

Supplementary Material

Figure S1. Product yield during batch torrefaction of pulp industry sludge

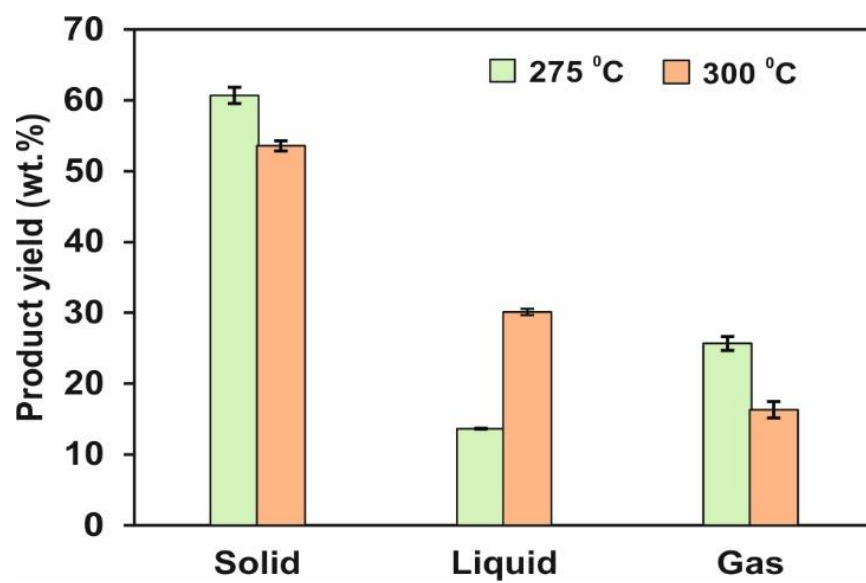


Figure S2. The total volatile fatty acid yield by the end of the anaerobic digestion experiments (30 days) for torrefaction condensate produced at 275 and 300 °C. a) mesophilic b) thermophilic. The 2, 4, 6 represent substrate loading (g VS/L); RS represents raw sludge.

