Errata list for master thesis “Modelling temperature transition and co-digestion in VEAS biogas process”

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This is a list of corrections for the master thesis “Modelling temperature transition and co-digestion in VEAS biogas process”. Only significant errors in the text and result data, and reference errors are included in this list. Minor spelling and grammatical mistakes are not included.

Abbreviation for different type of corrections:

Cor - Correction of language

Cit – Correction of reference source

Table 1: Corrections in the text like significant errors and reference errors.

Page	Line	Type of correction	Original text	Corrected text
26	43	Cit	[16] and [18] that EG under anaerobic…	[22]and [24] that EG under anaerobic …
31	21	Cor	and X_i is particulate component I …	and X_i is particulate component i …
32	6	Cor	S_i is soluble component I …	S_i is soluble component i …
32	9	Cor	converting the rest of MA …	converting the rest of MS …
44	16	Cor	production by using ADM1_FTne …	production by using ADM1_FTnew …
44	17	Cor	research papers (Kovalovzski et al.).	research paper (Kovalovzski et al.).
45	2	Cor	concentration from ADM1_FTne …	concentration from ADM1_FTnew

46	11	Cit	points from experimental data [5] …	points from experimental data [20] …
47	2	Cit	from research paper [5] …	from research paper [20] …
47	10	Cit	from research paper [5] …	from research paper [20] …
48	15	Cit	from research paper [5] …	from research paper [20] …
49	2	Cit	from research paper [5] …	from research paper [20] …
49	11	Cit	from research paper [5] …	from research paper [20] …
65	6	Cor	simulation has much higher IN …	simulation has much higher NH4 …
65	8	Cor	showing a decrease in IN …	showing a decrease in NH4 …
69	4	Cor	The simulated values of IN …	The simulated values of NH4 …
69	6	Cor	hand, has IN …	hand, has NH4 …
69	8	Cor	Figure 4.40: Comparison of IN …	Figure 4.40: Comparison of NH4 …
70	6	Cor	for simulations 7.2 and 2.3.	for simulations 7.2 and 7.3.
73	7	Cor	The simulated IN …	The simulated NH4 …
73	9	Cor	values for the IN …	values for the NH4 …
74	2	Cor	Figure 4.47: IN concentration …	Figure 4.47: NH4 concentration …
77	1	Cor	simulated IN concentration. In the figure, IN …	simulated NH4 concentration. In the figure, NH4 …
77	9	Cor	Figure 4.53: Comparison of simulated IN …	Figure 4.53: Comparison of simulated NH4 …
77	13	Cor	acetate, bicarbonate and IN …	acetate, bicarbonate and NH4 …

79	4-5	Cor	Figure 4.55: Comparison of simulated methane content in biogas from VEAS thermophilic simulations with and without additional sludge. Simulated methane content for simulations	~~Figure 4.55: Comparison of simulated methane content in biogas from VEAS thermophilic simulations with and without additional sludge.~~ Simulated methane content for simulations
81	8	Cor	Figure 4.59: Comparison of simulated biogas flow	Figure 4.59: Comparison of simulated NH4 concentration
82	Table 4.8	Cor	IN [%]	NH4 [%]
84	9	Cor	In the case with simulated IN concentration	In the case with simulated NH4 concentration
85	2	Cor	Figure 4.65: Comparison of simulated IN concentration	Figure 4.65: Comparison of simulated NH4 concentration
90	5	Cit	from two research works ([22] and [24]).	from two research works ([20] and [34]).
91	40	Cit	PG has a ThOD value of 1680 kg/m3 [12], …	PG has a ThOD value of 1680 kg/m3 [21], …
92	19	Cor	from the results in chapters 4.3.2 and 0	from the results in chapters 4.3.2 and 4.4.2
94	5	Cit	experimental data published in [22] …	experimental data published in [34] …
94	6	Cit	fit to experimental data in [24] …	fit to experimental data in [20]

On the page 34, Table 3.1 is missing source for the values presented in the table. Mesophilic temperatures should have the reference to [33] (A. Donoso-Bravo et al.) in the report. For thermophilic – assumed values.

Wrong data was used in some of the figures of simulation results (cases 5.1-5.4 and 8.1 – 8.4) and all relevant tables and figures are corrected and presented below. The figures and tables have the same number and text as in the report.

Page 63:

