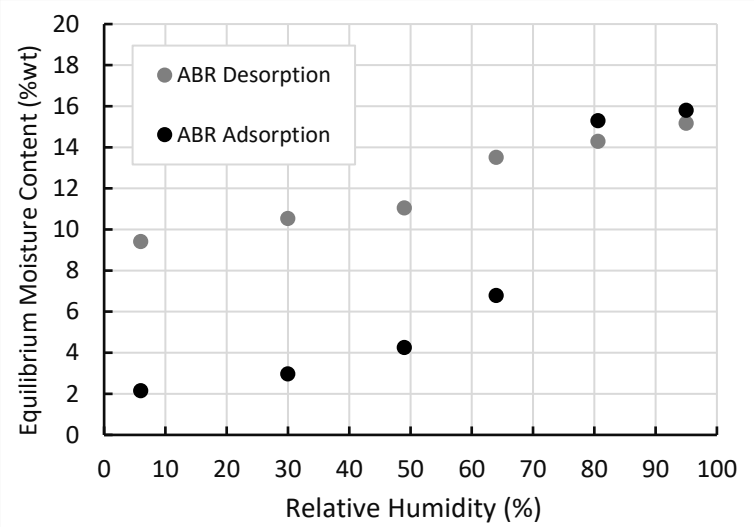
General information	
Type of data	Sorption isotherms
Place of experimentation	Pollution Research Group, University of KwaZulu-Natal (South Africa)
Dates of the experiments	2018 - 2019
Feedstock	
Type of faecal material	Faecal sludge from anaerobic baffled reactor (ABR) from a decentralised wastewater treatment plant (DEWAT)
Location of collection	Durban, South Africa
Age before collection	Unknown
Moisture content	~ 90%wt
Total solids content	~ 10%wt
Volatile solids content	~ 75%db
Ash content	~ 25%db
Presence of trash?	Yes (mainly small pieces of paper after pre-screening during pit emptying)
Pre-treatment	Screening to remove trash
Experimental Procedure	
Drying experimental setup	Saturated salt solution setup
Drying time	Until stabilisation of the sample mass
Operating conditions	○ Temperature: ambient (~20°C) ○ Relative humidity (RH): 6, 30, 49, 64, 81 and 95%
Sample form in the dryer	~ 1.5 g of samples placed in silicon cupcake baking mould
Analysed parameters	Moisture content
Employed methods	Direct measurement by the moisture analyzer balance *PCE-MB Series* (SOP 8.7.1.5)
Publications	
-	

Data source files
https://www.dropbox.com/s/64gp2lb2fksolmq/2018-2019%20FS%20and%20Fresh%20faeces_Sorption%20Isotherms.xlsx?dl=0
Additional Notes
○ Samples placed inside a jar with a saturated salt solution to control the relative humidity to a given value ○ Employed salts: potassium hydroxide (6%RH), calcium chloride (30% RH), magnesium nitrate (49%RH), potassium iodide (64%RH), ammonium sulphate (80%RH), potassium nitrate (95% RH) ○ Equilibrium moisture content reached after the stabilization of the mass
Description of Data

Equilibrium moisture content versus relative humidity (adsorption and desorption isotherms)



Observations:

- Higher equilibrium moisture contents for moisture desorption than adsorption (except at relative humidities higher than 80%)
- Possible to achieve low moisture content (< 20%wt) at high relative humidities (< 95%)
- Possible to regain slightly in moisture after drying if placed in environment with high relative humidity (hygroscopic behaviour)

General information	
Type of data	Sorption isotherms
Place of experimentation	Pollution Research Group, University of KwaZulu-Natal (South Africa)
Dates of the experiments	2018 - 2019
Feedstock	
Type of faecal material	Faecal sludge from urine diversion dry toilets (UDDT)
Location of collection	Durban, South Africa
Age before collection	Up to 3 years
Moisture content	~ 75%wt
Total solids content	~ 25%wt
Volatile solids content	~ 55%db
Ash content	~ 45%db
Presence of trash?	Yes (mainly stones, hair and plastics)
Pre-treatment	Screening to remove the trash
Experimental Procedure	
Drying experimental setup	Saturated salt solution setup
Drying time	Until stabilisation of the sample mass
Operating conditions	○ Temperature: ambient (~20°C) ○ Relative humidity (RH): 6, 30, 49, 64, 81 and 95%
Sample form in the dryer	~ 1.5 g of samples placed in silicon cupcake baking mould
Analysed parameters	Moisture content
Employed methods	Direct measurement by the moisture analyzer balance *PCE-MB Series* (SOP 8.7.1.5)
Publications	
-	

Data source files

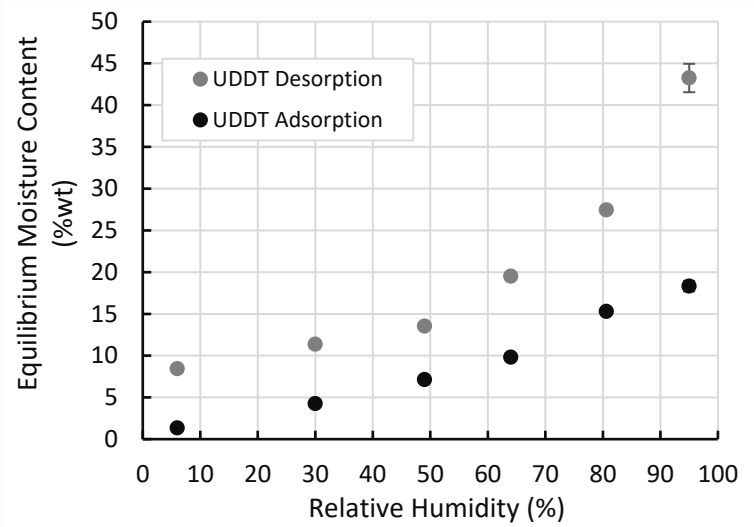
https://www.dropbox.com/s/64gp2lb2fksolmq/2018-2019%20FS%20and%20Fresh%20faeces_Sorption%20Isotherms.xlsx?dl=0

Additional Notes

- Samples placed inside a jar with a saturated salt solution to control the relative humidity to a given value
- Employed salts: potassium hydroxide (6%RH), calcium chloride (30% RH), magnesium nitrate (49%RH), potassium iodide (64%RH), ammonium sulphate (80%RH), potassium nitrate (95% RH)
- Equilibrium moisture content reached after the stabilization of the mass

Description of Data

Equilibrium moisture content versus relative humidity (adsorption and desorption isotherms)



Observations:

- Higher equilibrium moisture contents for moisture desorption than adsorption
- Possible to achieve low moisture content (< 30%wt) at high relative humidities (< 80%)
- Possible for the sludge to regain slightly in moisture after drying if placed in environment with high relative humidity (hygroscopic behaviour)

General information	
Type of data	Sorption isotherms
Place of experimentation	Pollution Research Group, University of KwaZulu-Natal (South Africa)
Dates of the experiments	2018 - 2019
Feedstock	
Type of faecal material	Faecal sludge from ventilated improved pit latrine (VIP)
Location of collection	Durban, South Africa
Age before collection	Up to 5 years
Moisture content	~ 75%wt
Total solids content	~ 25%wt
Volatile solids content	~ 40%db
Ash content	~ 60%db
Presence of trash?	Yes (mainly hair extensions, plastic and rocks)
Pre-treatment	Screening to remove trash
Experimental Procedure	
Drying experimental setup	Saturated salt solution setup
Drying time	Until stabilisation of the sample mass
Operating conditions	○ Temperature: ambient (~20°C) ○ Relative humidity (RH): 6, 30, 49, 64, 81 and 95%
Sample form in the dryer	~ 1.5 g of samples placed in silicon cupcake baking mould
Analysed parameters	Moisture content
Employed methods	Direct measurement by the moisture analyzer balance *PCE-MB Series* (SOP 8.7.1.5)
Publications	
-	

Data source files

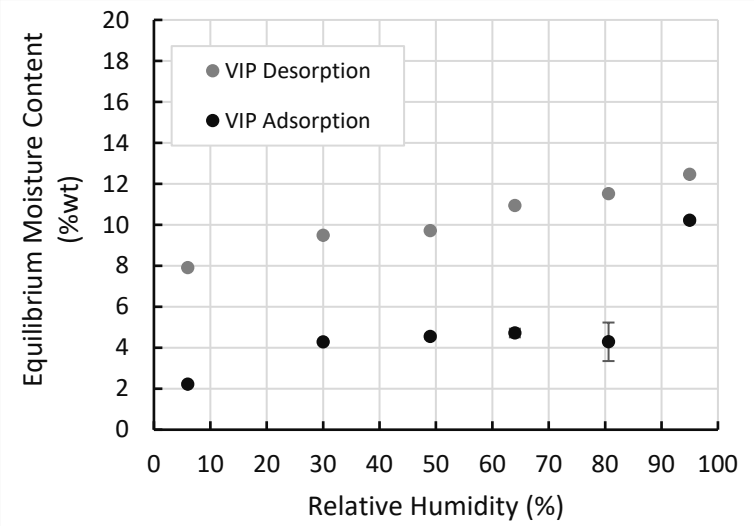
https://www.dropbox.com/s/64gp2lb2fksolmq/2018-2019%20FS%20and%20Fresh%20faeces_Sorption%20Isotherms.xlsx?dl=0

Additional Notes

- Samples placed inside a jar with a saturated salt solution to control the relative humidity to a given value
- Employed salts: potassium hydroxide (6%RH), calcium chloride (30% RH), magnesium nitrate (49%RH), potassium iodide (64%RH), ammonium sulphate (80%RH), potassium nitrate (95% RH)
- Equilibrium moisture content reached after the stabilization of the mass

Description of Data

Equilibrium moisture content versus relative humidity (adsorption and desorption isotherms)



Observations:

- Higher equilibrium moisture contents for moisture desorption than adsorption
- Possible to achieve low moisture content (< 20%wt) at high relative humidities (< 95%)
- Possible for the sludge to regain slightly in moisture after drying if placed in environment with high relative humidity (hygroscopic behaviour)

