Engineering ammonia resilience

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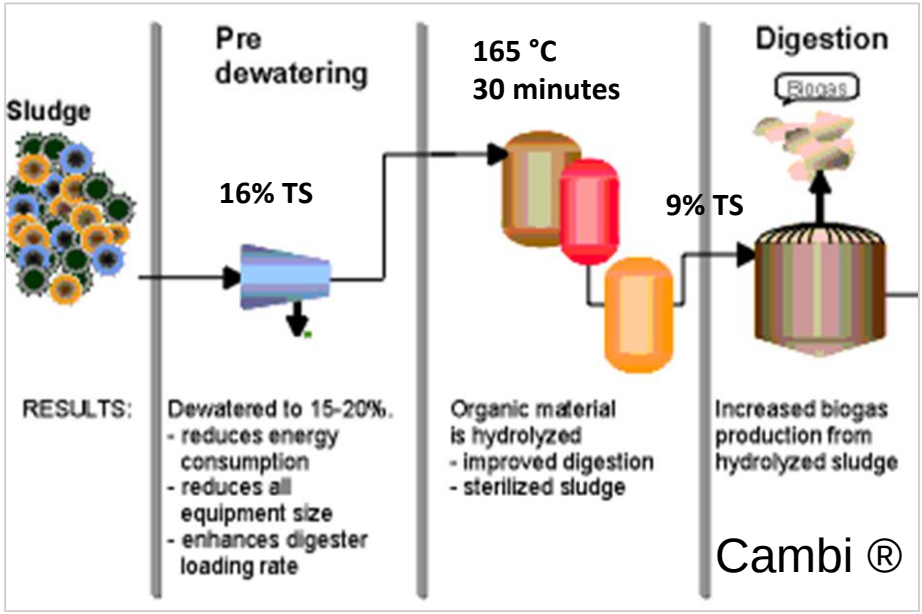
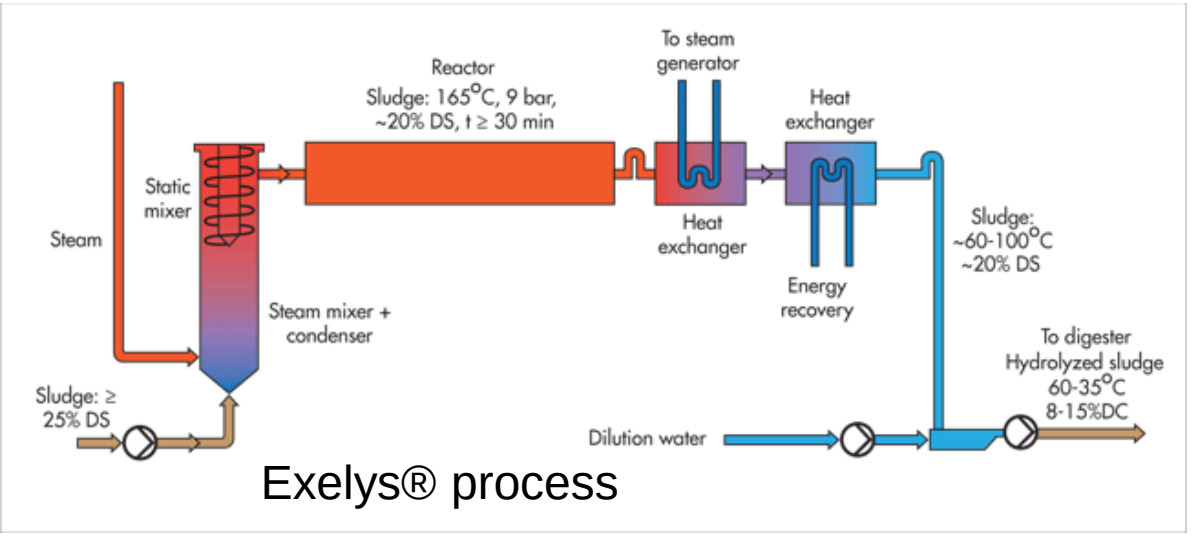
Thermal Hydrolysis

