**APPENDIX**Supplementary Materials

**Fig. S1** Comparison of initial and final BOD5, TKN and TN of wastewater after treatment by *Chlorella vulgaris* with air (Initial MW, initial values of wastewater parameters at the start of experiment; AR final, final values of wastewater parameters in algal reactor with algae; Control final, final values of wastewater parameters in control reactor)

**Fig. S2** Comparison of initial and final BOD5, TKN and TN of wastewater after treatment by *Chlorella vulgaris* with 5% CO2/air (Initial MW, initial values of wastewater parameters at the start of experiment; AR final, final values of wastewater parameters in algal reactor with algae; Control final, final values of wastewater parameters in control reactor)

**Table S1**

Organics and nutrients removal rate by *Chlorella vulgaris*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Treatment conditions****(7 days)** | **sCOD****removal rate****(mg L-1 d-1)** | **NH4-N****removal rate****(mg L-1 d-1)** | **NO3-N removal rate****(mg L-1 d-1)** | **PO4-P****removal rate****(mg L-1 d-1)** |
| *C. vulgaris* with air | 16.5 | 2.57 | 0.214 | 0.971 |
| *C. vulgaris* with 5%CO2/air | 18.9 | 3 | 0.257 | 1.1 |

**Table S2**

Comparison of the present treatment study with the related literature published previously

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Type of Wastewater** | **Mode of Operation** | **Algae** | **Cultivation Period (d)** | **Inlet Nutrient (mg L-1)** | **Nutrient removal (%)** | **Reference** |
| Municipal Wastewater | Batch | *Scenedesmus* | 12 | N: 25.36P: 2.30 | 90 | [57] |
| Municipal Wastewater | Batch | *Scenedesmus**Chlorella vulgaris* | 7 | N: 8.70P: 1.70 | 100 | [58] |
| Domestic Sewage | Batch | *Chlorella vulgaris* | 14 | N: 12.8P: 0.70 | 74100 | [56] |
| Artificial Wastewater | Batch | *Chlorella vulgaris* | 14 | N: 20P: 4 | 9490 | [55] |
| Domestic Sewage | Batch | *Chlorella vulgaris* | 15 | N: 19P: 1.10 | 45100 | [59] |
| Municipal Wastewater | Batch (7 L) | *Chlorella vulgaris* with 5% CO2 | 7 | N: 25P: 8.3 | 8892.8 | Present study |

**Calculation for NPK recovery from algal biomass post wastewater treatment**

Wastewater influent into Sewage Treatment Plant (STP) = 37.5 million litres per day (MLD)

*C. vulgaris* DW generated with 5% CO2 supply during wastewater treatment = 111 mg L-1 d-1

So, amount of *C. vulgaris* DW

= {(37.5 × 106) × (111× 10-6)} kg d-1

= 4162.5 kg d-1

NPK analysis amounted to 71.7 ±0.09 g nitrogen (N), 13.3 ±0.58 g phosphorus (P) and 20.1 ±1.08 g potassium (K) per kg of *C. vulgaris* DW.

Therefore, an approximate elemental nitrogen (N) recovery from algal biomass post wastewater treatment

= (4162.5 kg d-1 ×71.7 g kg-1)

= 298.45 kg d-1 nitrogen (N)

Similarly, approximate elemental phosphorus (P) and potassium (K) recovery from algal biomass post wastewater treatment are 55.4 and 83.67 kg d-1 respectively.