General information	
Type of data	Sorption isotherms
Place of experimentation	Pollution Research Group, University of KwaZulu-Natal (South Africa)
Dates of the experiments	2018 - 2019
Feedstock	
Type of faecal material	Fresh faeces
Location of collection	Durban, South Africa
Age before collection	A few days
Moisture content	~ 80%wt
Total solids content	~ 20%wt
Volatile solids content	~ 85%db
Ash content	~ 15%db
Presence of trash?	No
Pre-treatment	Mixing
Experimental Procedure	
Drying experimental setup	Saturated salt solution setup
Drying time	Until stabilisation of the sample mass
Operating conditions	○ Temperature: ambient (~20°C) ○ Relative humidity (RH): 6, 30, 49, 64, 81 and 95%
Sample form in the dryer	~ 1.5 g of samples placed in silicon cupcake baking mould
Analysed parameters	Moisture content
Employed methods	Direct measurement by the moisture analyzer balance *PCE-MB Series* (SOP 8.7.1.5)
Publications	
-	

Data source files

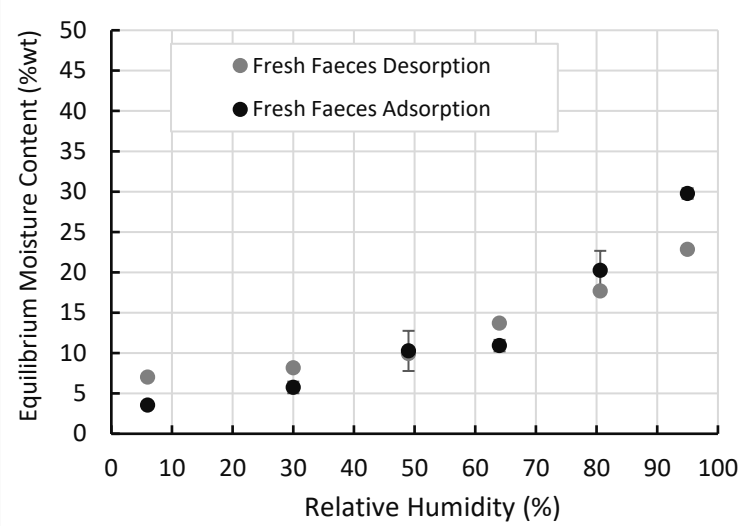
https://www.dropbox.com/s/64gp2lb2fksolmq/2018-2019%20FS%20and%20Fresh%20faeces_Sorption%20Isotherms.xlsx?dl=0

Additional Notes

- Fresh faeces collected from voluntary and anonymous donations from healthy young adults
- Samples placed inside a jar with a saturated salt solution to control the relative humidity to a given value
- Employed salts: potassium hydroxide (6%RH), calcium chloride (30% RH), magnesium nitrate (49%RH), potassium iodide (64%RH), ammonium sulphate (80%RH), potassium nitrate (95% RH)
- Equilibrium moisture content reached after the stabilization of the mass

Description of Data

Equilibrium moisture content versus relative humidity (adsorption and desorption isotherms)



Observations:

- Similar equilibrium moisture contents between moisture desorption and adsorption
- Possible to achieve low moisture content (< 30%wt) at high relative humidities (< 95%)
- Possible for the sludge to regain slightly in moisture after drying if placed in environment with high relative humidity (hygroscopic behaviour)

General information	
Type of data	Sorption isotherms
Place of experimentation	Civil and Water Engineering Department, Laval University, Quebec (Canada)
Dates of the experiments	2017
Feedstock	
Type of faecal material	Faecal sludge from share pit latrine
Location of collection	Quebec, Canada
Age before collection	1 or 2 years
Moisture content	~ 98 %wt
Total solids content	~ 2 %wt
Volatile solids content	~ 80 %wt
Ash content	~ 20 %wt
Presence of trash?	Yes (plastics, menstrual hygiene product, toilet paper)
Pre-treatment	Removal of trash
Experimental Procedure	
Drying experimental setup	Saturated salt solution setup
Drying time	Until stabilisation of the sample mass
Operating conditions	○ Temperature: 25°C, and 35°C ○ Relative humidity (RH) at 25°C: 29, 75, 89, 97% ○ RH at 35°C: 6, 29, 75, 89, 97%
Sample form in the dryer	1.5 and 5 g of samples placed in weighing tray
Analysed parameters	Moisture content
Employed methods	Static gravimetric analysis from the sample mass loss
Publications	
Bourgault, C., Lessard, P., Remington, C., & Dorea, C. C. (2019). Experimental determination of moisture sorption isotherm of fecal sludge. *Water*, *11*(2), 303. Bourgault, C. (2018). Characterization and quantification of faecal sludge from pit latrines. PhD thesis. University of Laval, Canada.	

Data source files

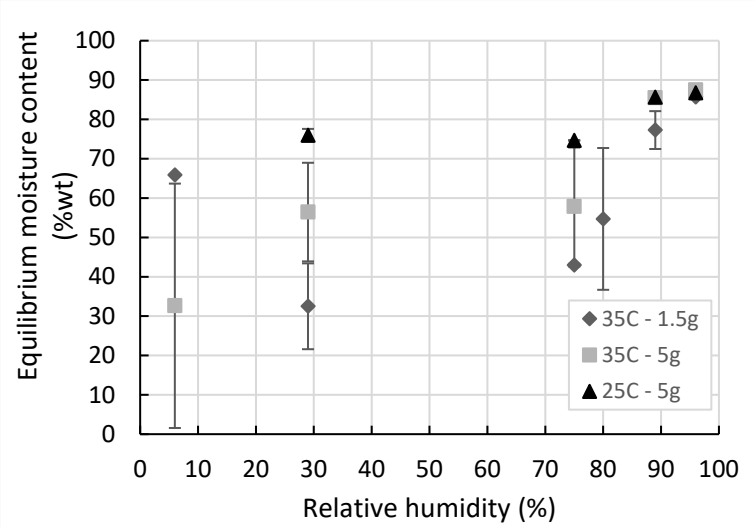
https://www.dropbox.com/s/mochav67q0gf0ul/2017%20VIP%20sludge%20Moisture%20Sorption%20Isotherms_Laval%20University.xlsx?dl=0

Additional Notes

- Samples placed inside a jar with a saturated salt solution to control the relative humidity to a given value
- Employed salts: sodium hydroxide (6%RH), calcium chloride (29%RH), sodium chloride (75%RH), potassium chloride (89%RH), potassium sulphate (97%RH)
- Equilibrium moisture content measured after the stabilization of the mass (2 to 4 weeks, depending on the sample)

Description of Data

Equilibrium moisture content versus relative humidity at 25 and 35°C (desorption isotherm)



Observations:

- Decrease of equilibrium moisture by decreasing the relative humidity in the range 75 to 96% RH
- Below 75% RH, not clear decrease of the equilibrium moisture content due to the high variability of the results
- Not clear effect of temperature and mass of sample

General information	
Type of data	Sorption isotherms
Place of experimentation	Public Health & Environmental Engineering Laboratory, University of Victoria, Victoria, (Canada)
Dates of the experiments	2018 - 2019
Feedstock	
Type of faecal material	Fresh faeces
Location of collection	Victoria, BC
Age before collection	A few days
Moisture content	~ 75%wt
Total solids content	~ 25%wt
Volatile solids content	Not measured
Ash content	Not measured
Presence of trash?	No
Pre-treatment	Mixing
Experimental Procedure	
Drying experimental setup	Saturated salt solution setup
Drying time	Until stabilisation of the sample mass
Operating conditions	○ Temperature: 15°C, 25°C, and 35°C ○ Relative humidity (RH) at 15°C: 6, 11, 34, 75, 80, 85, 97% ○ RH at 25°C: 6, 9, 28, 75, 78, 84, 97% ○ RH at 35°C: 6, 7, 23, 75, 76, 83, 97%
Sample form in the dryer	1, 1.5, and 5 g of samples placed in weighing tray
Analysed parameters	Moisture content
Employed methods	Static gravimetric analysis from the sample mass loss
Publications	
Remington, C., Bourgault, C., & Dorea, C. (2020). Measurement and modelling of moisture sorption isotherm and heat of sorption of fresh feces. *Water, 12*(2), 323. doi:10.3390/w12020323	

Remington, C. (2019). Countering the Porcelain Dream: Key Findings from an Evaluation of the Global Nitrogen Cycle, a Fundamental Characterization of Fresh Faeces, and a Campus Composting Toilet. MSc thesis. University of Victoria, Canada.