- Higher methane (CH_4) production
- Sludge sterilization (class A biosolid)
- Improved dewaterability
- Reduced odour

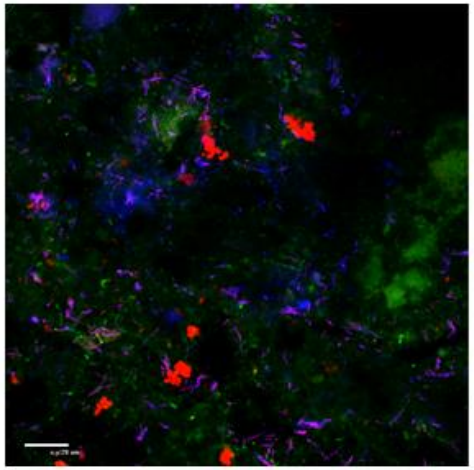




Operational benefits of THP

Operational Parameters	Without THP	With THP
OLR (kg of VS/(m^3.d))	1 - 5	5 - 7
Total dry solid (TS) (%)	3 - 6	9 - 12
Temperature (°C)	35 - 37	37 - 42
Volatile solid (VS) destruction (%)	40 - 50	55 - 65
Total ammonia (mg/l)	800-1800	2000-3000
Free ammonia* (mg/l)	30-70	80-450
pH	6.5-7.5	7.5-8
VFA (mg/l)	2000-6000	50-300

