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*Supplement of*

## **Life cycle assessment of combination of anaerobic digestion and pyrolysis: focusing on different options for biogas use**

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This supporting information contains 2 tables, detailing element concentration in biosludge and datasets used for modelling LCA scenarios.

**Table S1.** Element concentration (% dry matter) in biosludge<sup>a</sup>.

Elements	
Ash	17.0
N	3.15
P	0.44
K	0.16
Mg	0.13
Ca	0.58
C	46.4
S	1.48
H	5.95
O	28.5
Calorific value	18.1

<sup>a</sup> Estimated from (Ahlroth et al., 2016; Mohammadi et al., 2019).

**Table S2.** The datasets used for the three LCA scenarios.

Substance	Process name	Reference product	Scenario
<i>Ecoinvent 3.0 dataset</i>			
Calcium chloride (CaCl <sub>2</sub> )	Market for calcium chloride [GLO]	0.36 [kg]	A, B, C
Sodium persulfate (Na <sub>2</sub> S <sub>2</sub> O <sub>8</sub> )	Market for sodium persulfate [GLO]	0.35 [kg]	A, B, C
Sodium hydroxide (NaOH)	sodium hydroxide production [RNA]	18.6 [kg]	A, B, C
Ammonia (NH <sub>3</sub> )	Market for ammonia liquid [RER]	0.89 [kg]	A, B, C
Hydrochloric acid (HCl)	Market for hydrochloric acid [RoW]	1.1 [kg]	A, B, C
Sulphuric acid (H <sub>2</sub> SO <sub>4</sub> )	Market for sulphuric acid [GLO]	0.66 [kg]	A, B, C
Sodium chloride (NaCl)	Market for sodium chloride [GLO]	0.32 [kg]	A, B, C
Polymer	Market for acrylonitrile [GLO]	9 [kg]	A, B, C
Electricity	Market for electricity, medium voltage [BR]	781 [kWh]	B
Electricity	Market for electricity, medium voltage [BR]	-547.9 [kWh]	B
Electricity	Market for electricity, medium voltage [CN]	781 [kWh]	C
District heat	Heat, district or industrial, other than natural gas [SE]	-4680 [MJ]	C
Liquefied petroleum gas	Market for liquefied petroleum gas [RoW]	-138 [kg]	B
Transport	Lorry transport, 16-22 metric ton, Euro 3 [GLO]	23.8 [kg]	B, C
Natural gas	Market for liquefied natural gas [GLO]	-153 [m <sup>3</sup> ]	C
Diesel	Market for diesel [Europe without Switzerland]	0.1 [l]	A
Diesel	Market for diesel [RoW]	0.1 [l]	B, C
Loading and spreading biochar	Solid manure loading and spreading [CH]	188.2 [kg]	A
Loading and spreading biochar	Solid manure loading and spreading [RoW]	188.2 [kg]	B, C
<i>ELCD dataset</i>			
Electricity	Electricity consumption mix [SE]	823.5 [kWh]	A
Transport	Lorry transport, Euro 0,1,2,3,4 mix, 22 t weight [RER]	23.8 [kg]	A

## References

- Ahlroth, M., Bialik, M., and Jensen, A.: Hydrothermal carbonization of pulp- and paper mill effluent sludge. Åforsk project 15-489. Innventia Report No April 2016, 2016.
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