Data source files

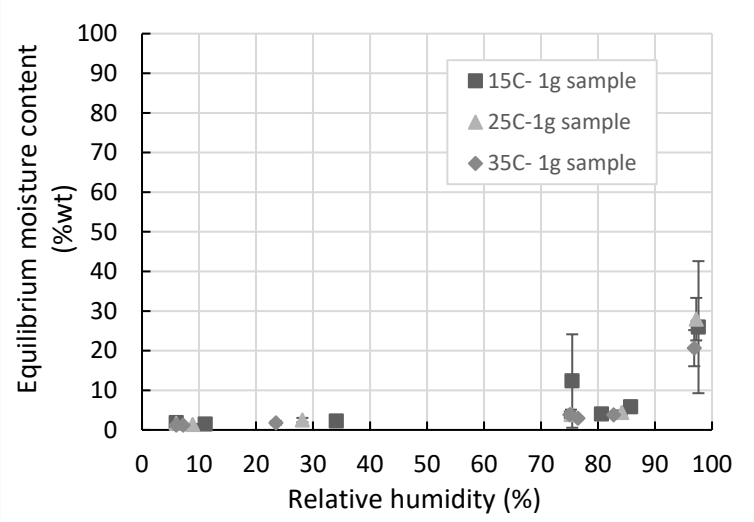
https://www.dropbox.com/s/hv4i7wb6uigk4di/2018-2019%20Human%20faeces%20Moisture%20Sorption%20Isotherms_University%20of%20Victoria.xlsx?dl=0

Additional Notes

- Fresh faeces collected from voluntary and anonymous donations from healthy young adults
- Samples placed inside a jar with a saturated salt solution to control the relative humidity to a given value
- Employed salts: sodium hydroxide (6%RH), potassium hydroxide (7 - 11%RH), calcium chloride (23 - 34%RH), sodium chloride (75%RH), ammonium chloride (76 - 80%RH), potassium chloride (83 - 85%RH), potassium sulphate (97%RH)
- Equilibrium moisture content measured after the stabilization of the mass (2 to 4 weeks, depending on the sample)

Description of Data

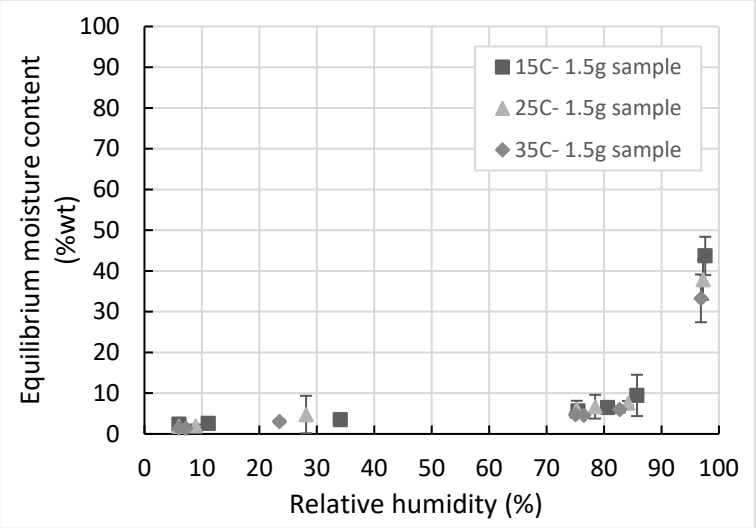
Equilibrium moisture content versus relative humidity at 15, 25 and 35°C for 1 g of sample



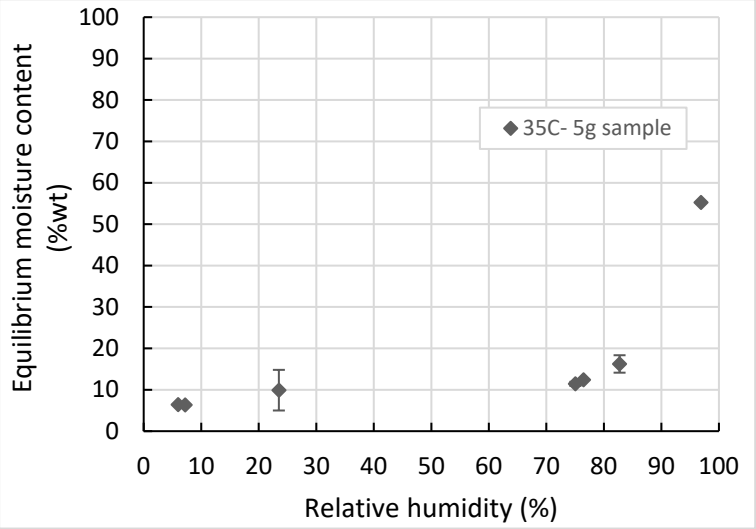
Observations:

- High variability of the equilibrium moisture content at 97%RH (probably because of the sorption isotherm tending to a vertical asymptote at 100%RH)
- Fast drop of the equilibrium moisture content below 97%RH
- Low equilibrium moisture content (< 20%) below 85%RH
- Not effect of temperature
- Similar pattern for the different mass of sample

Equilibrium moisture content versus relative humidity at 15, 25 and 35ºC for 1.5 g of sample



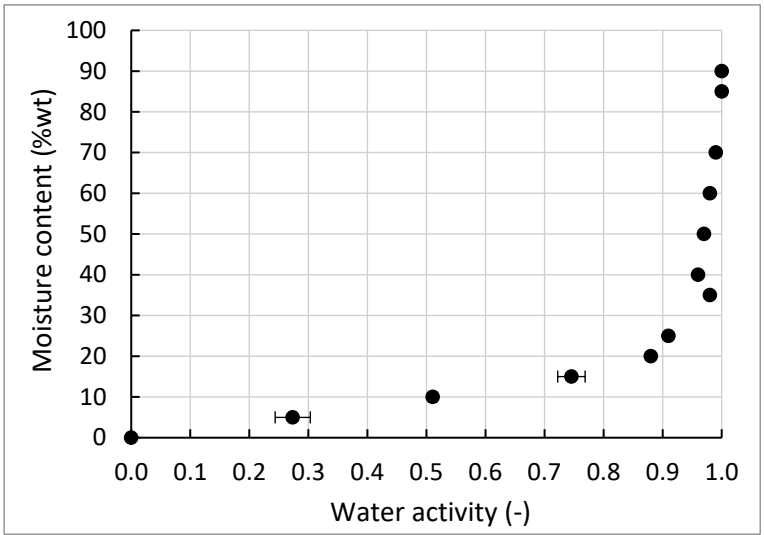
Equilibrium moisture content versus relative humidity at 15, 25 and 35º for 5 g of sample



General information	
Type of data	Water Activity
Place of experimentation	Pollution Research Group, University of KwaZulu-Natal (South Africa)
Dates of the experiments	2018 - 2019
Feedstock	
Type of faecal material	Faecal sludge from anaerobic baffled reactor (ABR) from a decentralised wastewater treatment plant (DEWAT)
Location of collection	Durban, South Africa
Age before collection	Unknown
Moisture content	~ 90%wt
Total solids content	~ 10%wt
Volatile solids content	~ 75%db
Ash content	~ 25%db
Presence of trash?	Yes (mainly small pieces of paper after pre-screening during pit emptying)
Pre-treatment	Screening to remove trash
Experimental Procedure	
Drying experimental setup	Moisture Analyser balance *PCE-MB Series*
Drying time	Until achieving 0, 5, 10, 15, 20, 25, 35, 40, 50, 55, 60, 70 and 85%wt moisture content
Operating conditions	Temperature: 100°C
Sample form in the dryer	1.5 g of sample on an 90 mm diameter aluminium crucible
Analysed parameters	Water activity
Employed methods	Use of water activity analyser *AquaLab Tunable Diode Laser-TDL* (SOP 8.8.3.3)
Publications	
Getahun, S., Septien, S., Mata, J., Somorin, T., Mabbett, I., & Buckley, C. (2020). Drying characteristics of faecal sludge from different on-site sanitation facilities. *Journal of Environmental Management*, *261*, 110267.	

Data source files
https://www.dropbox.com/s/ltlydxgp1xglrtz/2018-2019%20Moisture%20content%20as%20a%20function%20of%20Water%20activity.xlsx?dl=0
Additional Notes
-
Description of Data

Water activity as a function of moisture content



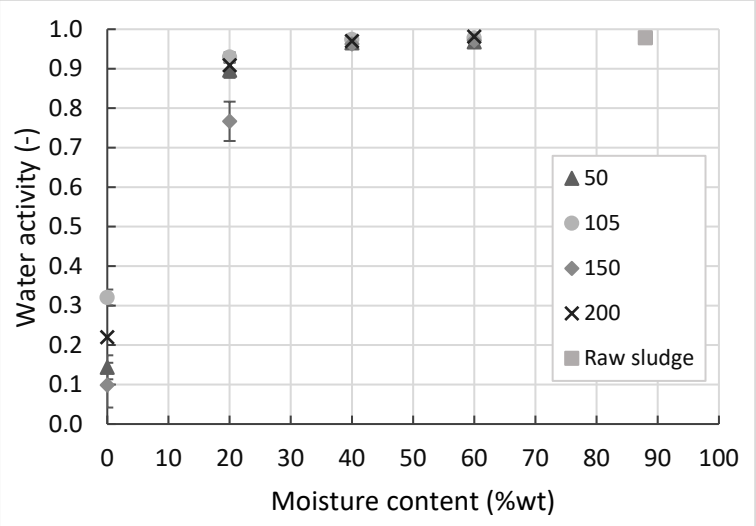
Observations:

- Water activity near 1 above 35%wt moisture content
- Decrease of water activity below 35%wt moisture content

General information	
Type of data	Water Activity
Place of experimentation	Pollution Research Group, University of KwaZulu-Natal (South Africa)
Dates of the experiments	2018-2019
Feedstock	
Type of faecal material	Faecal sludge from anaerobic baffled reactor (ABR) from a decentralised wastewater treatment plant (DEWAT)
Location of collection	Durban, South Africa
Age before collection	Unknown
Moisture content	~ 90%wt
Total solids content	~ 10%wt
Volatile solids content	~ 75%db
Ash content	~ 25%db
Presence of trash?	Yes (mainly small pieces of paper after pre-screening during pit emptying)
Pre-treatment	Screening to remove trash
Experimental Procedure	
Drying experimental setup	Oven
Drying time	Until achieving 0, 20, 30, 40, 50 and 60%wt moisture content
Operating conditions	Temperature: 50, 100, 150 and 200°C
Sample form in the dryer	250 g of sample on an aluminium tray (52 × 8.4 × 33 cm)
Analysed parameters	Water activity
Employed methods	Use of water activity analyzer *AquaLab Tunable Diode Laser-TDL* (SOP 8.8.3.3)
Publications	
Getahun, S., Septien, S., Buckley, C.A. (2019). Effect of Drying Temperature and Moisture Content on The Enduse of Faecal Sludge as a Solid Fuel. Proceedings of the 10th Asia Pacific Drying Conference, Vadodara, India, 14-17 December.	