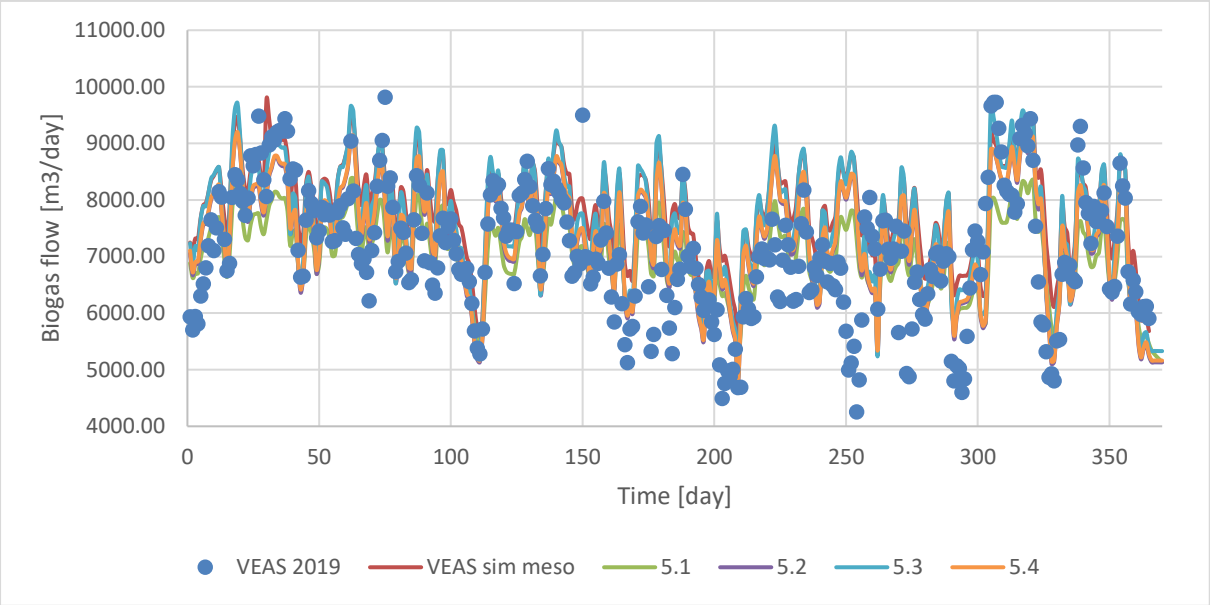

Figure 4.30: Comparison of biogas flow from VEAS 2019 process data and VEAS process simulation to four VEAS process simulations with additional sludges.

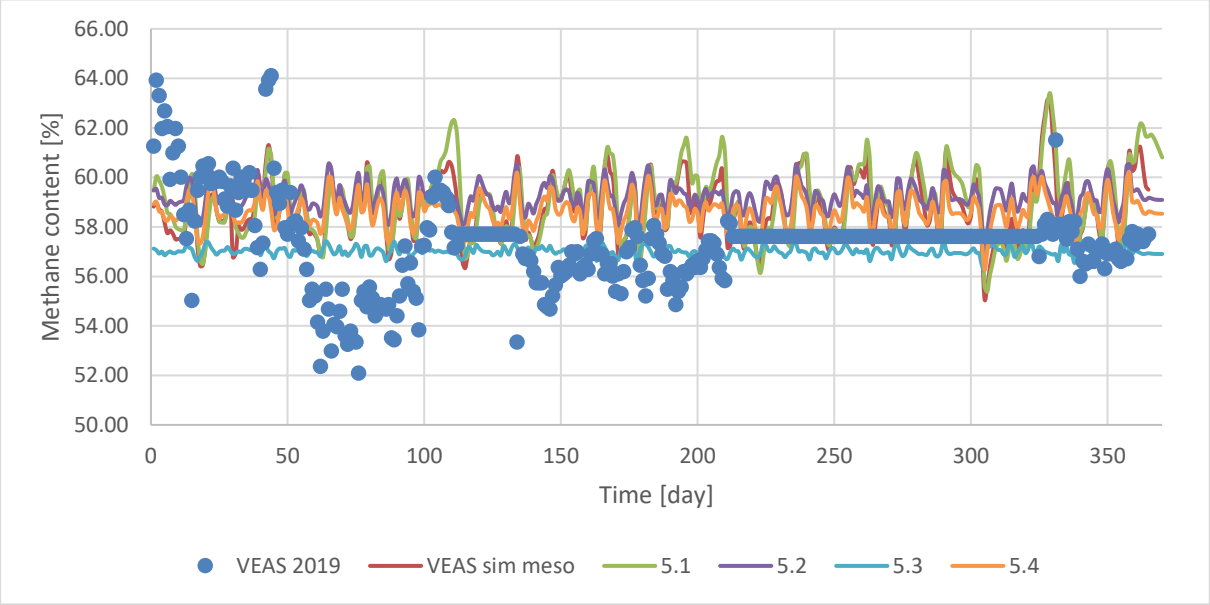

Figure 4.31: Comparison of methane content in biogas from VEAS 2019 process data and VEAS process simulation to four VEAS simulations with additional sludges.

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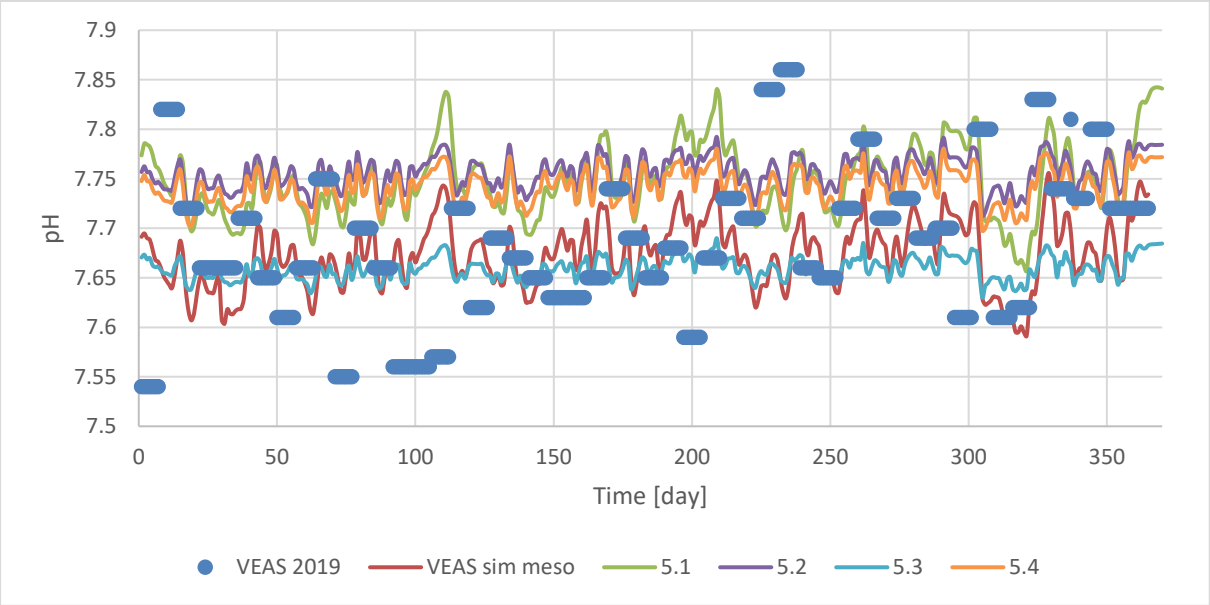

Figure 4.32: Comparison of pH values from VEAS 2019 process data and VEAS process simulation to four VEAS simulations with additional sludges.