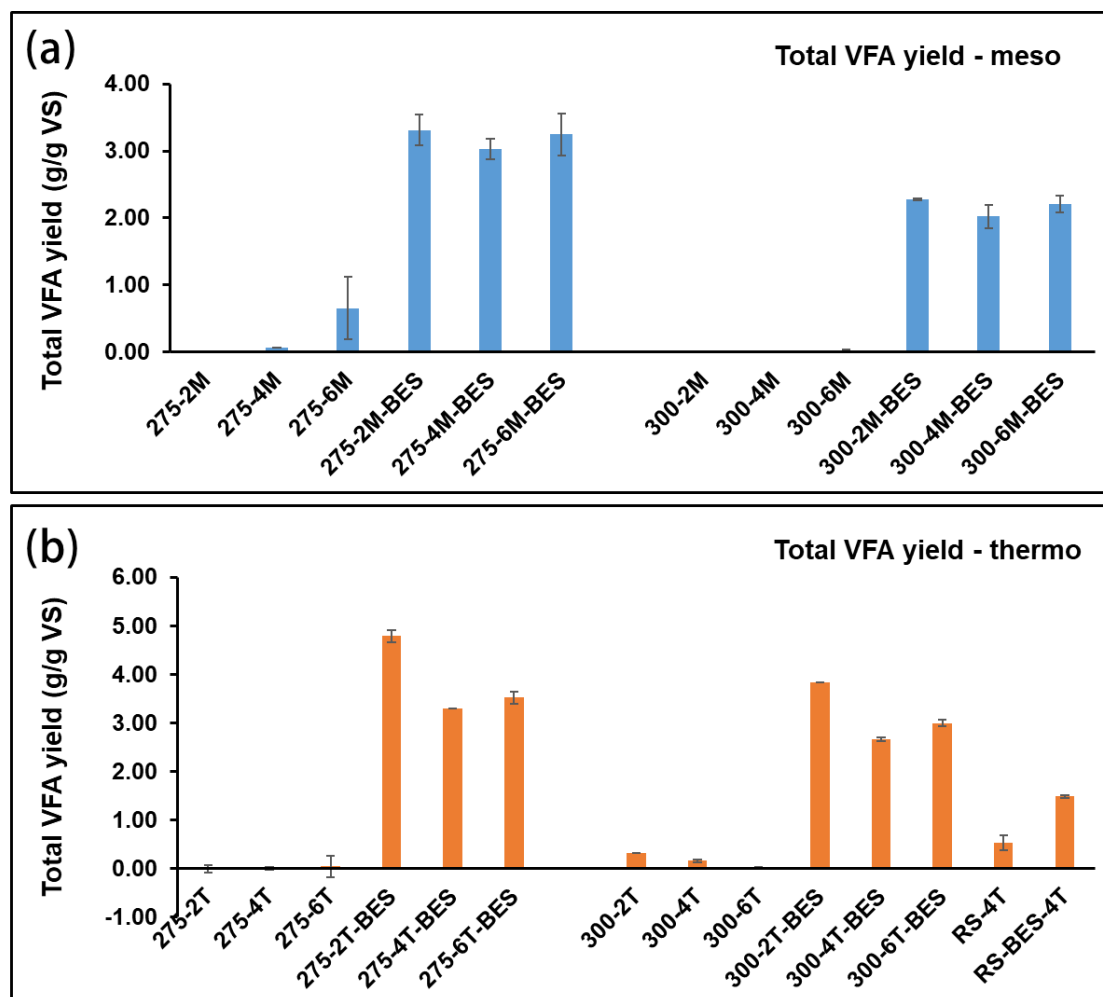


Figure S3. Volatile fatty acids production (g/L) for mesophilic process at various substrate loading for torrefaction condensate produced at (a) 275 °C and (b) 300 °C. The 2, 4, 6 represent substrate loading (g VS/L); BES represents methanogenesis inhibition;

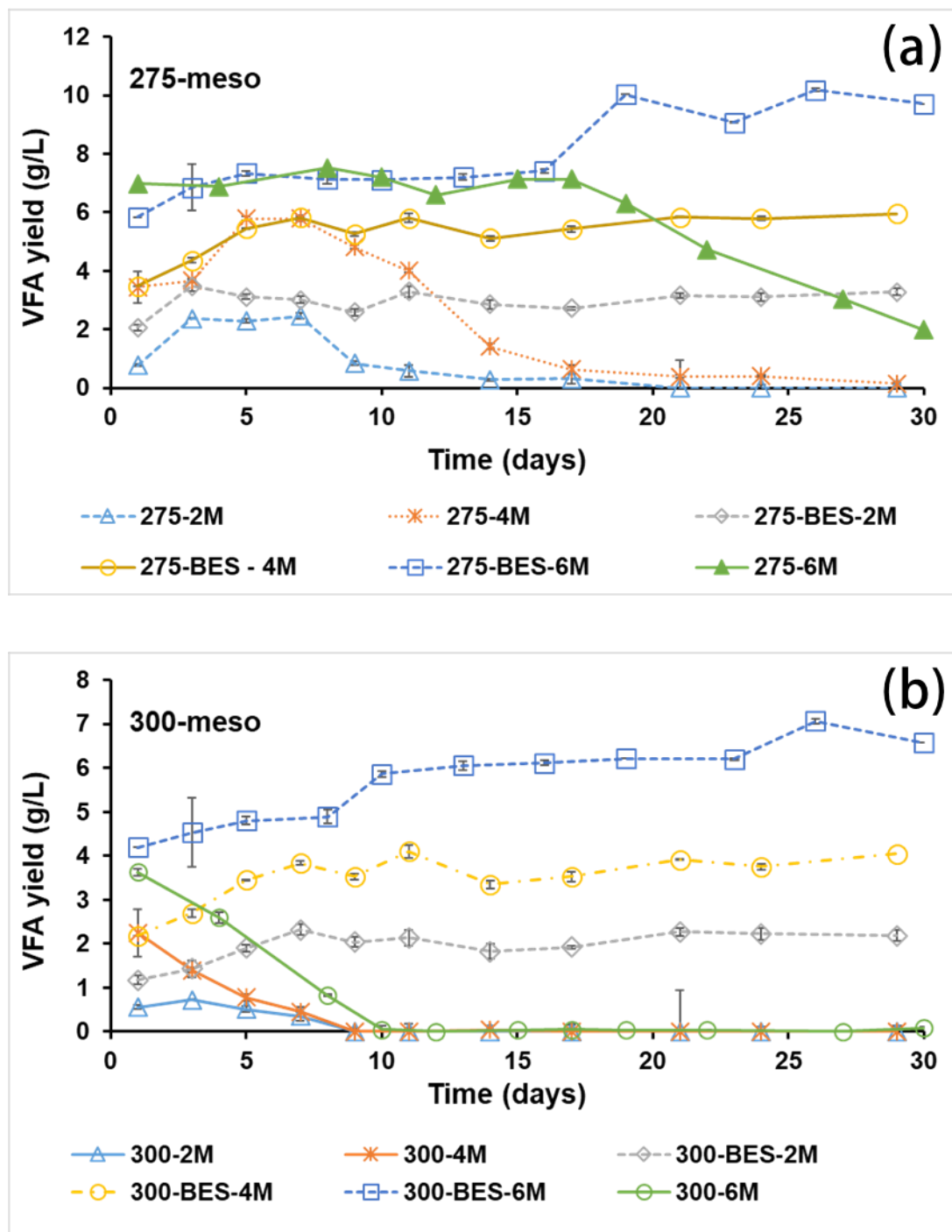


Figure S4. Volatile fatty acids production (g/L) for thermophilic process at various substrate loading for torrefaction condensate produced at (a) 275 °C and (b) 300 °C. The 2, 4, 6 represent substrate loading (g VS/L); BES represents methanogenesis inhibition; RS represents raw sludge.