Data source files
https://www.dropbox.com/s/qo53unswsdmvjgp/2018-2019%20ABR%2C%20UDDT%20and%20VIP%20tests_PRG.xlsx?dl=0
Additional Notes
-
Description of Data

Water activity as a function of moisture content and temperature



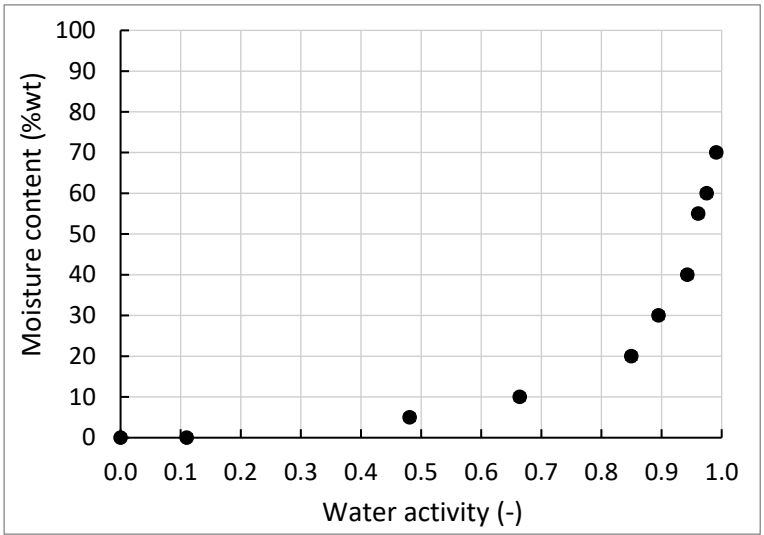
Observations:

- Water activity near 1 above 40%wt moisture content
- Decrease of water activity below 40%wt moisture content
- No effect of drying temperature

General information	
Type of data	Water Activity
Place of experimentation	Pollution Research Group, University of KwaZulu-Natal (South Africa)
Dates of the experiments	2018-2019
Feedstock	
Type of faecal material	Faecal sludge from urine diversion dry toilets (UDDT)
Location of collection	Durban, South Africa
Age before collection	Up to 3 years
Moisture content	~ 75%wt
Total solids content	~ 25%wt
Volatile solids content	~ 55%db
Ash content	~ 45%db
Presence of trash?	Yes (mainly stones, hair and plastics)
Pre-treatment	Screening to remove the trash
Experimental Procedure	
Drying experimental setup	Moisture Analyser balance *PCE-MB Series*
Drying time	Until achieving 0, 5, 10, 20, 30, 40, 55, 60%wt moisture content
Operating conditions	Temperature: 100°C
Sample form in the dryer	1.5 g of sample on an 90 mm diameter aluminium crucible
Analysed parameters	Water activity
Employed methods	Use of water activity analyzer *AquaLab Tunable Diode Laser-TDL* (SOP 8.8.3.3)
Publications	
Getahun, S., Septien, S., Mata, J., Somorin, T., Mabbett, I., & Buckley, C. (2020). Drying characteristics of faecal sludge from different on-site sanitation facilities. *Journal of Environmental Management*, *261*, 110267.	

Data source files
https://www.dropbox.com/s/ltlydxgp1xglrtz/2018-2019%20Moisture%20content%20as%20a%20function%20of%20Water%20activity.xlsx?dl=0
Additional Notes
-
Description of Data

Water activity as a function of moisture content



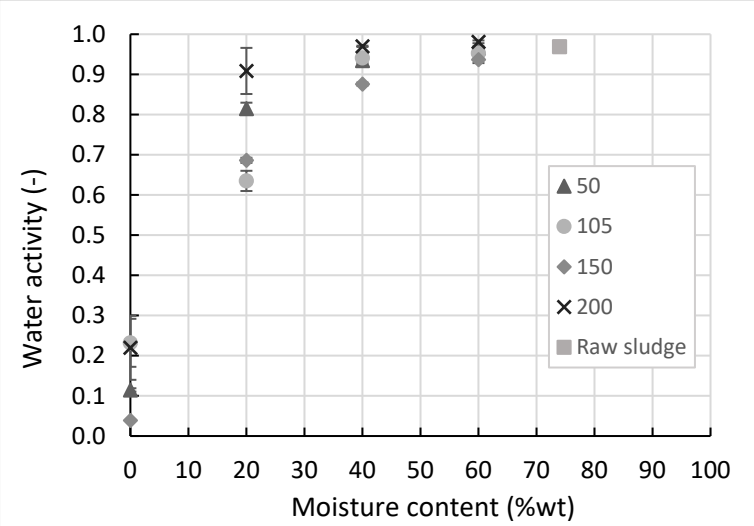
Observations:

- Decrease of water activity as sludge dried (faster below 40%wt)

General information	
Type of data	Water Activity
Place of experimentation	Pollution Research Group, University of KwaZulu-Natal (South Africa)
Dates of the experiments	2018-2019
Feedstock	
Type of faecal material	Faecal sludge from urine diversion dry toilets (UDDT)
Location of collection	Durban, South Africa
Age before collection	Up to 3 years
Moisture content	~ 75%wt
Total solids content	~ 25%wt
Volatile solids content	~ 55%db
Ash content	~ 45%db
Presence of trash?	Yes (mainly stones, hair and plastics)
Pre-treatment	Screening to remove the trash
Experimental Procedure	
Drying experimental setup	Oven
Drying time	Until achieving 0, 20, 30, 40, 50 and 60%wt moisture content
Operating conditions	Temperature: 50, 100, 150 and 200°C
Sample form in the dryer	250 g of sample on an aluminium tray (52 × 8.4 × 33 cm)
Analysed parameters	Water activity
Employed methods	Use of water activity analyzer *AquaLab Tunable Diode Laser-TDL* (8.8.3.3)
Publications	
Getahun, S., Septien, S., Buckley, C.A. (2019). Effect of Drying Temperature and Moisture Content on The Enduse of Faecal Sludge as a Solid Fuel. Proceedings of the 10th Asia Pacific Drying Conference, Vadodara, India, 14-17 December.	

Data source files
https://www.dropbox.com/s/qo53unswsdmvjgp/2018-2019%20ABR%2C%20UDDT%20and%20VIP%20tests_PRG.xlsx?dl=0
Additional Notes
-
Description of Data

Water activity as a function of moisture content and temperature



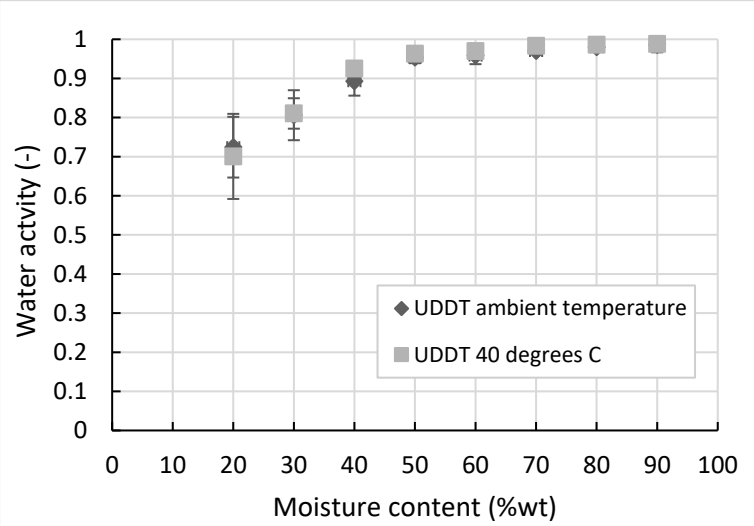
Observations:

- Water activity near 1 above 40%wt moisture content
- Decrease of water activity below 40%wt moisture content
- No effect of drying temperature

General information	
Type of data	Water Activity
Place of experimentation	Pollution Research Group, University of KwaZulu-Natal (South Africa)
Dates of the experiments	2019 - 2020
Feedstock	
Type of faecal material	Faecal sludge from urine diversion dry toilets (UDDT)
Location of collection	Durban, South Africa
Age before collection	Up to 3 years
Moisture content	~ 70%wt
Total solids content	~ 30%wt
Volatile solids content	Not measured
Ash content	Not measured
Presence of trash?	Small amounts of trash
Pre-treatment	Trash removal
Experimental Procedure	
Drying experimental setup	Moisture Analyser balance *PCE-MB Series*
Drying time	Until achieving 20, 30, 40, 50, 60, 70, 80, 90%wt moisture content
Operating conditions	Temperature: 105°C
Sample form in the dryer	1.5 g of sample on an 90 mm diameter aluminium crucible
Analysed parameters	Water activity at ambient (~22°C) and 40°C
Employed methods	Use of water activity analyzer *AquaLab Tunable Diode Laser-TDL* (SOP 8.8.3.3)
Publications	
-	

Data source files
https://www.dropbox.com/s/tw20fkfiokv0bdo/2019-2020%20Water%20activity%20as%20a%20function%20of%20moisture%20content.xlsx?dl=0
Additional Notes
-
Description of Data

Water activity as a function of moisture content at different temperature



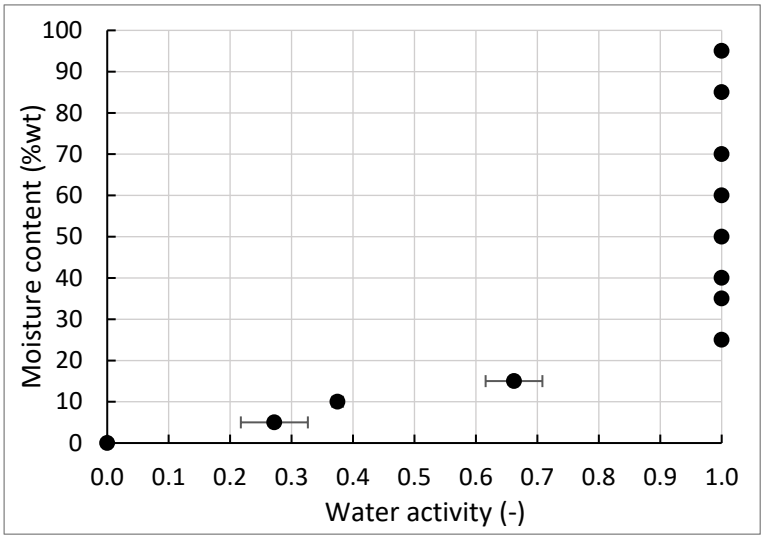
Observations:

