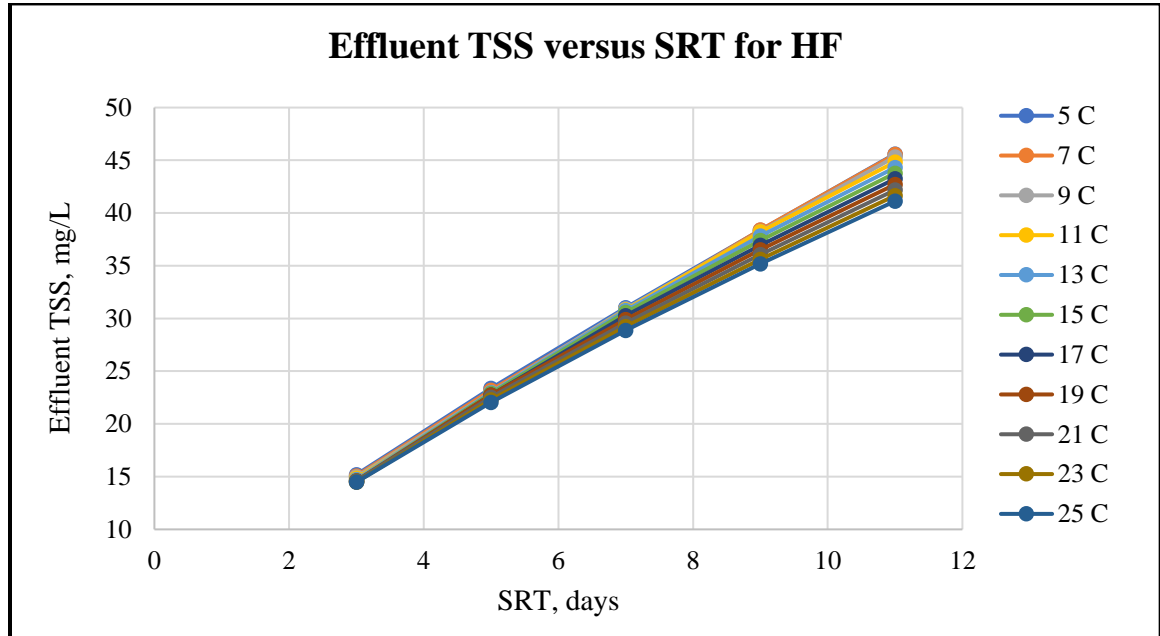
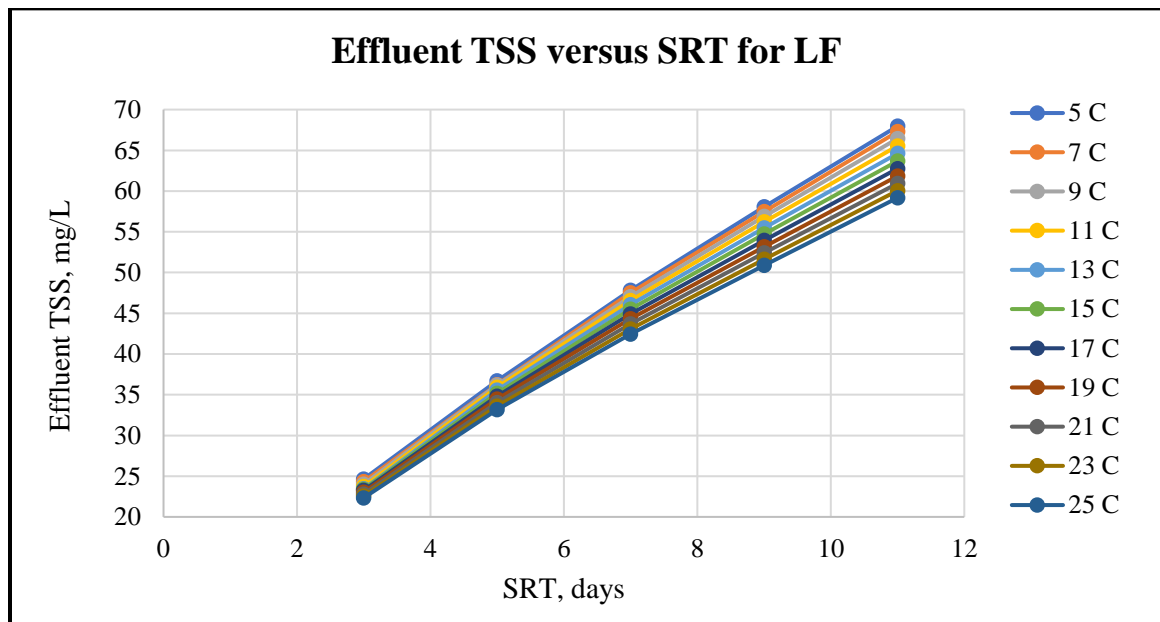


