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### Data Article

# A brief dataset on the model-based evaluation of the growth performance of *Bacillus coagulans* and L-lactic acid production in a lignin-supplemented medium

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#### ABSTRACT

The data presented in this article are related to the research article entitled “Model-based characterization of growth performance and L-lactic acid production with high optical purity by thermophilic *Bacillus coagulans* in a lignin-supplemented mixed substrate medium (R. Glaser and J. Venus, 2016) [1]”. This data survey provides the information on characterization of three *Bacillus coagulans* strains. Information on cofermmentation of lignocellulose-related sugars in lignin-containing media is given. Basic characterization data are supported by optical-density high-throughput screening and parameter adjustment to logistic growth models. Lab scale fermentation procedures are examined by model adjustment of a Monod kinetics-based growth model. Lignin consumption is analyzed using the data on decolorization of a lignin-supplemented minimal medium.

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## Specifications Table

Subject area	Biotechnology, Bioeconomy
More specific subject area	Cofefermentation of hexoses and pentoses of lignocellulose hydrolyzates and lignin uptake by <i>Bacillus coagulans</i> .
Type of data	Table, Figure, Data file
How data was acquired	Conducting thermophile anaerobic fermentation of lignocellulose model substrate and lignocellulose hydrolysate. High pressure liquid chromatography for was used for carbohydrate analysis. UV–vis photometry was conducted for lignin analysis. Logistic and Monod models were used for the mathematical modeling and simulation approaches.
Data format	Raw, Filtered, Analysed
Experimental factors	Different <i>Bacillus coagulans</i> isolates were cultivated anaerobically in lignocellulose model substrate and enzymatic lignocellulose hydrolysate.
Experimental features	The growth behaviour and growth kinetics of different isolates of <i>Bacillus coagulans</i> were determined in micro-scale optical density measurements and lab-scale fermentations.
Data source location	Potsdam, Brandenburg, Germany, 52°26′17.9″N 13°00′48.2″E
Data accessibility	The data are available with this article.

## Value of the data

- The data presents the kinetic analyses of three *Bacillus coagulans* strains co-fermenting lignocellulose-related sugars glucose, xylose, and arabinose.
- The presented data and methods can easily be used for benchmarking models for high-throughput optical-density screening procedures and growth performance of fermentation procedures.
- This data allows other researchers to compare fermentation results and model fitting directly and to extend the analyses.

## 1. Data

The dataset of this article provides information on the biotechnological production of lactic acid (LA) by different isolates of *Bacillus coagulans* grown on lignin-containing substrates. Screening data achieved by a high-throughput method to derive kinetic parameters for the evaluation of the resistance to the component alkali-lignin (AL) are given.

The data that are displayed in Fig. 1 represent the progression of parameter  $\beta$  [3] with increasing lignin concentration derived by the used screening method. The parameter  $\beta$  is discussed in the main research article Ref. [1] in comparison to a new parameter:  $\delta$  which is also described in Ref. [1].

The measurement data on a bacterial screening process, the derived parameter for the maximum growth rate  $\mu_{max}$ , and the lag time  $\lambda$  are given in the following files:

- Data shown in Fig. 1A and Fig. 1A in Ref. [1]:  
001 - Bioscreen turbidimetry measurements of lignin endurance - DSM No 2314.xlsx
- Data shown in Fig. 2A and Fig. 2A in Ref. [1]:  
002 - Bioscreen turbidimetry measurements of lignin endurance - DSM ID 14–298.xlsx
- Data shown in Fig. 3A and Fig. 3A in Ref. [1]:  
003 - Bioscreen turbidimetry measurements of lignin endurance - DSM ID 14–301.xlsx

Basic data of lignocellulose hydrolysate fermentations using an artificial medium (AM), method is described in Ref. [1], and data of fermentations of wheat straw hydrolysate (WSH), aspen wood

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