- Water activity constant around 1 above a 50%wt moisture content
- Decrease of water activity below 50%wt moisture content
- No effect of temperature in water activity

General information	
Type of data	Water Activity
Place of experimentation	Pollution Research Group, University of KwaZulu-Natal (South Africa)
Dates of the experiments	2018 - 2019
Feedstock	
Type of faecal material	Faecal sludge from ventilated improved pit latrine (VIP)
Location of collection	Durban, South Africa
Age before collection	Up to 5 years
Moisture content	~ 95%wt
Total solids content	~ 5%wt
Volatile solids content	~ 65%db
Ash content	~ 35%db
Presence of trash?	No (sludge pre-screened during pit emptying)
Pre-treatment	Mixing
Experimental Procedure	
Drying experimental setup	Moisture Analyser balance *PCE-MB Series*
Drying time	Until achieving 0, 5, 10, 15, 20, 25, 30, 35, 40, 50, 60, 70 and 85%wt moisture content
Operating conditions	Temperature: 100°C
Sample form in the dryer	1.5 g of sample on an 90 mm diameter aluminium crucible
Analysed parameters	Water activity
Employed methods	Use of water activity analyzer *AquaLab Tunable Diode Laser-TDL* (SOP 8.8.3.3)
Publications	
Getahun, S., Septien, S., Mata, J., Somorin, T., Mabbett, I., & Buckley, C. (2020). Drying characteristics of faecal sludge from different on-site sanitation facilities. *Journal of Environmental Management*, *261*, 110267.	

Data source files
https://www.dropbox.com/s/ltlydxgp1xglrtz/2018-2019%20Moisture%20content%20as%20a%20function%20of%20Water%20activity.xlsx?dl=0
Additional Notes
-
Description of Data

Water activity as a function of moisture content



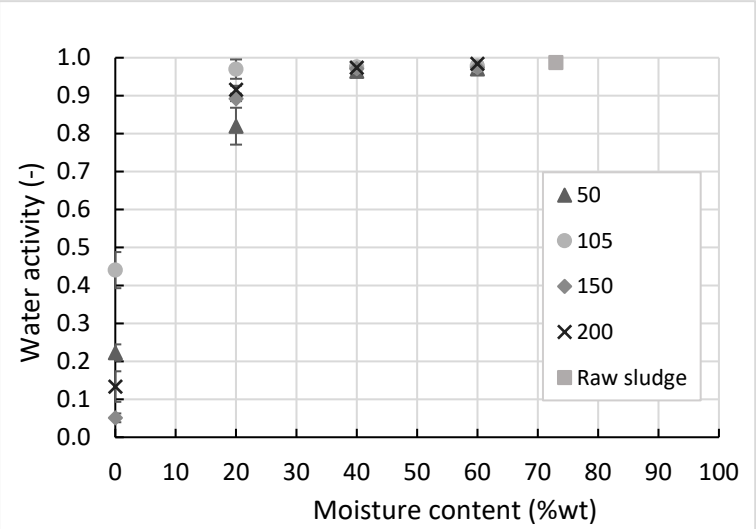
Observations:

- Water activity near 1 above 20%wt moisture content
- Decrease of water activity below 20%wt moisture content

General information	
Type of data	Water Activity
Place of experimentation	Pollution Research Group, University of KwaZulu-Natal (South Africa)
Dates of the experiments	2018-2019
Feedstock	
Type of faecal material	Faecal sludge from ventilated improved pit latrine (VIP)
Location of collection	Durban, South Africa
Age before collection	Up to 5 years
Moisture content	~75%wt
Total solids content	~25%wt
Volatile solids content	~40%db
Ash content	~60%db
Presence of trash?	Yes (mainly hair extensions, plastic and rocks)
Pre-treatment	Screening to remove trash
Experimental Procedure	
Drying experimental setup	Oven
Drying time	Until achieving 0, 20, 30, 40, 50 and 60%wt moisture content
Operating conditions	Temperature: 50, 100, 150 and 200°C
Sample form in the dryer	250 g of sample on an aluminium tray (52 × 8.4 × 33 cm)
Analysed parameters	Water activity
Employed methods	Use of water activity analyzer *AquaLab Tunable Diode Laser-TDL* (SOP 8.8.3.3)
Publications	
Getahun, S., Septien, S., Buckley, C.A. (2019). Effect of Drying Temperature and Moisture Content on The Enduse of Faecal Sludge as a Solid Fuel. Proceedings of the 10th Asia Pacific Drying Conference, Vadodara, India, 14-17 December.	

Data source files
https://www.dropbox.com/s/qo53unswsdmvjgp/2018-2019%20ABR%2C%20UDDT%20and%20VIP%20tests_PRG.xlsx?dl=0
Additional Notes
-
Description of Data

Water activity as a function of moisture content and temperature



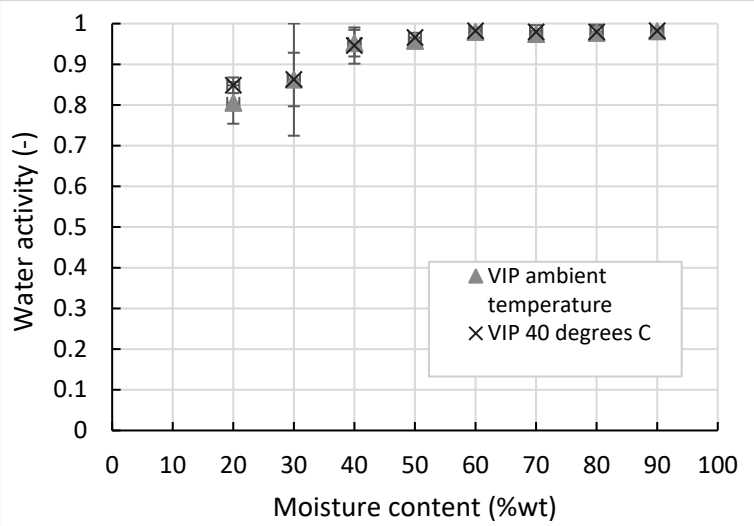
Observations:

- Water activity near 1 above 40%wt moisture content
- Decrease of water activity below 40%wt moisture content
- No effect of drying temperature

General information	
Type of data	Water Activity
Place of experimentation	Pollution Research Group, University of KwaZulu-Natal (South Africa)
Dates of the experiments	2019 - 2020
Feedstock	
Type of faecal material	Faecal sludge from ventilated improved pit latrine (VIP)
Location of collection	Durban, South Africa
Age before collection	Up to 5 years
Moisture content	~ 70%wt
Total solids content	~ 30%wt
Volatile solids content	Not measured
Ash content	Not measured
Presence of trash?	Small amounts of trash
Pre-treatment	Trash removal
Experimental Procedure	
Drying experimental setup	Moisture Analyser balance *PCE-MB Series*
Drying time	Until achieving 20, 30, 40, 50, 60, 70, 80, 90%wt moisture content
Operating conditions	Temperature: 105°C
Sample form in the dryer	1.5 g of sample on an 90 mm diameter aluminium crucible
Analysed parameters	Water activity at ambient (~22°C) and 40°C
Employed methods	Use of water activity analyzer *AquaLab Tunable Diode Laser-TDL* (SOP 8.8.3.3)
Publications	
-	

Data source files
https://www.dropbox.com/s/tw20fkfiokv0bdo/2019-2020%20Water%20activity%20as%20a%20function%20of%20moisture%20content.xlsx?dl=0
Additional Notes
-
Description of Data

Water activity as a function of moisture content at different temperatures



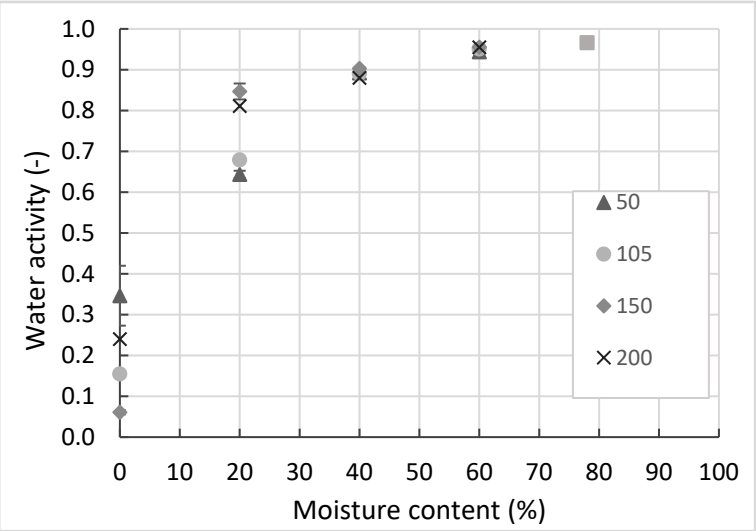
Observations:

- Water activity constant around 1 above a 50%wt moisture content
- Decrease of water activity below 50%wt moisture content
- No effect of temperature in water activity

General information	
Type of data	Water Activity
Place of experimentation	Pollution Research Group, University of KwaZulu-Natal, (South Africa)
Dates of the experiments	2018-2019
Feedstock	
Type of faecal material	Fresh faeces
Location of collection	Durban, South Africa
Age before collection	A few days
Moisture content	~ 80%wt
Total solids content	~ 20%wt
Volatile solids content	~ 85%db
Ash content	~ 15%db
Presence of trash?	No
Pre-treatment	Mixing
Experimental Procedure	
Drying experimental setup	Oven
Drying time	Until complete drying
Operating conditions	Temperature: 50, 100, 150 and 200°C
Sample form in the dryer	250 g of sample on an aluminium tray (52 × 8.4 × 33 cm)
Analysed parameters	Water activity
Employed method	Use of water activity analyzer *AquaLab Tunable Diode Laser-TDL* (SOP 8.8.3.3)
Publications	
-	

Data source files
https://www.dropbox.com/s/vpa68hptk81v4e4/2019%20Fresh%20faeces%20tests_PRG.xlsx?dl=0
Additional Notes
Fresh faeces collected from voluntary and anonymous donations
Description of Data