Page 65:

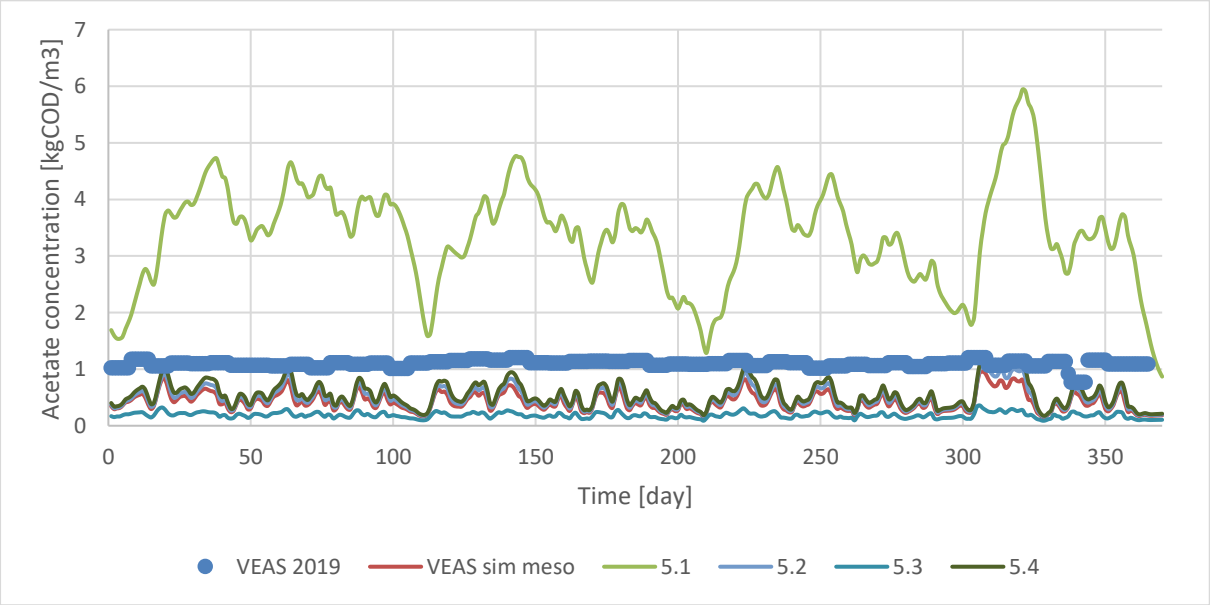

Figure 4.33: Comparison of acetate concentration from VEAS 2019 process data and VEAS process simulation to four VEAS simulations with additional sludges.

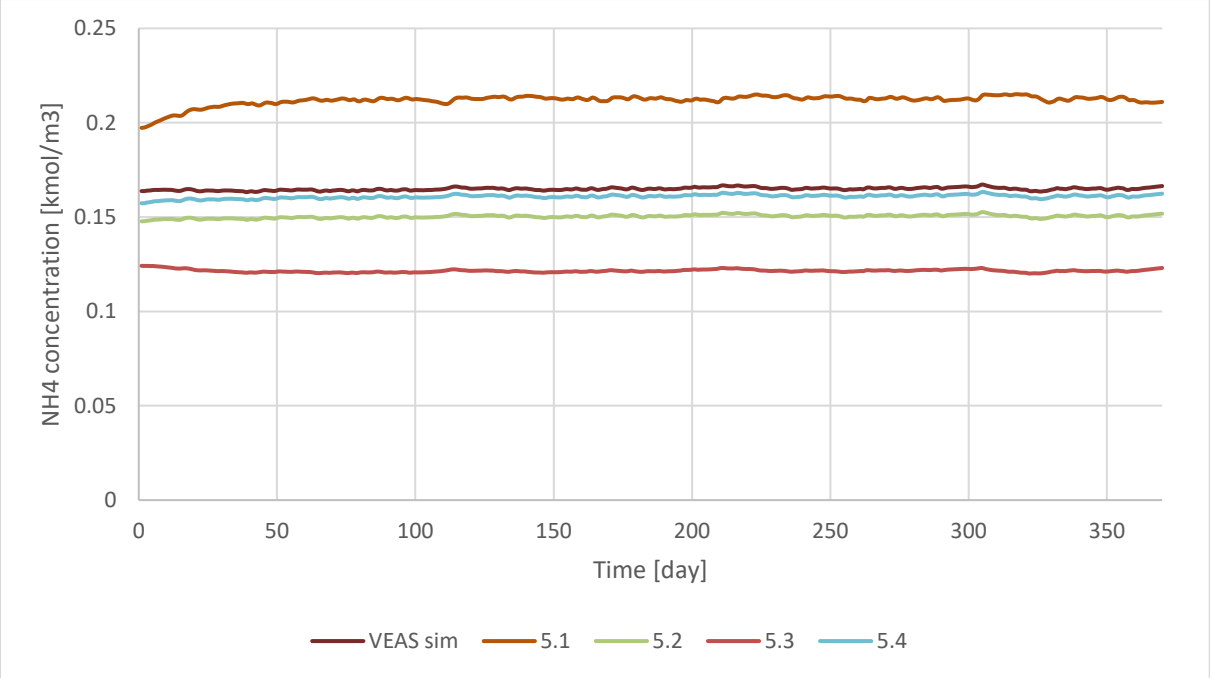

Figure 4.34: Comparison of NH4 concentration from VEAS process simulation to four VEAS simulations with additional sludges.

