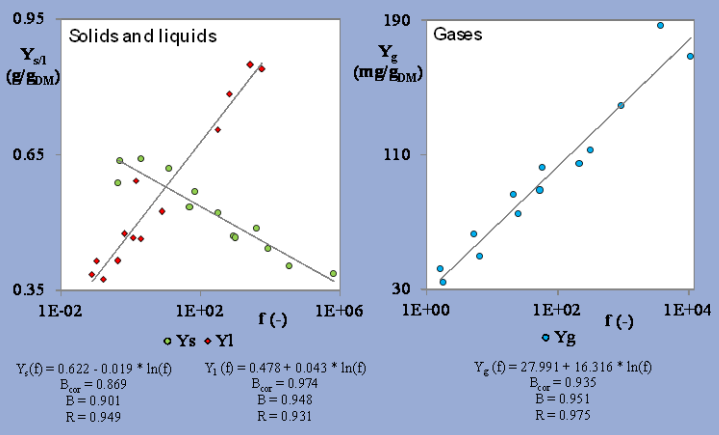


ANALYSIS

Mathematical approach.



Yield models (Example biogas digestate).