Water activity as a function of moisture content and temperature



Observations:

- Water activity near 1 above 40%wt moisture content
- Decrease below 40%wt moisture content
- No effect of drying temperature

General information	
Type of data	Water Activity
Place of experimentation	Pollution Research Group, University of KwaZulu-Natal (South Africa)
Dates of the experiments	2019 - 2020
Feedstock	
Type of faecal material	Fresh faeces
Location of collection	Durban, South Africa
Age before collection	A few days
Moisture content	~ 80%wt
Total solids content	~ 20%wt
Volatile solids content	~ 85%db
Ash content	~ 15%db
Presence of trash?	No
Pre-treatment	Mixing
Experimental Procedure	
Drying experimental setup	Natural drying (in the open-air)
Drying time	16 weeks
Operating conditions	○ Temperature: ambient (~ 20°C) ○ Relative humidity: ambient (~ 60%)
Sample form in the dryer	900 g of sample placed in 1 L plastic bucket
Analysed parameters	Water activity
Employed method	Use of water activity analyzer *AquaLab Tunable Diode Laser-TDL* (SOP 8.8.3.3)
Publications	
-	

Data source files

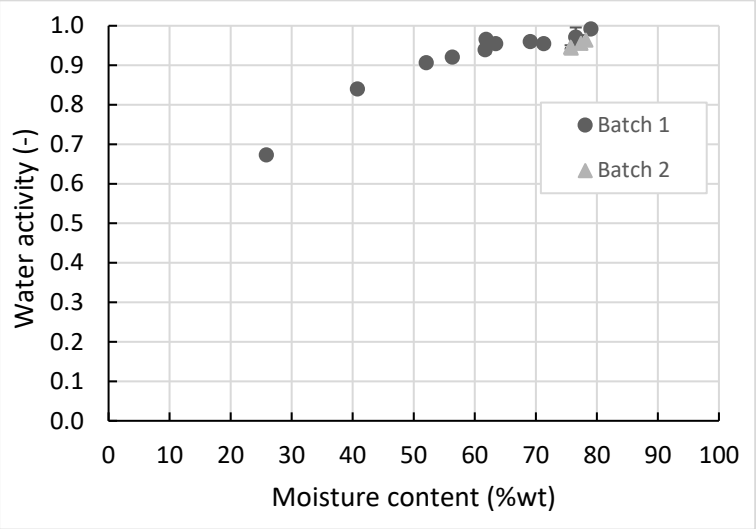
https://www.dropbox.com/s/xbv6su0jxsipiok/2019-2020%20Natural%20drying%20of%20fresh%20faeces%20in%20the%20open%20air_UKZN%20PRG.xlsx?dl=0

Additional Notes

- Fresh faeces collected from voluntary and anonymous donations
- Containers with sample placed in a ventilated area
- Mesh placed at the opening of the container to avoid the development of maggots
- Samples from batch 1 analysed in a weekly basis for 16 weeks
- Samples from batch 2 analysed at days 0, 3, 5 and 7 during one week

Description of Data

Water activity as a function of moisture content for the samples from batch 1 and 2



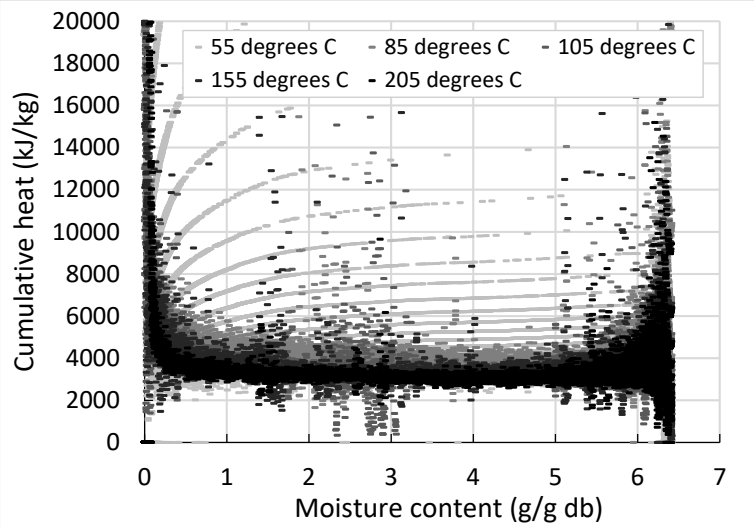
Observations:

- Relatively constant water activity above 60%wt moisture content
- Decrease of water activity below 60%wt moisture content

General information	
Type of data	Heat of drying
Place of experimentation	Material Engineering Department (SPECIFIC), Swansea University Prifysgol Abertawe
Dates of the experiments	2018 - 2020
Feedstock	
Type of faecal material	Faecal sludge from anaerobic baffled reactor (ABR) from a decentralised wastewater treatment plant (DEWAT)
Location of collection	Durban, South Africa
Age before collection	Unknown
Moisture content	~ 85%wt
Total solids content	~ 15%wt
Volatile solids content	Not measured
Ash content	Not measured
Presence of trash?	Yes (mainly small pieces of paper after pre-screening during pit emptying)
Pre-treatment	Screening to remove trash
Experimental Procedure	
Drying experimental setup	Thermogravimetric analyser - simultaneous thermal analysis *Perkin Elmer STA 6000*
Drying time	~ 40 - 80 min
Operating conditions	○ Set temperature: 55, 85, 105, 155 and 205°C ○ Heating rate: 10°C/min ○ Carrier gas: nitrogen ○ Flow rate: 30 mL/min
Sample form in the dryer	~ 40 mg in a crucible
Analysed parameters	Heat of reaction and Moisture content
Employed method	Determined through the mass (1) and energy (2) variation measured by the STA
Publications	
-	

Data source files
https://www.dropbox.com/s/eypvydu2nyjolvg/Swansea%20Heat%20of%20drying%20tests_Faeces%20and%20Faecal%20sludge%20%282018-2020%29.xlsx?dl=0
Additional Notes
○ Faecal sludge couriered from South Africa ○ Considerable drying of the sample before reaching the set temperature at 105, 155 and 205°C
Description of Data

Cumulative heat per evaporated moisture versus moisture content as a function of temperature



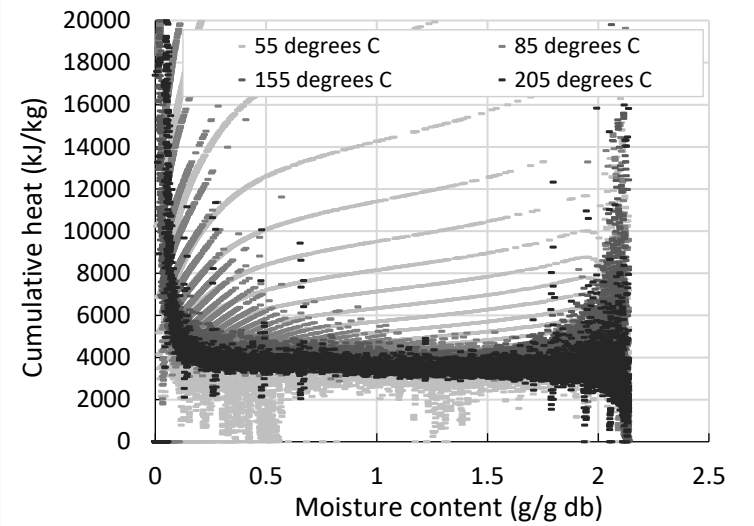
Observations

- High fluctuation of the heat of drying at the beginning of the transformation (probably due to the stabilization of the process)
- Heat of drying fairly constant or slightly increasing during most of process, ranging between about 3000 and 4000 kJ/kg
- Exponential increase of the heat of drying below a moisture content of 1 g/g db
- Heat of drying tending to a vertical asymptote at very low moisture content (~0.1 g/g db)
- No trend observed as a function of the drying temperature
- Heat of drying higher than latent heat of water vaporization (> 2260 kJ/kg)

General information	
Type of data	Heat of drying
Place of experimentation	Material Engineering Department (SPECIFIC), Swansea University Prifysgol Abertawe
Dates of the experiments	2018 - 2020
Feedstock	
Type of faecal material	Faecal sludge from urine diversion dry toilets (UDDT)
Location of collection	Durban, South Africa
Age before collection	Up to 3 years
Moisture content	~ 70%wt
Total solids content	~ 30%wt
Volatile solids content	Not measured
Ash content	Not measured
Presence of trash?	Yes (mainly stones, hair and plastics)
Pre-treatment	Screening to remove the trash
Experimental Procedure	
Drying experimental setup	Thermogravimetric analyser - simultaneous thermal analysis *Perkin Elmer STA 6000*
Drying time	~ 40 - 80 min
Operating conditions	○ Set temperature: 55, 85, 105, 155 and 205°C ○ Heating rate: 10°C/min ○ Carrier gas: nitrogen ○ Flow rate: 30 mL/min
Sample form in the dryer	~ 40 mg in a crucible
Analysed parameters	Heat of reaction and Moisture content
Employed method	Determined through the mass (1) and energy (2) variation measured by the STA
Publications	
-	

Data source files
https://www.dropbox.com/s/eypvydu2nyjolvg/Swansea%20Heat%20of%20drying%20tests_Faeces%20and%20Faecal%20sludge%20%282018-2020%29.xlsx?dl=0
Additional Notes
○ Faecal sludge couriered from South Africa ○ Considerable drying of the sample before reaching the set temperature at 105, 155 and 205°C
Description of Data