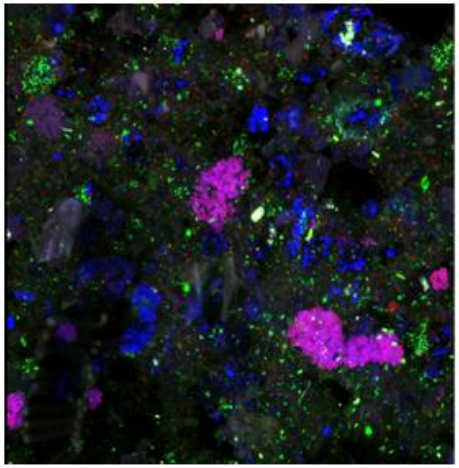
Ammonia impact on *archea* communities



Sewage sludge

Methanosarcinaceae in red

0.8 g·L^{-1} NH_4-N



Food waste

Methanosarcinaceae in purple

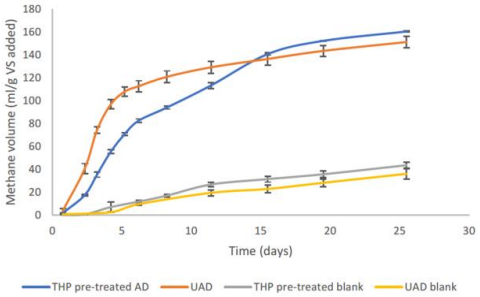
ca. 3.4 g·L^{-1} NH_4-N

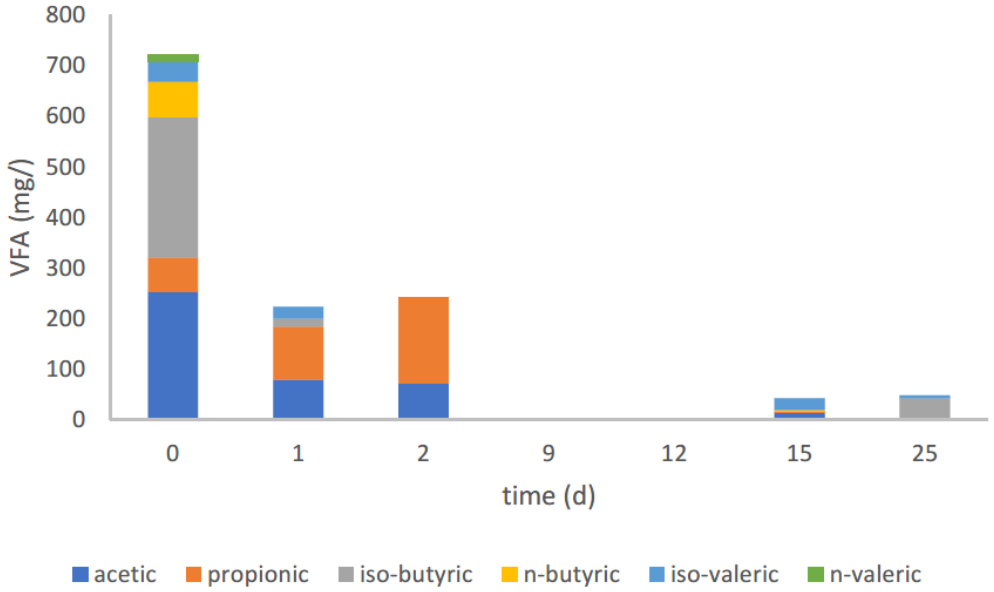
- Levels >3 g·L^{-1} NH_4-N completely inhibitory for acetoclastic methanogens
- *Methanosarcina* related species present a higher tolerance to ammonia toxicity, due to the formation of big *Archaea* clusters

Adapted from Bajón Fernández, et. al.