## Appendix

### TSS for conventional AS system



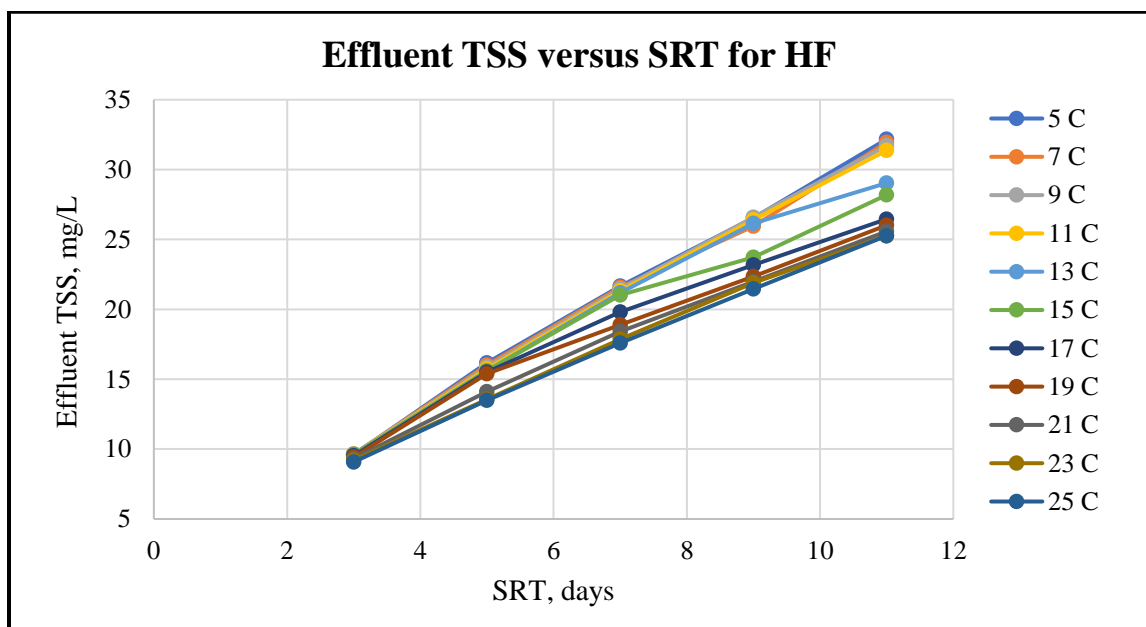
(a)



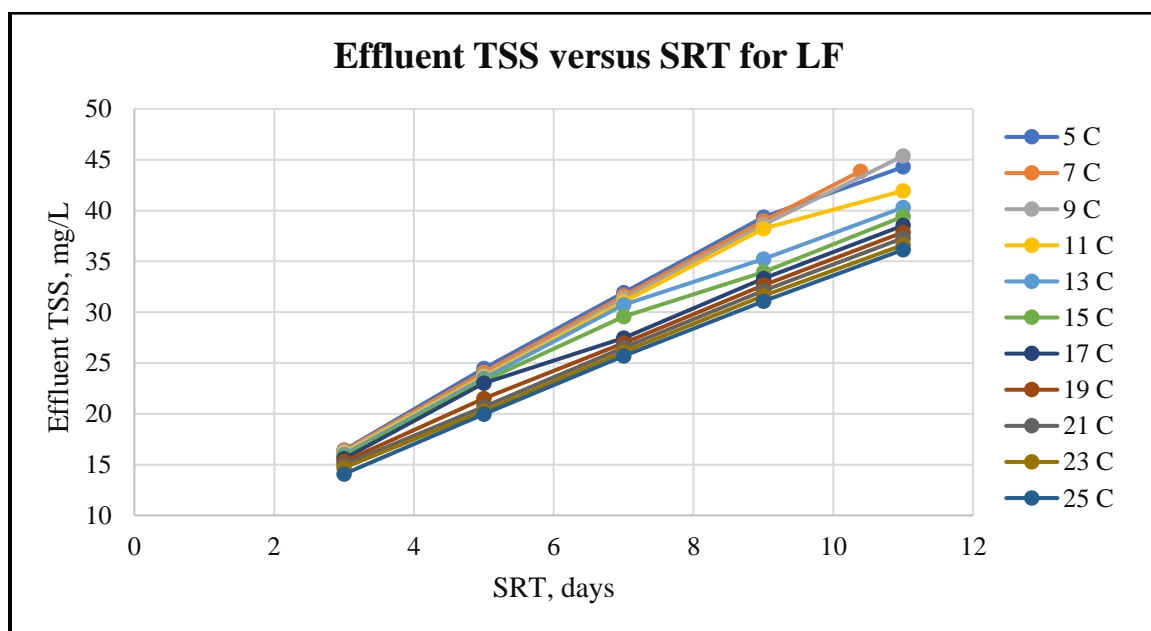
(b)

