Materials and methods

S1 Microalgal strain and preculture condition

The microalgal strain *C.vulgaris* was obtained from Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia. MLA medium was used to cultivate them before the experiment. It is derived from the ASM-1 medium described by Gorham et al. (1964), which was originally formulated for the isolation and culture of cyanobacteria such as Anabaena flos-aquae [1]. The medium was autoclaved at 121◦C for 30 min prior to use. Temperature and light of *C. vulgaris* cultivation were maintained at 25 ± 1 ◦C with 350 μmol/m^2/s continuously.

Table S1 Acclimatization phase results

Characteristics	Feed wastewater	Phase 0	Phase I	Phase II
DO (mg/L)	_	9.2	8	8.8
pH	7.1-8	8.7	8.5	6.87
NH_4^+-N (mg/L)	58-70	6.76	32.6	19
NO_2^--N (mg/L)	_	4.3		26
NO_3^--N (mg/L)	_	18.19		5.64
TN (mg/L)	66-70	N/A	35 (52)	50
PO_4^{3-}-P (mg/L)	5.67	20	5.5	4
IC (mg/L)	66-92	36	7.578	3
TOC (mg/L)	33-100	7	11.78	16
VSS (g/L)	0.025	0.43	0.3	0.1
Chlorophyll (mg/L)		1.9	0.6	0.9

Table S2 Experimental conditions

Phase (Days from the start)	HRT (days): Days of the experiment	SRT (days): Days of the experiment	Air flow(L/min)	Light: Dark ratio	Daily feed[1]
0 (0-35)	20: 0-12 10: 13-35	20: 0-12, 10: 13-35	1	24:0	0-15: MLA media 15-35: In every three days, MLA medium two days and sMW one day.
I (36-44)	20	20: 36-44	1	14:10	sMW
II (45-65)	10	10	1	14:10	sMW