Page 66:

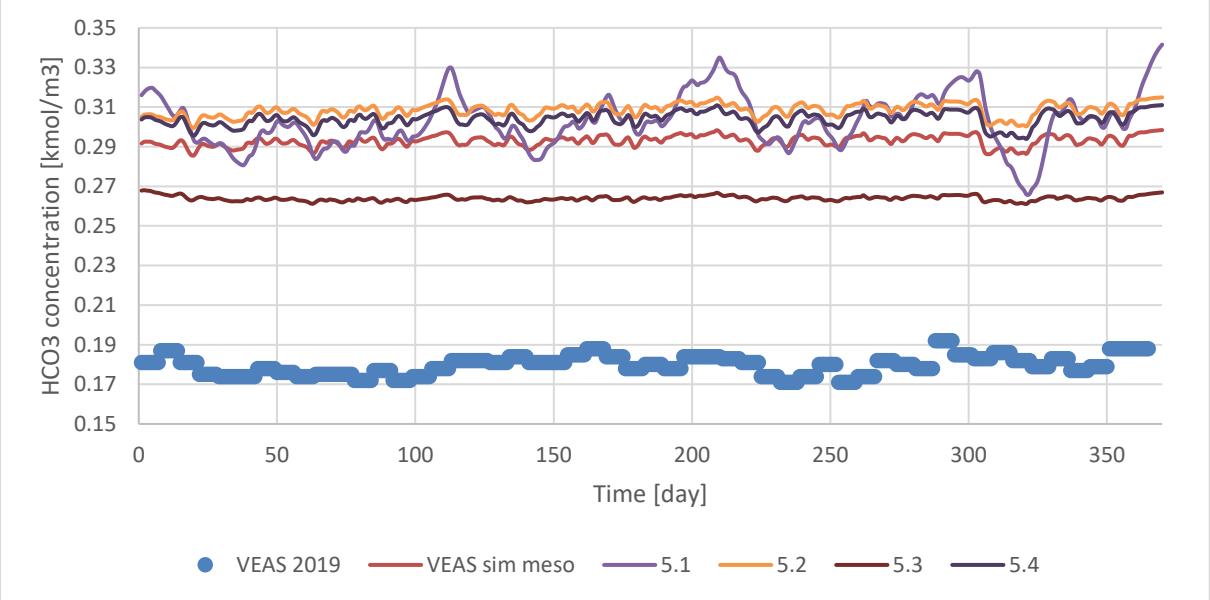

Figure 4.35: Comparison of bicarbonate concentration from VEAS 2019 process data and VEAS process simulation to four VEAS simulations with additional sludges.

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Table 4.3: Comparing some average results values from simulations with co-substrate against not altered VEAS process simulation. Average values calculated for the same time period for simulation 5.1, 5.2, 5.3, 5.4 and VEAS process simulation.

Results compared	Relative differences

	pH [%]	Acetate [%]	HCO3 [%]	NH4 [%]	Methane content [%]	Biogas flow [%]
VEAS sim meso to 5.1	0.99	693.71	3.48	28.89	0.44	-12.60
VEAS sim meso to 5.2	1.08	14.10	5.31	-8.80	0.79	-8.75
VEAS sim meso to 5.3	-0.18	-56.36	-9.89	-26.43	-2.97	-5.20
VEAS sim meso to 5.4	0.91	28.54	3.80	-2.39	-0.19	-8.24

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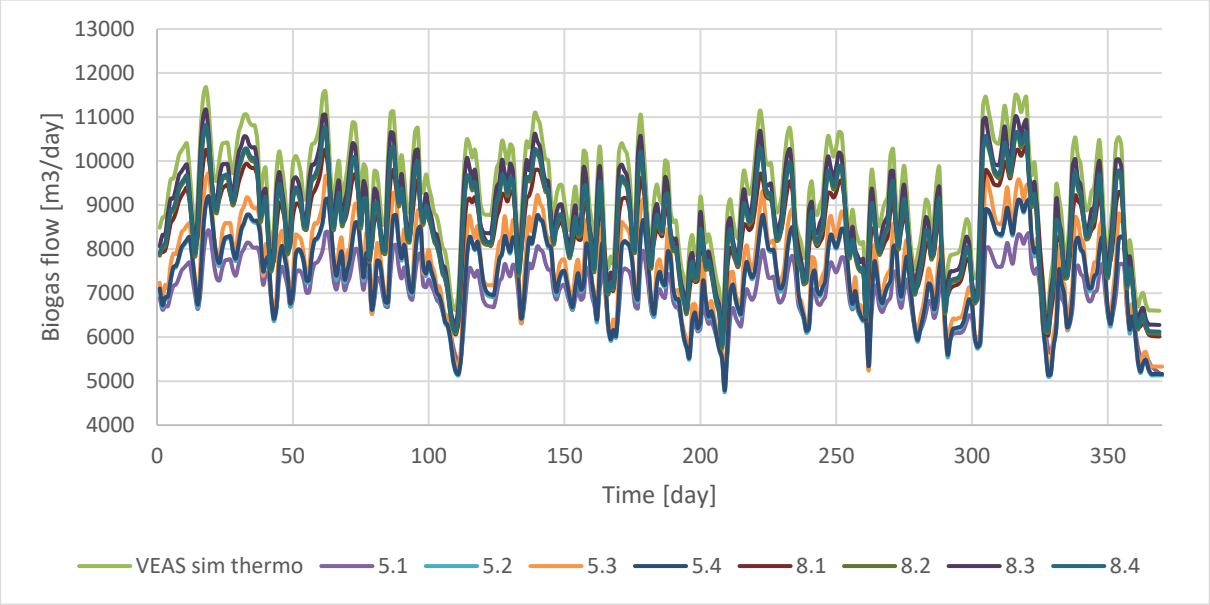

Figure 4.54: Comparison of simulated biogas flow from VEAS thermophilic simulations with and without additional sludge.