Figure A.1: Effluent TSS for conventional AS system (a) HF, (b) LF

## TSS for MLE system



(a)



(b)

Figure A.2: Effluent TSS for MLE system (a) HF, (b) LF

## Influent wastewater parameters considered for conventional AS and Ludzack-Ettinger systems

Table A1: Influent kinetic and stoichiometric parameters for conventional AS and Ludzack-Ettinger systems

Name	Raw Defaults	Value
Fbs - Readily biodegradable (including Acetate) [gCOD/g of total COD]	0.1600	<b>0.2000</b>
Fac - Acetate [gCOD/g of readily biodegradable COD]	0.1500	<b>0.2182</b>
Fxsp - Non-colloidal slowly biodegradable [gCOD/g of slowly degradable COD]	0.7500	<b>0.7490</b>
Fus - Unbiodegradable soluble [gCOD/g of total COD]	0.0500	<b>0.0909</b>
Fup - Unbiodegradable particulate [gCOD/g of total COD]	0.1300	<b>0.1267</b>
Fcel - Cellulose fraction of unbiodegradable particulate [gCOD/gCOD]	0.5000	0.5000
Fna - Ammonia [gNH <sub>3</sub> -N/gTKN]	0.6600	0.6600
Fnox - Particulate organic nitrogen [gN/g Organic N]	0.5000	0.5000
Fnus - Soluble unbiodegradable TKN [gN/gTKN]	0.0200	0.0200
FupN - N:COD ratio for unbiodegradable part. COD [gN/gCOD]	0.0700	0.0700
Fpo4 - Phosphate [gPO <sub>4</sub> -P/gTP]	0.5000	0.5000
FupP - P:COD ratio for unbiodegradable part. COD [gP/gCOD]	0.0220	0.0220
Fsr - Reduced sulfur [H <sub>2</sub> S] [gS/gS]	0.1500	0.1500
FZbh - Ordinary heterotrophic COD fraction [gCOD/g of total COD]	0.0200	0.0200
FZbm - Methyilotrophic COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZao - Ammonia oxidizing COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZno - Nitrite oxidizing COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZaao - Anaerobic ammonia oxidizing COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZppa - Phosphorus accumulating COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZpa - Propionic acetogenic COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZam - Acetoclastic methanogenic COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZhm - Hydrogenotrophic methanogenic COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZso - Sulfur oxidizing COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZsrpa - Sulfur reducing propionic acetogenic COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZsra - Sulfur reducing acetotrophic COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZsrh - Sulfur reducing hydrogenotrophic COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZe - Endogenous products COD fraction [gCOD/g of total COD]	0.0000	0.0000

**Influent wastewater parameters considered for conventional AS and MLE systems  
for high flow condition**

Table A2: Influent kinetic and stoichiometric parameters for the high flow condition for  
conventional AS and MLE systems

