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Supplementary Information

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Biodegradability of Unheated and Laboratory Heated Dissolved Organic Matter

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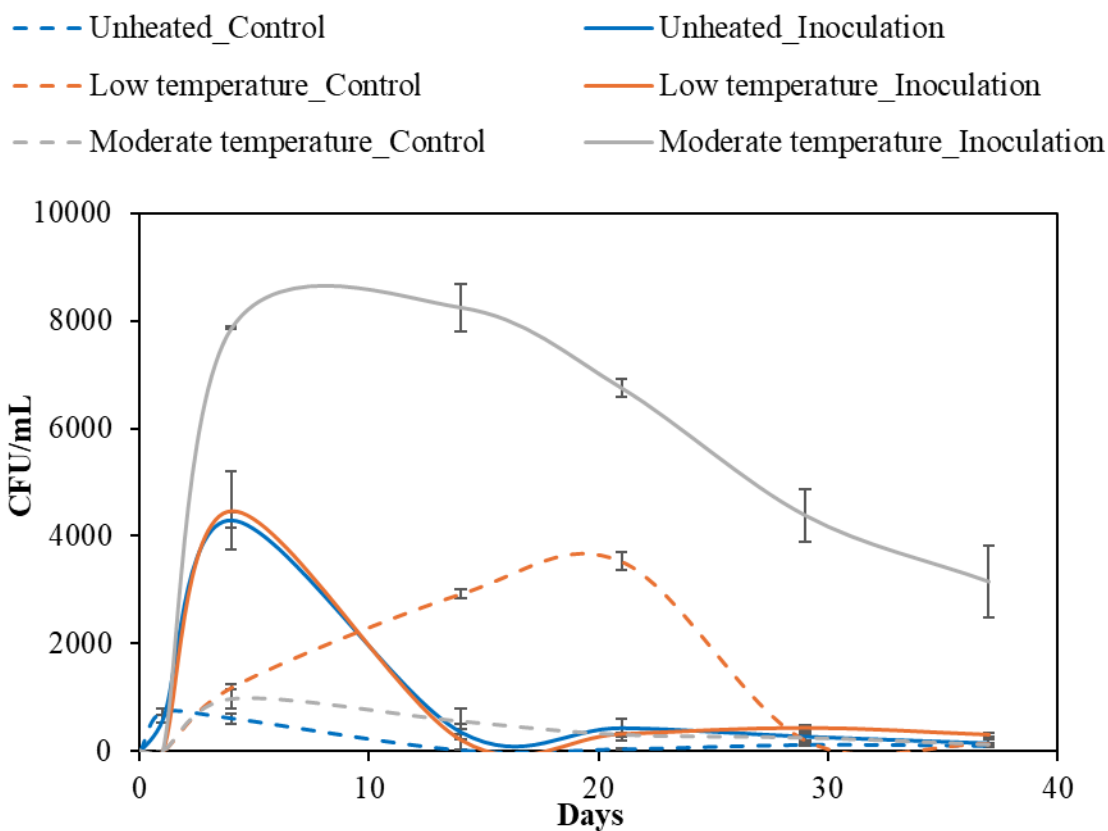


Figure S1. Changes in microbial concentration (CFU/mL) with incubation time.