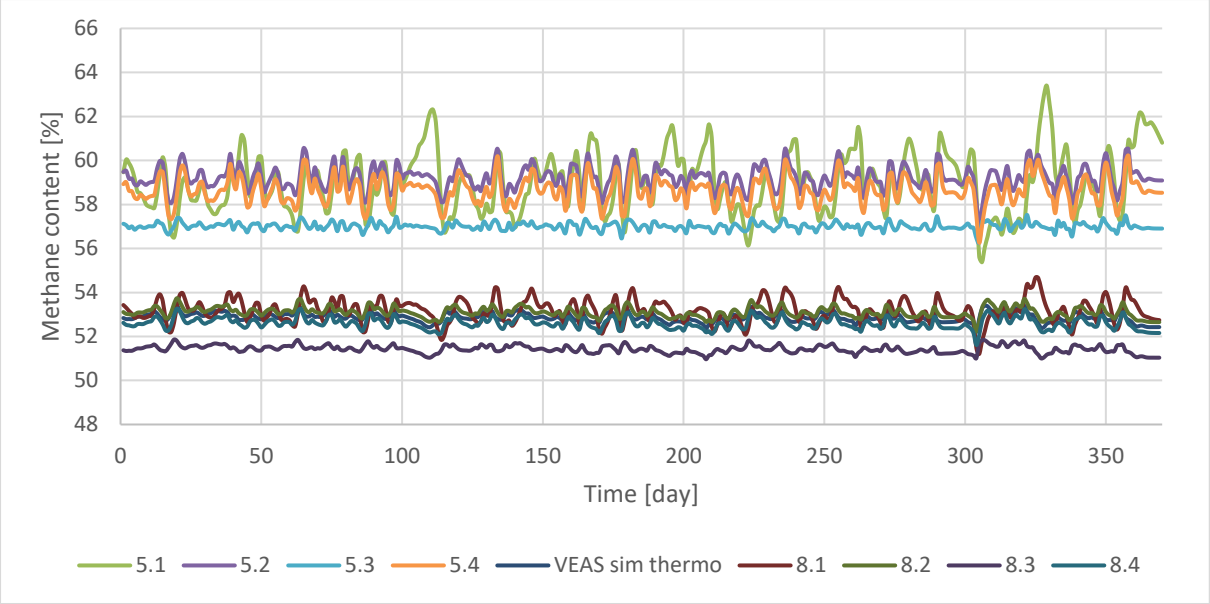

Figure 4.55: Comparison of simulated methane content in biogas from VEAS thermophilic simulations with and without additional sludge.

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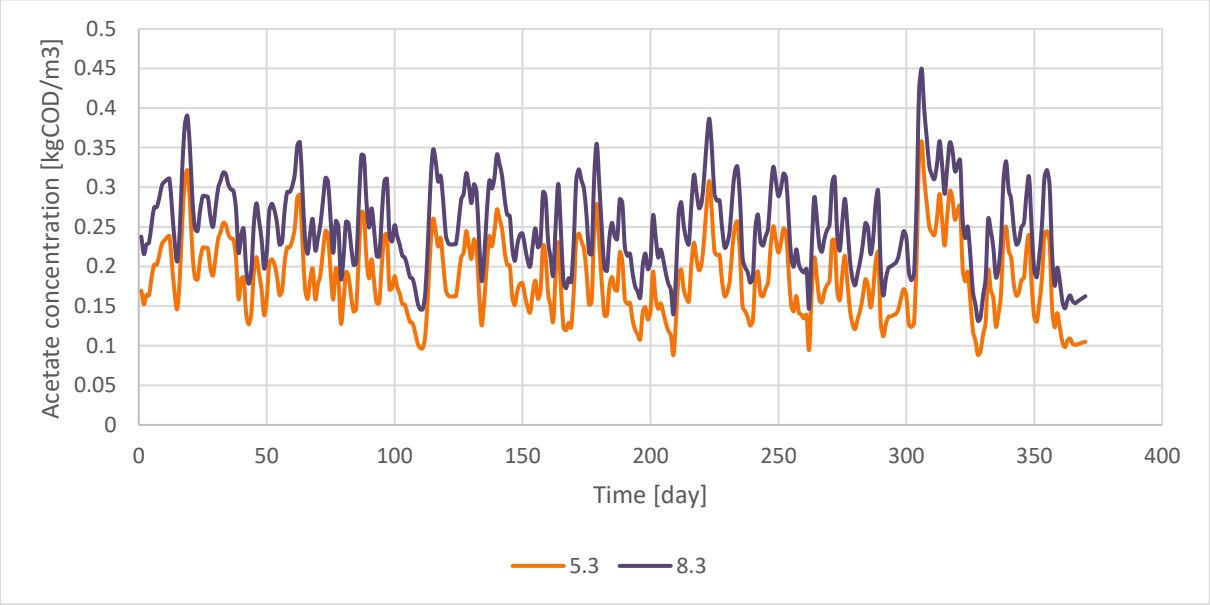

Figure 4.56: Comparison of simulated acetate concentration from VEAS thermophilic simulations with and without additional sludge.