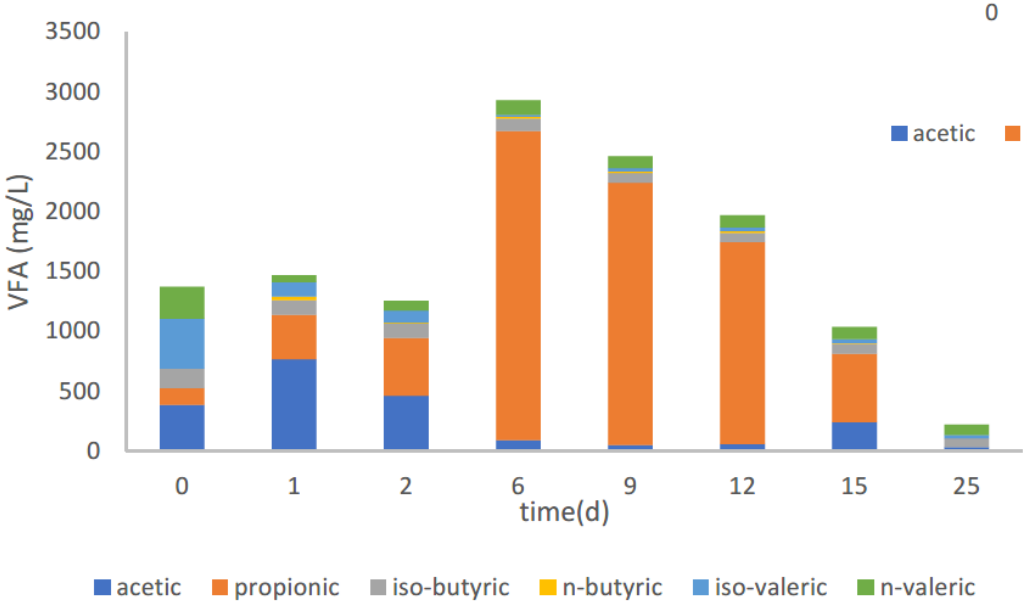
THP vs Non-treated: VFAs

Non-treated

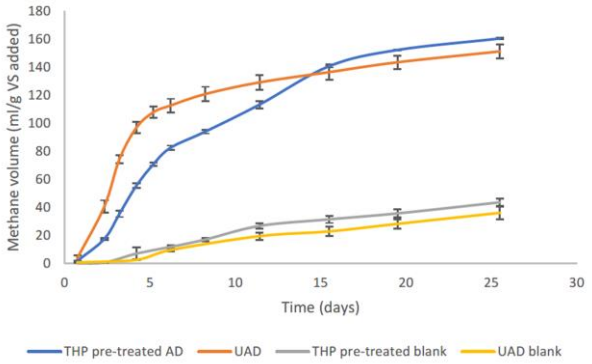


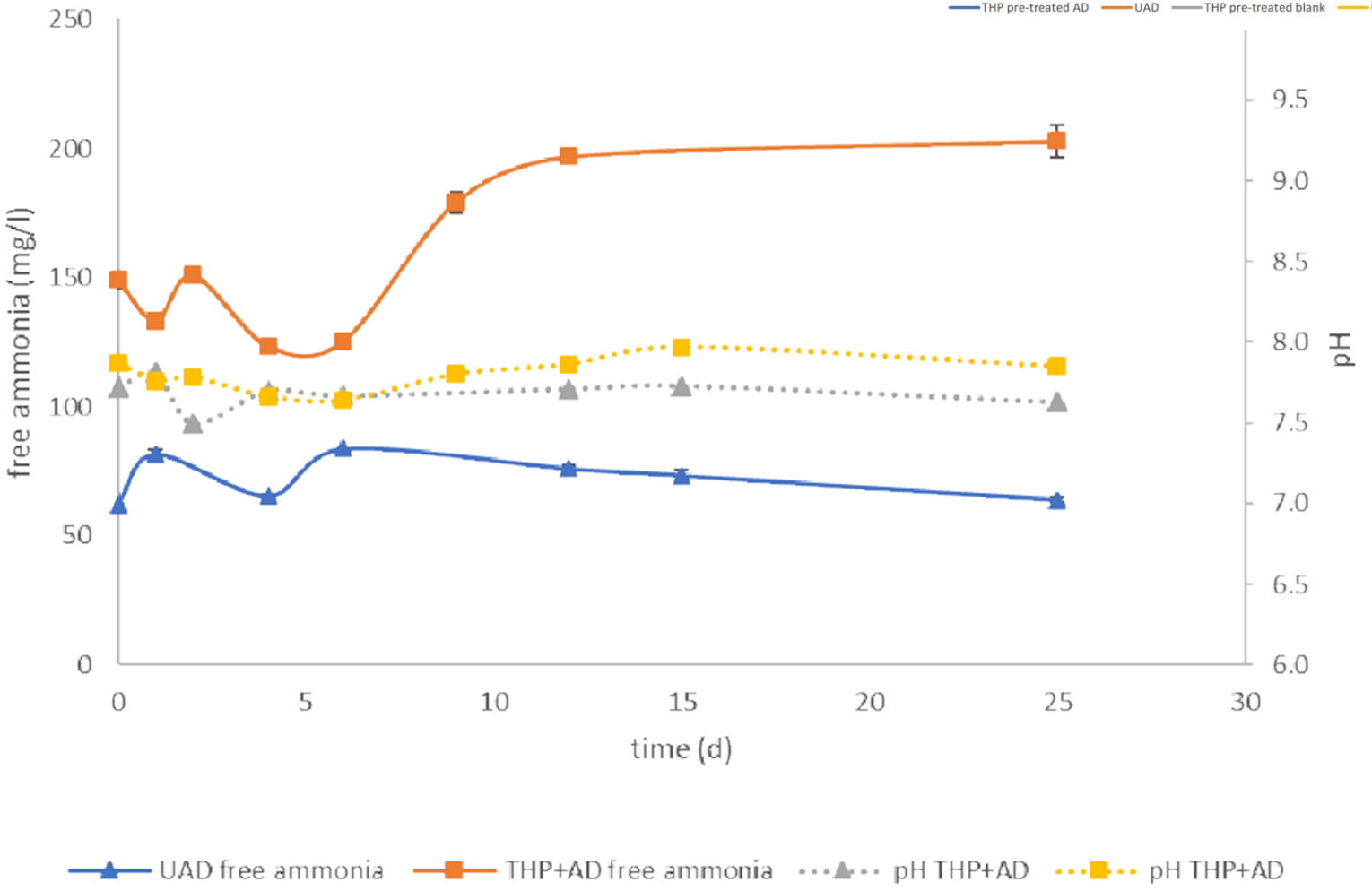


THP



THP vs Non-treated: Ammonia





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