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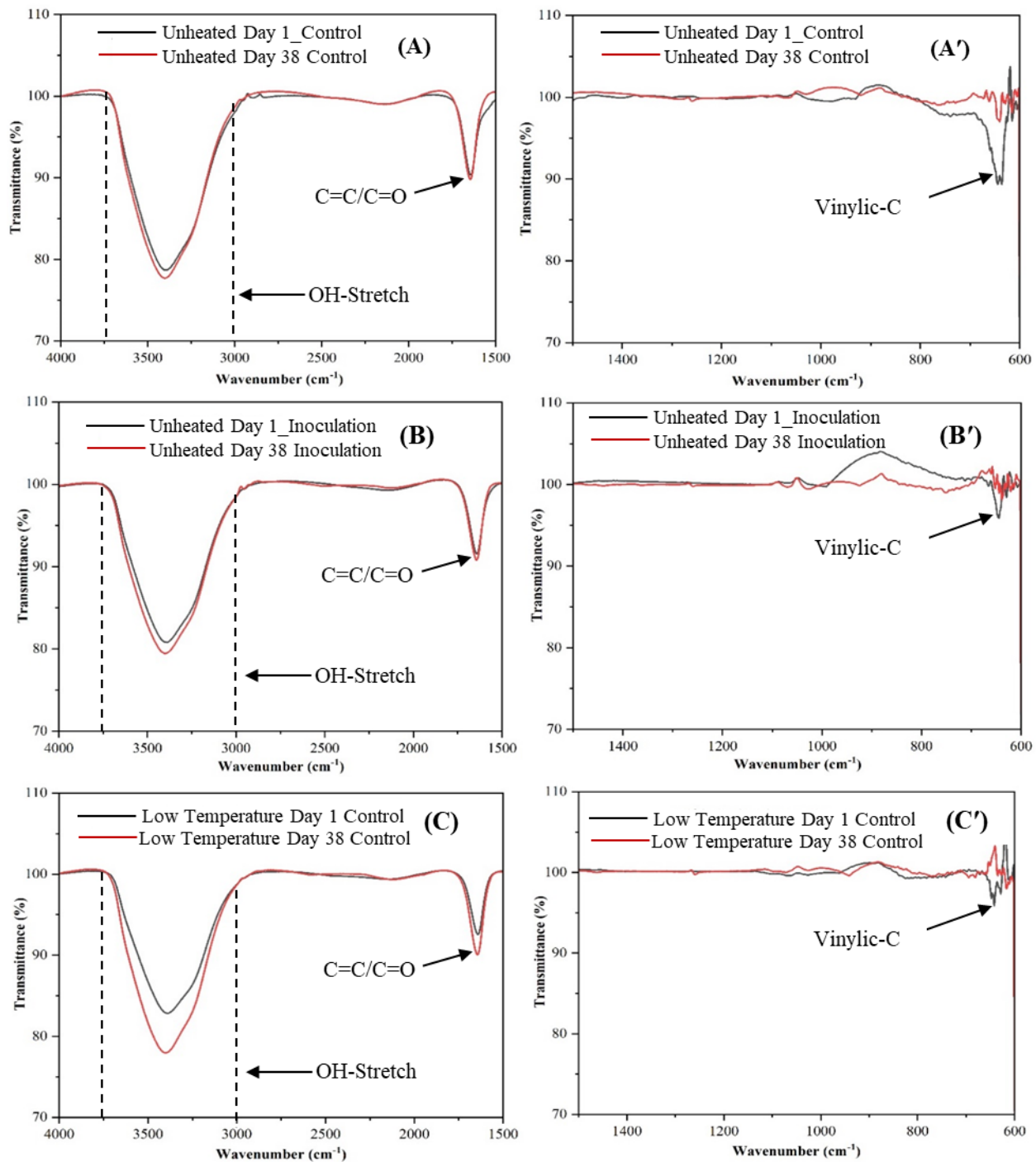


Figure S2. FTIR spectra of functional group (4000-1500 cm⁻¹) region for (A) Unheated Control (B) Unheated Inoculation (C) Low Temperature Control (D) Low Temperature Inoculation (E) Moderate Temperature Control (f) Moderate Temperature Inoculation. Fingerprint regions (1500-600 cm⁻¹) for all the samples are shown in the 'prime' denoted figures (A',B',C', D', E', F') at Day 1 (black line) and Day 38 (red line) of the incubation period.