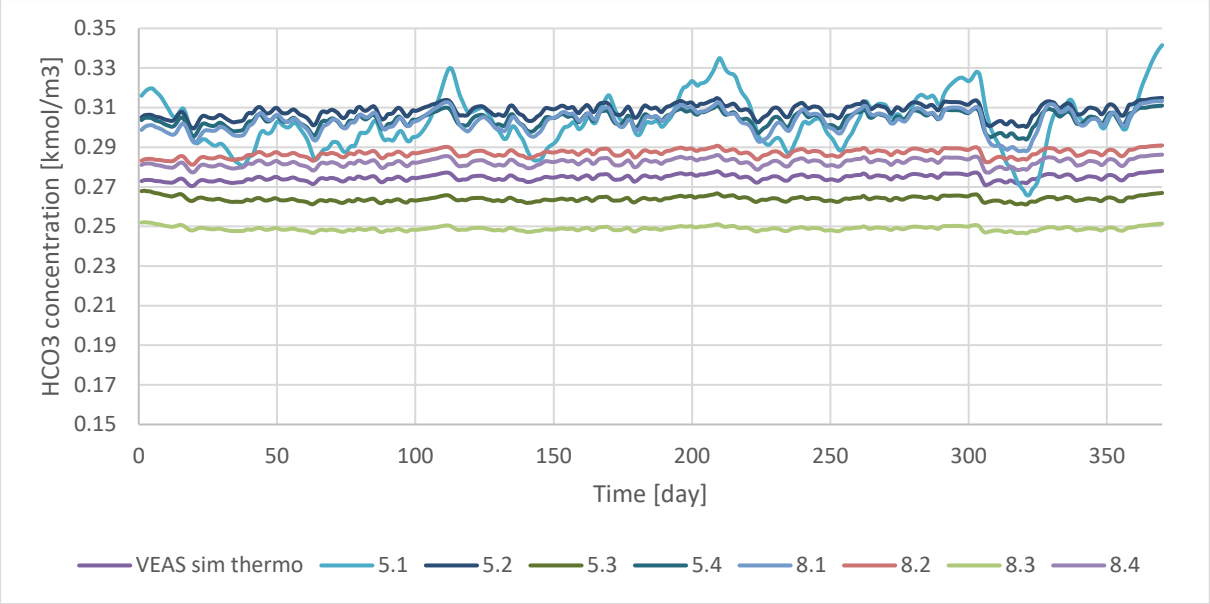

Figure 4.57: Comparison of simulated bicarbonate concentration from VEAS thermophilic simulations with and without additional sludge.

Page 81:

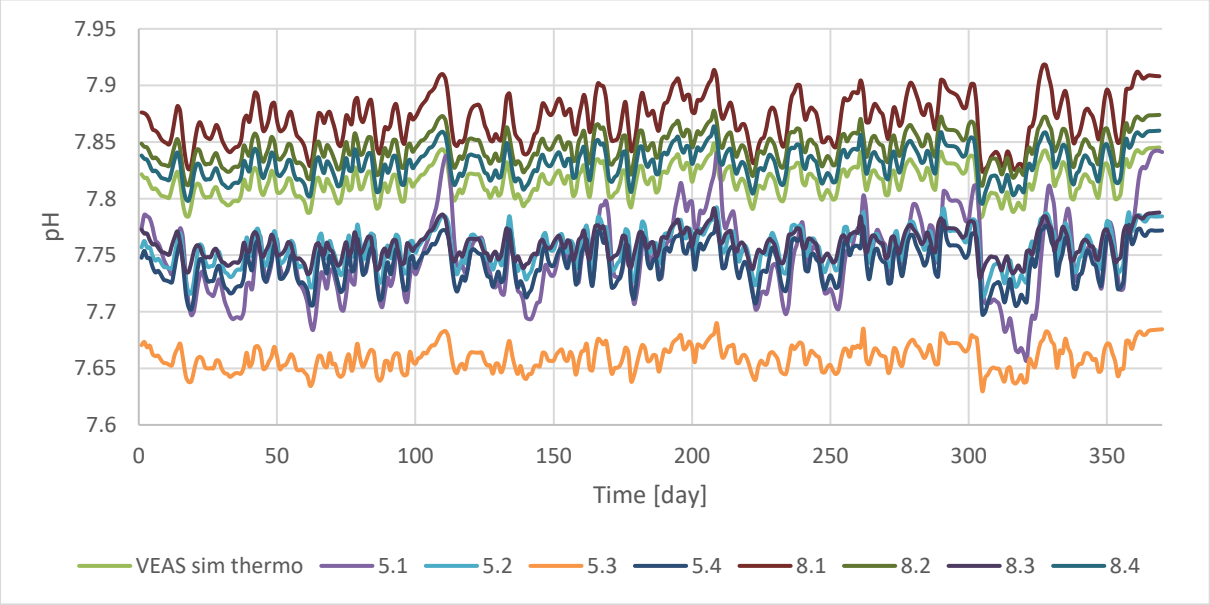

Figure 4.58: Comparison of simulated pH from VEAS thermophilic simulations with and without additional sludge.

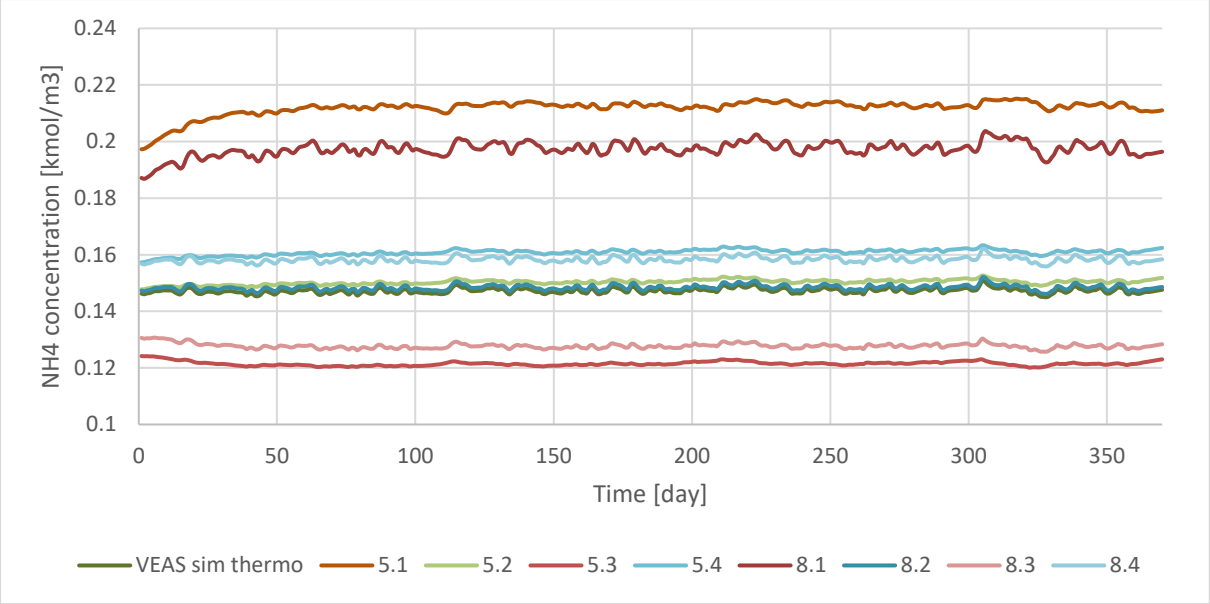

Figure 4.59: Comparison of simulated NH4 from VEAS thermophilic simulations with and without additional sludge.