Heat of drying versus moisture content as a function of temperature



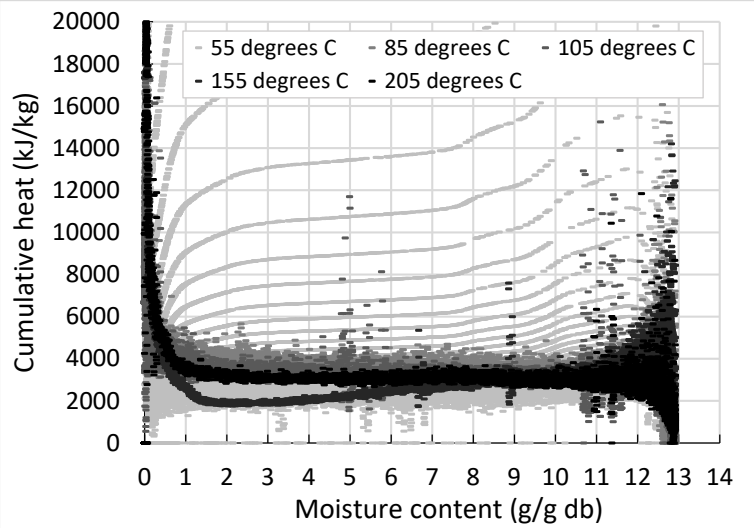
Observations

- High fluctuation of the heat of drying at the beginning of the transformation (probably due to the stabilization of the process)
- Heat of drying fairly constant or slightly increasing during most of process, ranging between about 7000 and 10000 kJ/kg
- Exponential increase of the heat of drying below a moisture content of 0.5 g/g db
- Heat of drying tending to a vertical asymptote at very low moisture content (~0.1 g/g db)
- Apparent lower heating of drying at higher temperature
- Heat of drying higher than latent heat of water vaporization (> 2260 kJ/kg)

General information	
Type of data	Heat of drying
Place of experimentation	Materials Engineering Department (SPECIFIC), Swansea University Prifysgol Abertawe
Dates of the experiments	2018 - 2020
Feedstock	
Type of faecal material	Faecal sludge from ventilated improved pit latrine (VIP)
Location of collection	Durban, South Africa
Age before collection	Up to 5 years
Moisture content	~ 95%wt
Total solids content	~ 5%wt
Volatile solids content	Not measured
Ash content	Not measured
Presence of trash?	No (sludge pre-screened during pit emptying)
Pre-treatment	Mixing
Experimental Procedure	
Drying experimental setup	Thermogravimetric analyser - simultaneous thermal analysis (STA) *Perkin Elmer STA 6000*
Drying time	~ 40 - 80 min
Operating conditions	○ Set temperature: 55 and 85, 105, 155 and 205°C ○ Heating rate: 10°C/min ○ Carrier gas: nitrogen ○ Flow rate: 30 mL/min
Sample form in the dryer	~ 40 mg in a crucible
Analysed parameters	Heat of reaction and moisture content
Employed method	Determined through the mass (1) and energy (2) variation measured by the STA
Publications	
-	

Data source files
https://www.dropbox.com/s/eypvydu2nyjolvg/Swansea%20Heat%20of%20drying%20tests_Faeces%20and%20Faecal%20sludge%20%282018-2020%29.xlsx?dl=0
Additional Notes
○ Faecal sludge couriered from South Africa ○ Considerable drying of the sample before reaching the set temperature at 105, 155 and 205°C
Description of Data

Heat of drying versus moisture content as a function of temperature



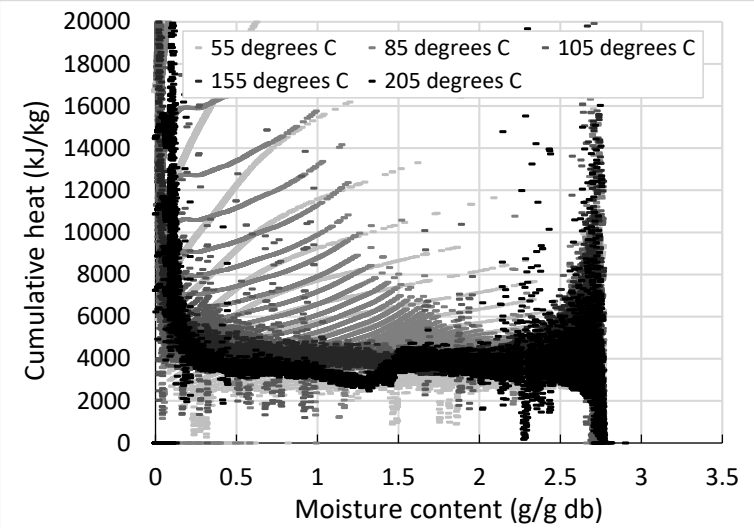
Observations

- High fluctuation of the heat of drying at the beginning of the transformation (probably due to the stabilization of the process)
- Heat of drying fairly constant during most of process, ranging between about 1500 and 2000 kJ/kg (except for 155°C)
- Exponential increase of the heat of drying below a moisture content of 2 g/g db
- Heat of drying tending to a vertical asymptote at very low moisture content (~0.1 g/g db)
- No trend observed as a function of the drying temperature
- Heat of drying close to the latent heat of water vaporization during most of the transformation (~ 2260 kJ/kg)

General information	
Type of data	Heat of drying
Place of experimentation	Material Engineering Department (SPECIFIC), Swansea University Prifysgol Abertawe
Dates of the experiments	2018 - 2020
Feedstock	
Type of faecal material	Fresh faeces
Location of collection	Cranfield, UK
Age before collection	A few days
Moisture content	~ 60%wt
Total solids content	~ 40%wt
Volatile solids content	Not measured
Ash content	Not measured
Presence of trash?	No
Pre-treatment	Mixing
Experimental Procedure	
Drying experimental setup	Thermogravimetric analyser - simultaneous thermal analysis *Perkin Elmer STA 6000*
Drying time	~ 40 - 80 min
Operating conditions	○ Set temperature: 55, 85, 105, 155 and 205°C ○ Heating rate: 10°C/min ○ Carrier gas: nitrogen ○ Flow rate: 30 mL/min
Sample form in the dryer	~ 40 mg in a crucible
Analysed parameters	Heat of reaction and Moisture content
Employed method	Determined through the mass (1) and energy (2) variation measured by the STA
Publications	
-	

Data source files
https://www.dropbox.com/s/eypvydu2nyjolvg/Swansea%20Heat%20of%20drying%20tests_Faeces%20and%20Faecal%20sludge%20%282018-2020%29.xlsx?dl=0
Additional Notes
○ Fresh faeces obtained from anonymous and voluntary donations ○ Considerable drying of the sample before reaching the set temperature at 105, 155 and 205°C
Description of Data

Heat of drying versus moisture content as a function of temperature



Observations

- High fluctuation of the heat of drying at the beginning of the transformation (probably due to the stabilization of the process)
- Heat of drying fairly constant or slightly increasing during most of process, ranging between about 5000 and 10000 kJ/kg (except for 85°C)
- Exponential increase of the heat of drying below a moisture content of 0.5 g/g db
- Heat of drying tending to a vertical asymptote at very low moisture content (~0.7 g/g db)
- No trend observed as a function of the drying temperature
- Heat of drying higher than latent heat of water vaporization (> 2260 kJ/kg)

General information	
Type of data	Thermal stability
Place of experimentation	Pollution Research Group, University of KwaZulu-Natal (South Africa)
Dates of the experiments	2018 - 2019
Feedstock	
Type of faecal material	Faecal sludge from anaerobic baffled reactor (ABR) from a decentralised wastewater treatment plant (DEWAT)
Location of collection	Durban, South Africa
Age before collection	Unknown
Moisture content	~ 90%wt
Total solids content	~ 10%wt
Volatile solids content	~ 75%db
Ash content	~ 25%db
Presence of trash?	Yes (mainly small pieces of paper after pre-screening during pit emptying)
Pre-treatment	Screening to remove trash
Experimental Procedure	
Drying experimental setup	Thermogravimetry analyser - differential thermal analyser *DTG-60A Shimadu*
Drying time	~ 35 min
Operating conditions	o Temperature: ramp from ambient temperature to 500°C o Heating rate: 5°C/min o Air flowrate: 50 mL/min
Sample form in the dryer	~ 70 mg sample on aluminium crucible (6 mm diameter × 5 mm height)
Analysed parameters	Mass
Employed method	Measurement by the *DTG-60A* instrument (SOP 8.8.1.1)
Publications	
Getahun, S., Septien, S., Mata, J., Somorin, T., Mabbett, I., & Buckley, C. (2020). Drying characteristics of faecal sludge from different on-site sanitation facilities. *Journal of Environmental Management*, *261*, 110267.	

Septien, S., Getahun, S., Mirara, S., Makununika, B.S.N., Mugauri, T.R., Singh, A., Pocock, J., Inambao, F., Velkushanova, K., Buckley, C.A. (2019). Investigations of faecal sludge drying from on-site sanitation facilities. Proceedings of the 10th Asia Pacific Drying Conference, Vadodara, India, 14-17 December.