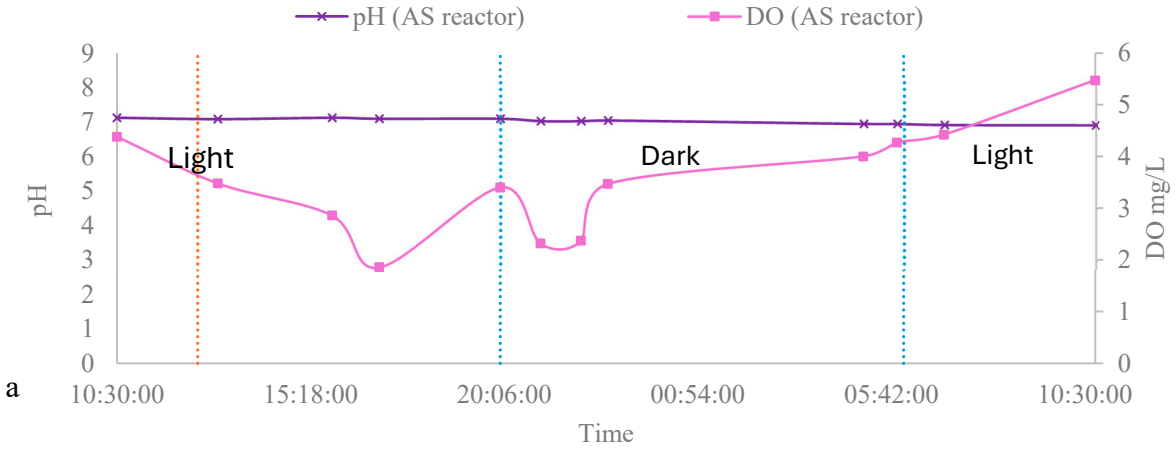


Figure S1: One day cycle of DO profile in phase I

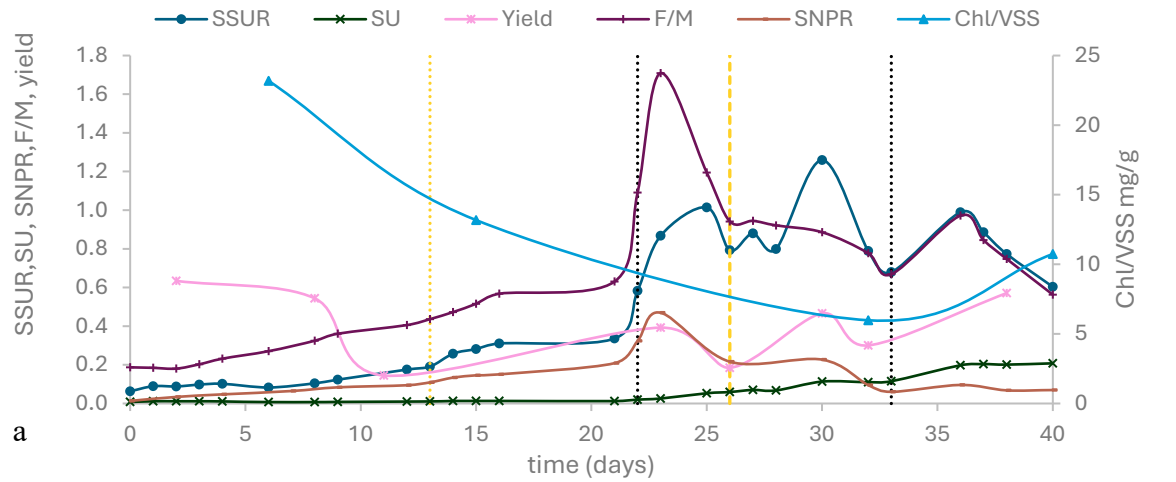


Figure S2: The SSUR (kg COD/kg MLVSS/d), SU (mg/d), SNPR (kg NOx/kg MLVSS/d), yield (kg MLVSS/kg COD) and F/M ratio kg profile in the reactor

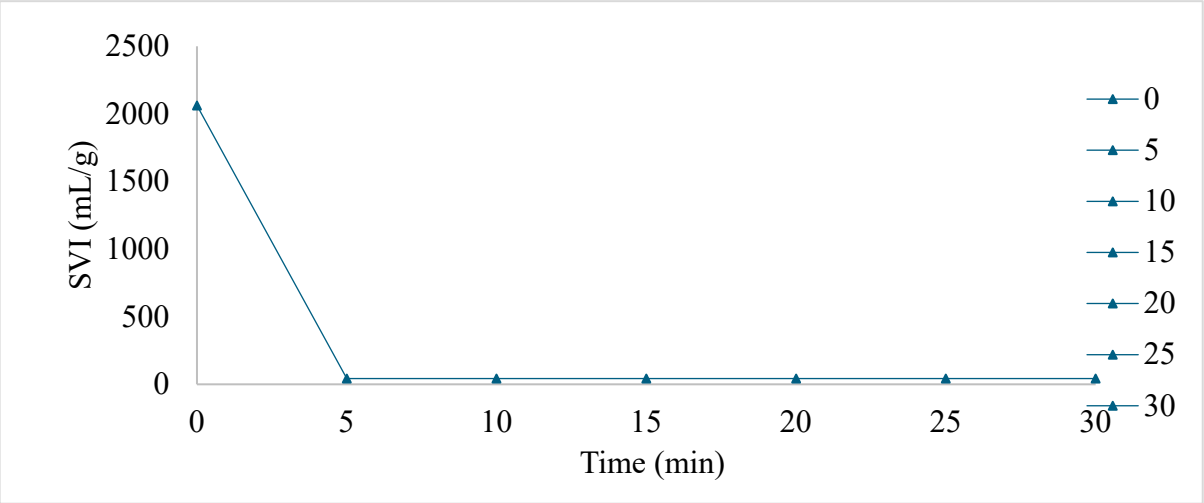


Figure S3: SVI of microalgal bacterial consortium in AS reactor

1. Gorham, P.R., et al., *Isolation and culture of toxic strains of Anabaena flos-aquae (Lyngb.) de Bréb.* SIL Proceedings, 1922-2010, 1964. **15**(2): p. 796-804.