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Table 4.8: Chosen simulations compared by relative difference. Calculation of difference based on the average value taken for the same period for all simulations.

Simulations compared	Relative differences					
	pH [%]	Acetate [%]	HCO3 [%]	NH4 [%]	Methane content [%]	Biogas flow [%]
5.1 to 8.1	1.58	-66.56	0.05	-6.99	-10.02	20.53
5.2 to 8.2	1.15	-9.04	-6.97	-1.30	-10.33	16.92
5.3 to 8.3	1.30	35.17	-5.70	5.16	-9.79	16.18
5.4 to 8.4	1.14	-14.10	-7.16	-1.67	-10.31	17.14

Page 87:

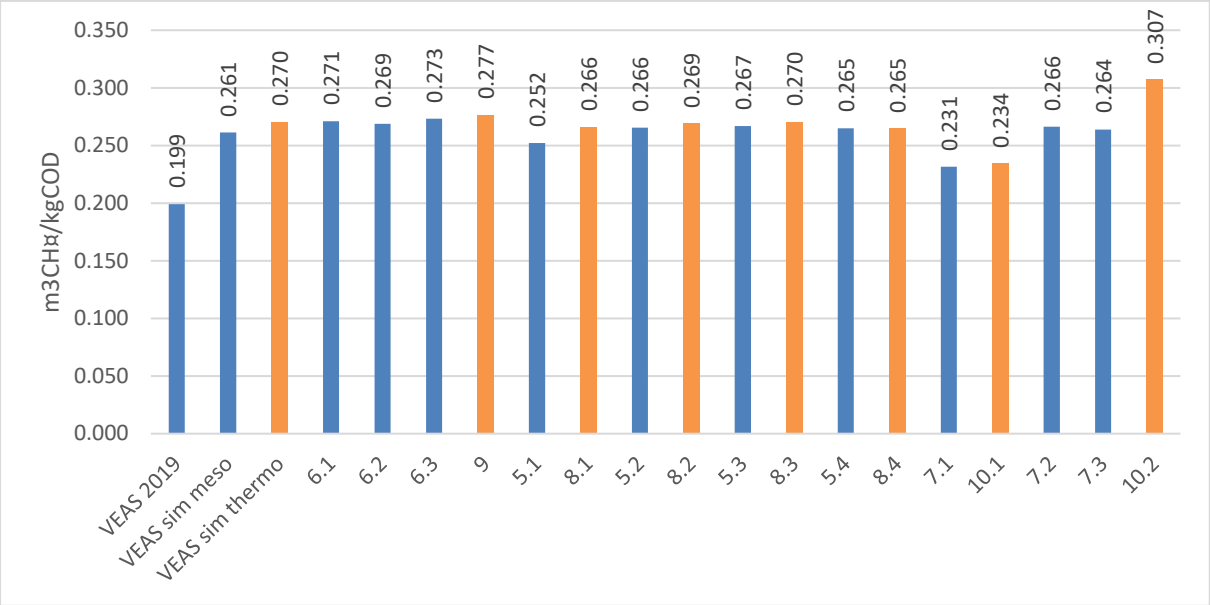

Figure 4.66: Methane yield for VEAS 2019 process and all simulations (blue mesophilic process, orange thermophilic).

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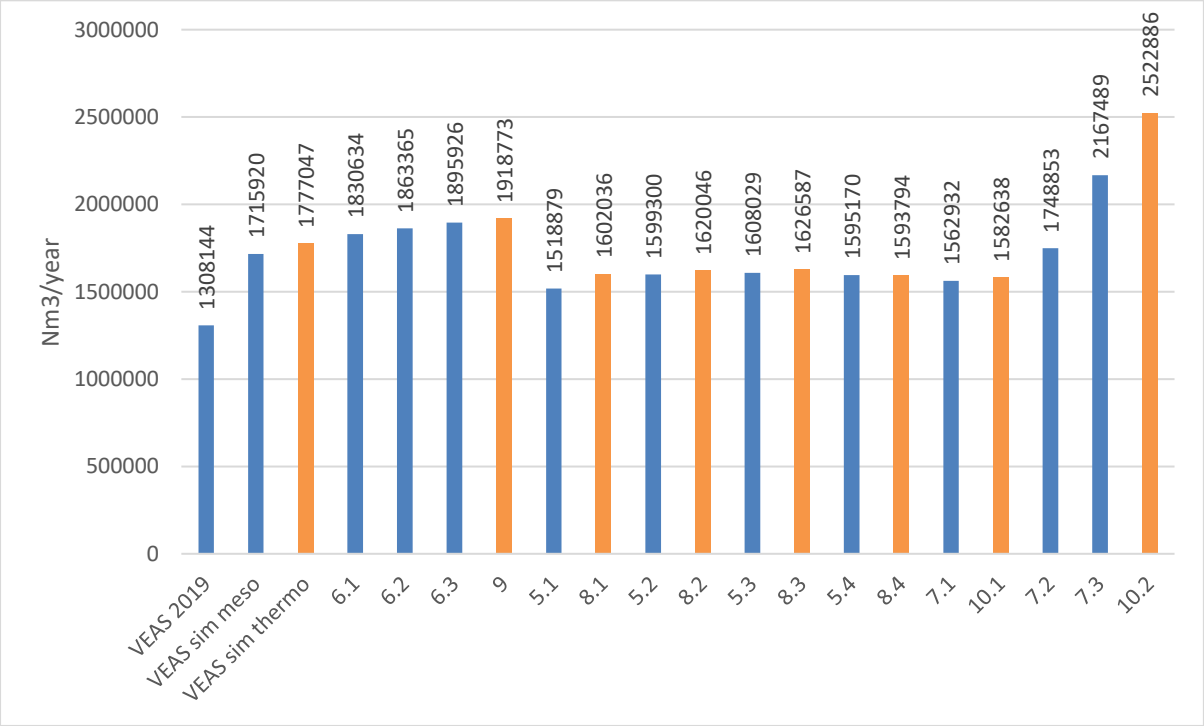

Figure 4.67: Volume of methane (STP) produced per year by VEAS in 2019 and simulated production for all simulations (blue mesophilic process, orange thermophilic).