Name	Raw Defaults	Value
Fbs - Readily biodegradable (including Acetate) [gCOD/g of total COD]	0.1600	<b>0.1320</b>
Fac - Acetate [gCOD/g of readily biodegradable COD]	0.1500	<b>0.2546</b>
Fxsp - Non-colloidal slowly biodegradable [gCOD/g of slowly degradable COD]	0.7500	<b>0.6812</b>
Fus - Unbiodegradable soluble [gCOD/g of total COD]	0.0500	<b>0.0700</b>
Fup - Unbiodegradable particulate [gCOD/g of total COD]	0.1300	<b>0.1400</b>
Fcel - Cellulose fraction of unbiodegradable particulate [gCOD/gCOD]	0.5000	<b>0.6000</b>
Fna - Ammonia [gNH3-N/gTKN]	0.6600	<b>0.6937</b>
Fnox - Particulate organic nitrogen [gN/g Organic N]	0.5000	0.5000
Fnus - Soluble unbiodegradable TKN [gN/gTKN]	0.0200	0.0200
FupN - N:COD ratio for unbiodegradable part. COD [gN/gCOD]	0.0700	0.0700
Fpo4 - Phosphate [gPO4-P/gTP]	0.5000	<b>0.4093</b>
FupP - P:COD ratio for unbiodegradable part. COD [gP/gCOD]	0.0220	0.0220
Fsr - Reduced sulfur [H2S] [gS/gS]	0.1500	0.1500
FZbh - Ordinary heterotrophic COD fraction [gCOD/g of total COD]	0.0200	0.0200
FZbm - Methylothetic COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZao - Ammonia oxidizing COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZno - Nitrite oxidizing COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZaao - Anaerobic ammonia oxidizing COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZppa - Phosphorus accumulating COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZpa - Propionic acetogenic COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZam - Acetoclastic methanogenic COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZhm - Hydrogenotrophic methanogenic COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZso - Sulfur oxidizing COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZsrpa - Sulfur reducing propionic acetogenic COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZsra - Sulfur reducing acetotrophic COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZsrh - Sulfur reducing hydrogenotrophic COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZe - Endogenous products COD fraction [gCOD/g of total COD]	0.0000	0.0000

**Influent wastewater parameters considered for conventional AS and MLE systems  
for low flow condition**

Table A3: Influent kinetic and stoichiometric parameters for the low flow condition for  
conventional AS and MLE systems

Name	Raw Defaults	Value
Fbs - Readily biodegradable (including Acetate) [gCOD/g of total COD]	0.1600	<b>0.1813</b>
Fac - Acetate [gCOD/g of readily biodegradable COD]	0.1500	<b>0.0549</b>
Fxsp - Non-colloidal slowly biodegradable [gCOD/g of slowly degradable COD]	0.7500	<b>0.6861</b>
Fus - Unbiodegradable soluble [gCOD/g of total COD]	0.0500	<b>0.0207</b>
Fup - Unbiodegradable particulate [gCOD/g of total COD]	0.1300	0.1300
Fcel - Cellulose fraction of unbiodegradable particulate [gCOD/gCOD]	0.5000	0.5000
Fna - Ammonia [gNH <sub>3</sub> -N/gTKN]	0.6600	<b>0.6980</b>
Fnox - Particulate organic nitrogen [gN/g Organic N]	0.5000	0.5000
Fnus - Soluble unbiodegradable TKN [gN/gTKN]	0.0200	0.0200
FupN - N:COD ratio for unbiodegradable part. COD [gN/gCOD]	0.0700	0.0700
Epo4 - Phosphate [gPO <sub>4</sub> -P/gTP]	0.5000	<b>0.1773</b>
FupP - P:COD ratio for unbiodegradable part. COD [gP/gCOD]	0.0220	0.0220
Fsr - Reduced sulfur [H <sub>2</sub> S] [gS/gS]	0.1500	0.1500
FZbh - Ordinary heterotrophic COD fraction [gCOD/g of total COD]	0.0200	0.0200
FZbm - Methylotrophic COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZao - Ammonia oxidizing COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZno - Nitrite oxidizing COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZaao - Anaerobic ammonia oxidizing COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZppa - Phosphorus accumulating COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZpa - Propionic acetogenic COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZam - Acetoclastic methanogenic COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZhm - Hydrogenotrophic methanogenic COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZso - Sulfur oxidizing COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZsrpa - Sulfur reducing propionic acetogenic COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZsra - Sulfur reducing acetotrophic COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZsrh - Sulfur reducing hydrogenotrophic COD fraction [gCOD/g of total COD]	1.00E-04	1.000E-04
FZe - Endogenous products COD fraction [gCOD/g of total COD]	0.0000	0.0000