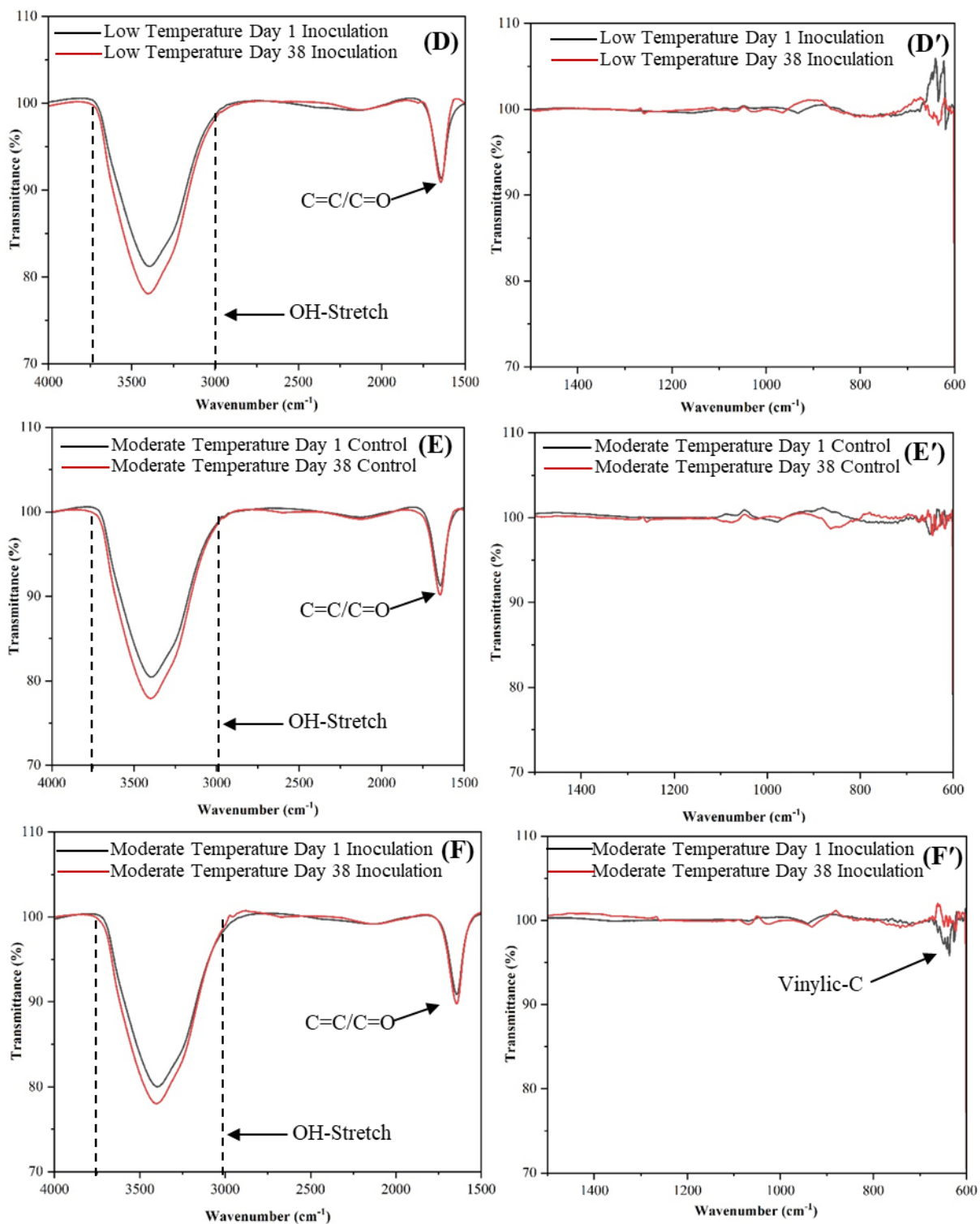


Figure S2 (Cont.). FTIR spectra of functional group ($4000\text{-}1500\text{ cm}^{-1}$) region for (A) Unheated Control (B) Unheated Inoculation (C) Low Temperature Control (D) Low Temperature Inoculation (E) Moderate Temperature Control (F) Moderate Temperature Inoculation. Fingerprint regions ($1500\text{-}600\text{ cm}^{-1}$) for all the samples are shown in the 'prime' denoted figures (A',B',C', D', E', F') at Day 1 (black line) and Day 38 (red line) of the incubation period.

16 Changes in Different Nitrogen Species

17 DON biodegradation influenced nitrogen speciation during incubation experiments (Figure
18 S3). For all samples, with the decrease of organic nitrogen, ammonia-N increased as microbes
19 converted organic nitrogen to ammonia/ammonium through ammonification. Nitrite and nitrate
20 ($\text{NO}_2^- + \text{NO}_3^-$) concentrations also increased with time. After four days of incubation, $\text{NO}_2^- + \text{NO}_3^-$
21 started to increase for all samples in the control experiment and for low and moderate temperature
22 samples in the inoculation experiment. For control unheated samples, the $\text{NO}_2^- + \text{NO}_3^-$ increase
23 started on day 8 (Figure S3). It is possible that a portion of ammonia/ammonium was converted to
24 $\text{NO}_2^- + \text{NO}_3^-$ following nitrification as nitrifying bacteria are common in microbial communities,
25 and under aerobic conditions first transform free ammonium into nitrite and then into nitrate.^{1,2}
26 However, for low and moderate temperature samples in the control experiment, $\text{NO}_2^- + \text{NO}_3^-$
27 concentration decreased on day 21 and day 8, respectively (Figure S3). The reactors for these
28 samples may have become anaerobic and N_2 or N_2O gas was being produced from $\text{NO}_2^- + \text{NO}_3^-$
29 through denitrification as under anaerobic conditions denitrifying bacteria transform NO_3^- into
30 $\text{N}_2/\text{N}_2\text{O}$ gas.^{1,3} However, the $\text{N}_2/\text{N}_2\text{O}$ gas concentration was not measured in this study, and the
31 occurrence of denitrification could not be confirmed. Lastly, the increase in the DON concentration
32 for several samples on day 21 of the incubation may be due to the death of some microorganisms
33 as dead microbial cells are a major source of DON.³