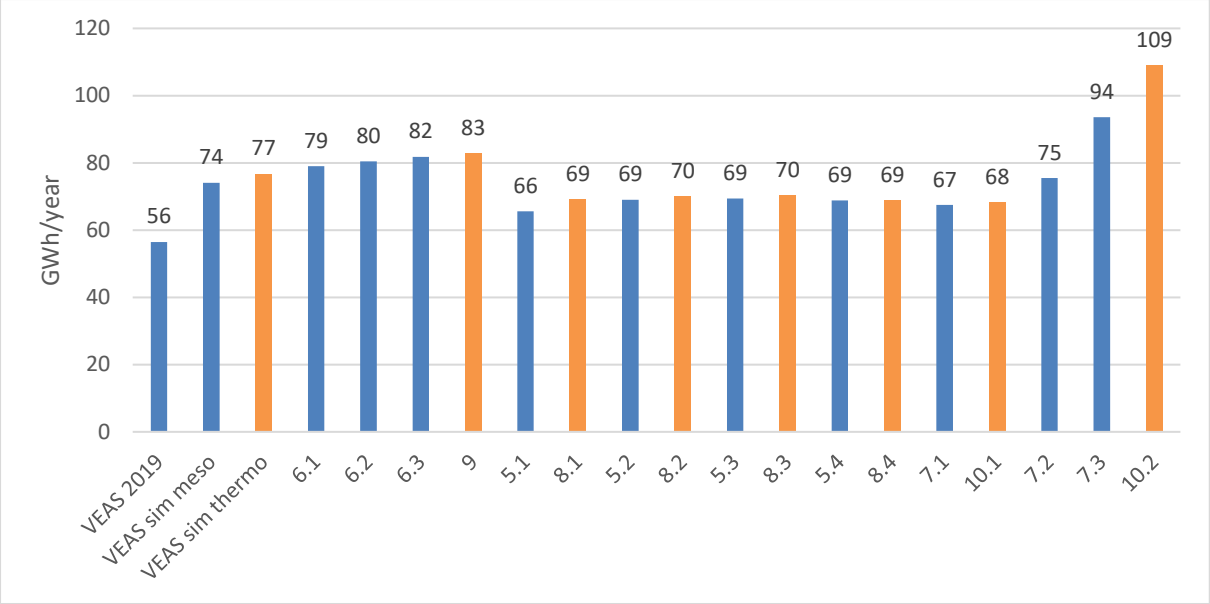

Figure 4.68: Potential energy production from methane for VEAS 2019 and all simulations (blue mesophilic process, orange thermophilic).

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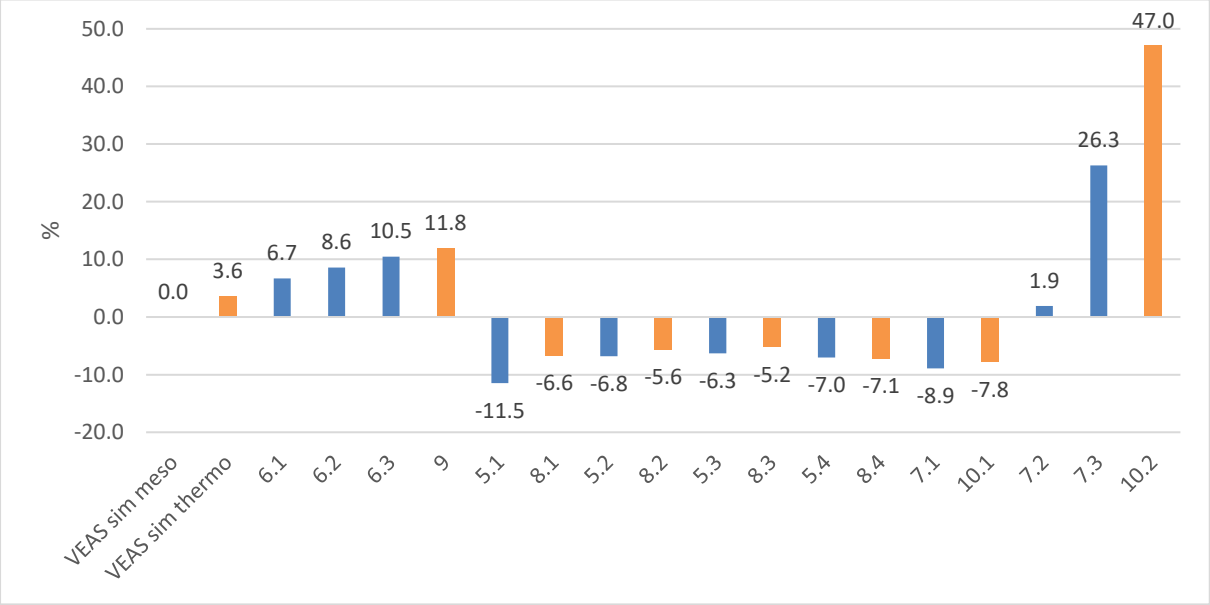

Figure 4.69: Difference in simulated potential energy from methane compared to VEAS mesophilic simulation (blue mesophilic process, orange thermophilic).