Data source files

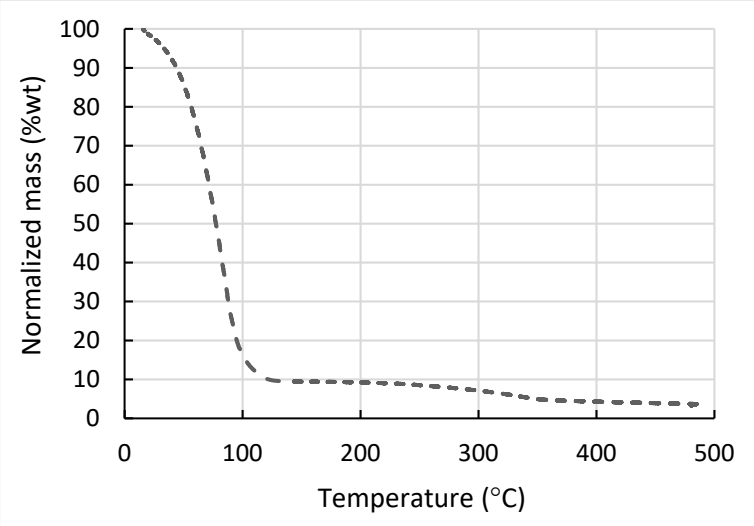
https://www.dropbox.com/s/dr718ewj9s1k5h0/2018-2019%20Faecal%20sludge_Heat%20of%20drying%20and%20Dynamic%20Tests_PRG.xlsx?dl=0

Additional Notes

- Normalized mass at a given instance = mass at given instance / initial mass

Description of Data

Variation of mass with temperature



Observations:

- Large decrease of mass from ambient temperature to around 130°C (due to drying)
- Second slight decrease of mass from 250°C to 350°C (probably due to a thermal degradation)

General information	
Type of data	Thermal stability
Place of experimentation	Pollution Research Group, University of KwaZulu-Natal, South Africa
Dates of the experiments	2018 - 2019
Feedstock	
Type of faecal material	Faecal sludge from urine diversion dry toilet (UDDT)
Location of collection	Durban, South Africa
Age before collection	1 - 3 years
Moisture content	~ 75%wt
Total solids content	~ 25%wt
Volatile solids content	~ 55%db
Ash content	~ 45%db
Presence of trash?	Yes (mainly stones and textiles)
Pre-treatment	Screening to remove trash
Experimental Procedure	
Drying experimental setup	Thermogravimetry analyser - differential thermal analyser *DTG-60A Shimadu*
Drying time	~ 35 min
Operating conditions	o Temperature: ramp from ambient temperature to 500°C o Heating rate: 5°C/min o Air flowrate: 50 mL/min
Sample form in the dryer	~70 mg sample on aluminium crucible (6 mm diameter × 5 mm height)
Analysed parameters	Mass
Employed method	Measurement by the *DTG-60A* instrument
Publications	
Getahun, S., Septien, S., Mata, J., Somorin, T., Mabbett, I., & Buckley, C. (2020). Drying characteristics of faecal sludge from different on-site sanitation facilities. *Journal of Environmental Management*, *261*, 110267.	

Septien, S., Getahun, S., Mirara, S., Makununika, B.S.N., Mugauri, T.R., Singh, A., Pocock, J., Inambao, F., Velkushanova, K., Buckley, C.A. (2019). Investigations of faecal sludge drying from on-site sanitation facilities. Proceedings of the 10th Asia Pacific Drying Conference, Vadodara, India, 14-17 December.

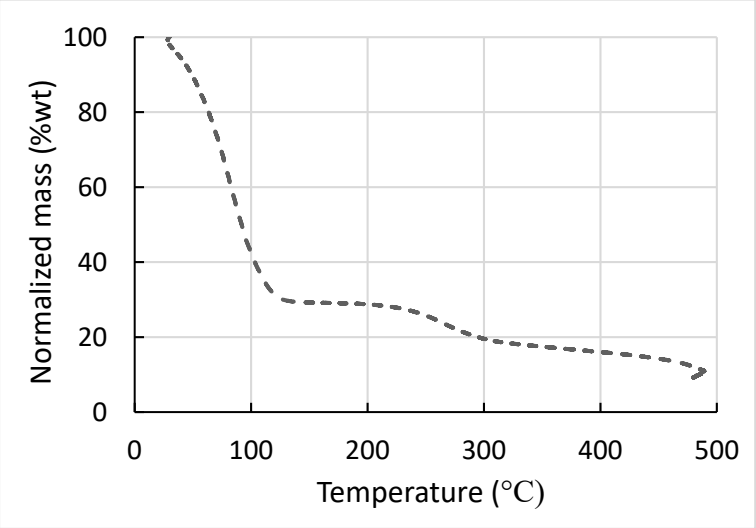
Data source files

Additional Notes

Normalized mass at a given instance = mass at given instance / initial mass

Description of Data

Variation of mass with temperature



Experimental conditions:

- Temperature: from ambient to 500°C
- Heating rate: 5°C/min
- Airflow rate: 50 ml/min

Observations:

- Large decrease of mass from ambient temperature to around 130°C (due to drying)
- Second slight decrease of mass from 250°C to 350°C (probably due to a thermal degradation)

General information	
Type of data	Thermal stability
Place of experimentation	Pollution Research Group, University of KwaZulu-Natal, South Africa
Dates of the experiments	2018 - 2019
Feedstock	
Type of faecal material	Faecal sludge from ventilated pit latrines
Location of collection	Durban, South Africa
Age before collection	3 – 5 years
Moisture content	~ 95%wt
Total solids content	~ 5%wt
Volatile solids content	~ 65%db
Ash content	~ 35%db
Presence of trash?	No (sludge pre-screened during pit emptying)
Pre-treatment	Mixing
Experimental Procedure	
Drying experimental setup	Thermogravimetry analyser - differential thermal analyser *DTG-60A Shimadu*
Drying time	~ 35 min
Operating conditions	o Temperature: ramp from ambient temperature to 500°C o Heating rate: 5°C/min o Air flowrate: 50 mL/min
Sample form in the dryer	~70 mg sample on aluminium crucible (6 mm diameter × 5 mm height)
Analysed parameters	Mass
Employed method	Measurement by the *DTG-60A* instrument
Publications	
Getahun, S., Septien, S., Mata, J., Somorin, T., Mabbett, I., & Buckley, C. (2020). Drying characteristics of faecal sludge from different on-site sanitation facilities. *Journal of Environmental Management*, *261*, 110267.	

Septien, S., Getahun, S., Mirara, S., Makununika, B.S.N., Mugauri, T.R., Singh, A., Pocock, J., Inambao, F., Velkushanova, K., Buckley, C.A. (2019). Investigations of faecal sludge drying from on-site sanitation facilities. Proceedings of the 10th Asia Pacific Drying Conference, Vadodara, India, 14-17 December.

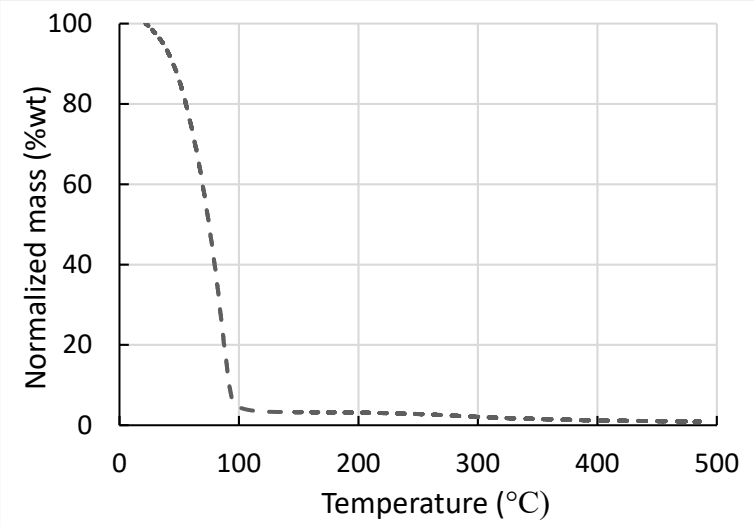
Data source files

Additional Notes

Normalized mass at a given instance = mass at given instance / initial mass

Description of Data

Variation of mass with temperature



Experimental conditions:

- Temperature: from ambient to 500°C
- Heating rate: 5°C/min
- Airflow rate: 50 ml/min

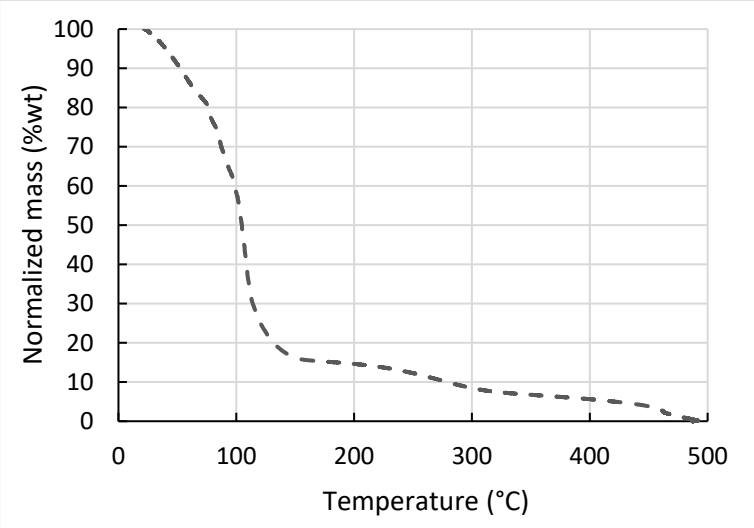
Observations:

- Large decrease of mass from ambient temperature to around 130°C (due to drying)
- Second slight decrease of mass from 250°C to 350°C (probably due to a thermal degradation)

General information	
Type of data	Thermal stability
Place of experimentation	Pollution Research Group, University of KwaZulu-Natal (South Africa)
Dates of the experiments	2018 - 2019
Feedstock	
Type of faecal material	Fresh faeces
Location of collection	Durban, South Africa
Age before collection	A few days
Moisture content	~ 80%wt
Total solids content	~ 20%wt
Volatile solids content	~ 85%db
Ash content	~ 15%db
Presence of trash?	No
Pre-treatment	Mixing
Experimental Procedure	
Drying experimental setup	Thermogravimetry analyser - differential thermal analyser *DTG-60A Shimadu*
Drying time	~ 35 min
Operating conditions	o Temperature: ramp from ambient temperature to 500°C o Heating rate: 5°C/min o Air flowrate: 50 mL/min
Sample form in the dryer	~ 70 mg sample on aluminium crucible (6 mm diameter × 5 mm height)
Analysed parameters	Mass
Employed method	Measurement by the *DTG-60A* instrument (SOP 8.8.1.1)
Publications	

Data source files
https://www.dropbox.com/s/r185a7e9g4a8r2v/2018-2019%20Fresh%20faeces_Dynamic%20test_PRG.xlsx?dl=0
Additional Notes
○ Fresh faeces collected from voluntary and anonymous donations ○ Normalized mass at a given instance = mass at given instance / initial mass
Description of Data

Variation of mass with temperature



Observations:

- Large decrease of mass from ambient temperature to around 160°C (due to drying)
- Second slight decrease of mass from 220 to 330°C (probably due to a thermal degradation)
- Third slight decrease from 440 to 500°C (probably due to further thermal degradation)