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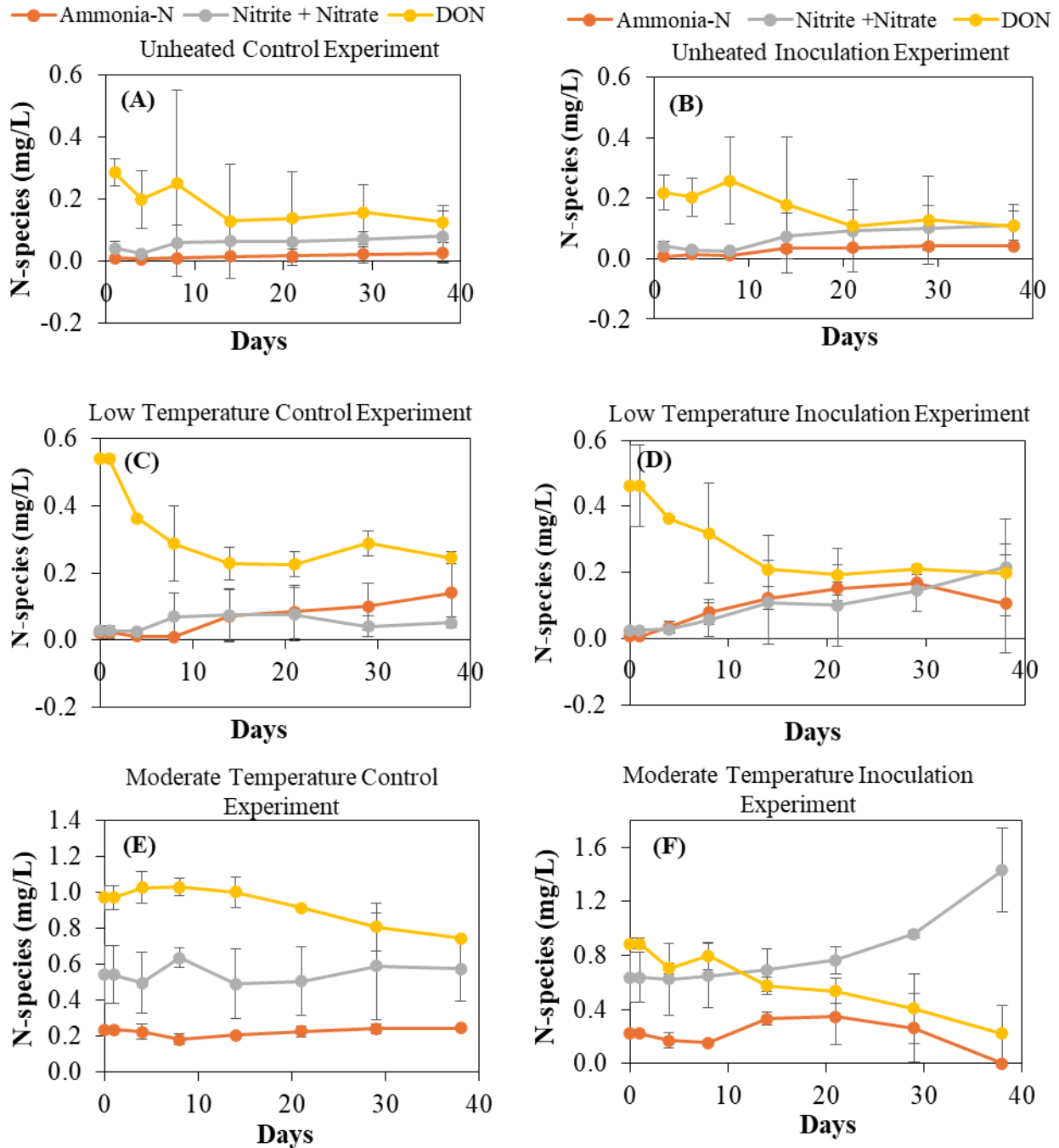


Figure S3. Changes in the concentration of nitrogen species- DON, Ammonia-N and nitrite +nitrate for samples of (A) Unheated Control; (B) Unheated Inoculation; (C) Low Temperature Control; (D) Low Temperature Inoculation; (E) Moderate Temperature Control and (F) Moderate Temperature Inoculation experiments.

38 References

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