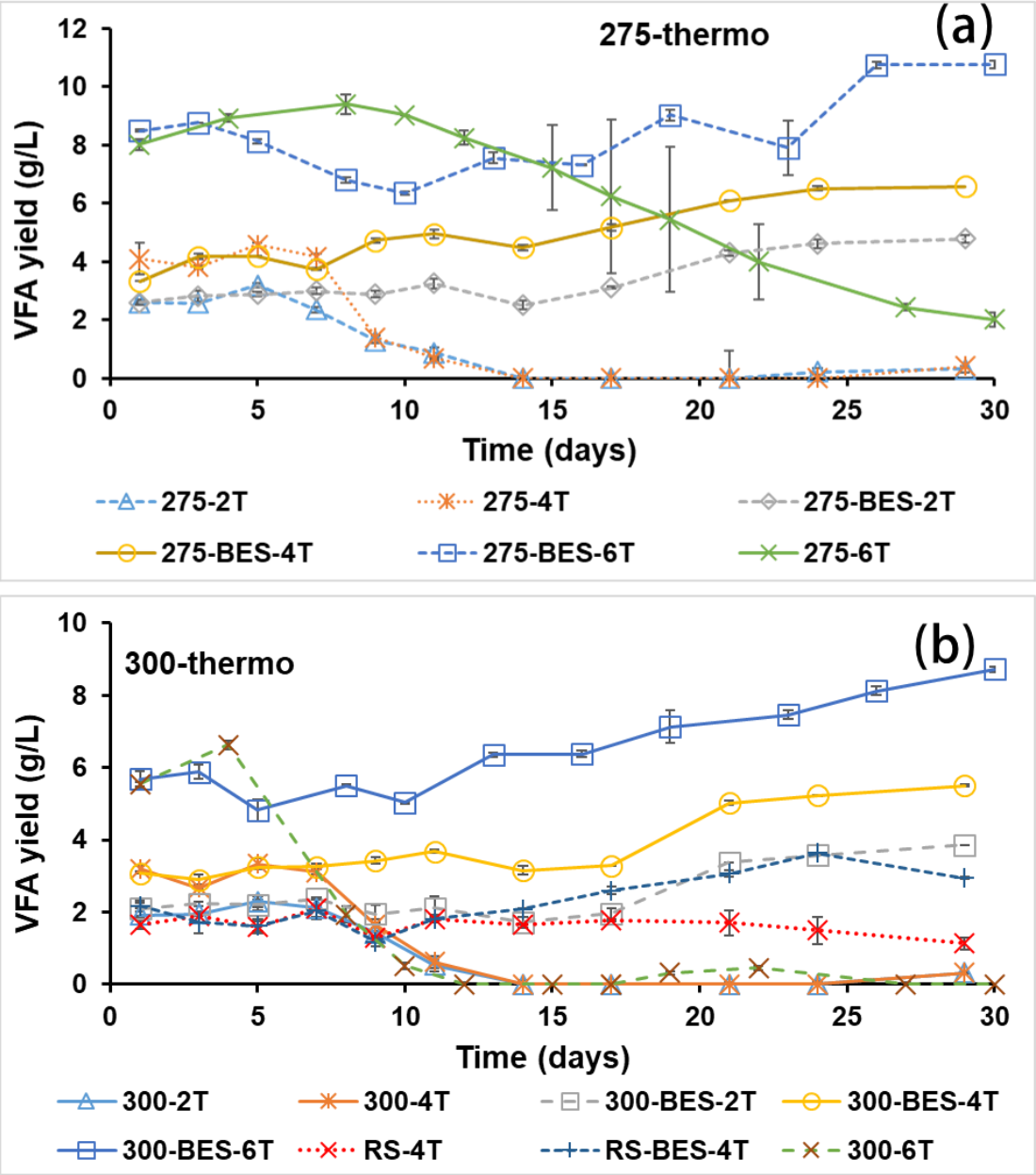


Table S1. The methane potential of torrefaction condensate produced at 275 °C and 300 °C and raw pulp sludge for mesophilic and thermophilic condition at different substrate loading.

| Sample | Substrate loading (g VS/L) | Methane yield (mL/g VS) |
|-----------------|-------------------------------|-----------------------------|
| Mesophilic | | |
| TC-275 | 2 | 756.6 ± 0.9 |
| | 4 | 501.9 ± 8.2 |
| | 6 | 546.0 ± 5.9 |
| TC-300 | 2 | 772.0 ± 4.0 |
| | 4 | 481.3 ± 0.4 |
| | 6 | 610.3 ± 12.4 |
| Raw pulp sludge | 4 | 178.1 ± 0.2 |
| Thermophilic | | |
| TC-275 | 2 | 746.6 ± 5.7 |
| | 4 | 570.3 ± 4.8 |
| | 6 | 401.7 ± 3.8 |
| TC300 | 2 | 697 |
| | 4 | 542.8 ± 7.0 |
| | 6 | 605.2 ± 5.3 |
| Raw pulp sludge | 4 | 304.5 ± 4.01 |