Supplementary material

Evaluation of integrated anaerobic/aerobic conditions for treating dye-rich synthetic and textile wastewater using a soda lake-derived alkaliphilic microbial consortia

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Table S1. A series of dye concentration removal efficiency evaluation

Sampling	Absorbance at λmax = 485 nm					
	% Removal (at 50 mg/L)	% Removal (100 mg/L)	% Removal (200 mg/L)	% Removal (400 mg/L)	% Removal (600 mg/L)	% Removal (800 mg/L)
Before treatment	0					
04 days	95.70					
09 days	91.03					
A14 days	93.09					
A19 days	98.86					
24 days	98.84					
After the initial concentration (50 mg/L) of dye reached 98.8%, other concentrations were continually tested over the system. This concentration test was not restarted for each concentration. It is tested on the existing liquids in the reactor.						
29 days	98.6%					

34 days		96.3%				
39 days		98.7%				
44 days			94.6%			
49 days			98.2%			
54 days				92.6%		
59 days				96.7%		
64 days					91.4%	
69 days					96.2%	
74 days						89.3%
79 days						90.4%
84 days						93.6%

Table S2. Mineral salts medium (MSM) composition.

Major elements (g/L)		Trace elements (mg/L)	
Na_2HPO_4	3.6	H_3BO_3	30.0
KH_2PO_4	1.0	$ZnSO_47H_2O$	10.0
$(NH_4)_2SO_4$	1.0	$Na_2MoO_42H_2O$	3.0
$MgSO_4$	1.0	$MnCl_24H_2O$	3.0
$CaCl_2$	0.10	$NiCl_26H_2O$	2.0
$FeC_6H_5O_7$	0.01	$CoCl_26H_2O$	1.0
		$CuCl_22H_2O$	1.0

The major element consists additional 10 mL/L of trace element solution. Stock solutions of glucose (50%, w/v) and yeast extract (10%, w/v) have been sterilized separately and added to the media to maintain final concentrations of 0.5% (w/v) and 0.1% (w/v), respectively. A 1% Na_2CO_3 has been separately sterilized and added to the media to maintain the final pH >9.



Figure. S1. (a) Lake Chitu, (b) Mud sampling at Lake Chitu as alkaliphilic microbial sources

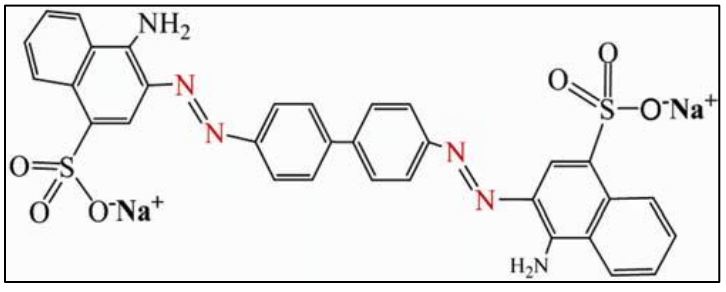




Figure S2. Chemical structure of direct red 28 dye (DR28) and picture of powder dyes.

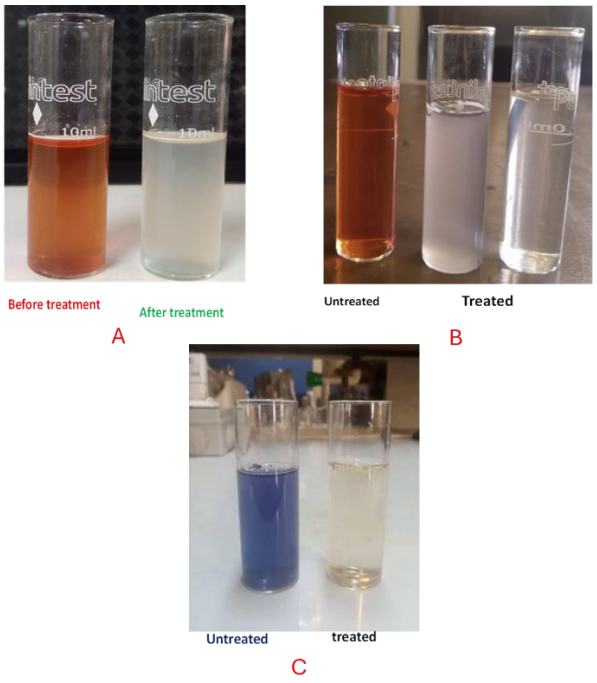


Figure. S3. Photograph representation for the before and after treatment for (a) synthetic WW, real textile WW (b & c) round I and II collected samples

Table S3 FTIR spectra of untreated and treated (steady state) textile WW with the corresponding assigned functional group

Identified peaks (cm^{-1})	**Peak Intensity**	**Assigned functional group**	**Samples**
3441	Medium, broad	-OH	Untreated WW
1,562	Weak, sharp	-N=N-	
1495	Medium, sharp	C=N; C-H deformation	
1,050	Weak	Dye-SO	
753	Weak	C-Cl	
632	Weak	C-N, N-H deformation	
3453	Strong, broad	-OH	Final clarifier
2080	Medium, broad	−C≡C−	5 days anaerobically acclimatized sample
2080	Weak	−C≡C−	Final clarifier
1635	Strong, sharp	C=O; C=C in the aromatic ring	Final clarifier, and 5 days anaerobic time
1386	Medium, broad	S=O	5 days anaerobic time
1106	Medium sharp	C-O	Final clarifier

Table S4. library identified substances with percentage peak area resulting from GC-MS of textile WW before and after alkaliphilic microbial consortia treated samples

Untreated			5 days anaerobic acclimatization condition			Treated_Steady state		
Retention time (min)	Compound names	Peak area (%)	Retention time (min)	Compound names	Peak area (%)	Retention time (min)	Compound names	Peak area (%)
3.745	3-Methyl-2-hexene	2.366	3.745	2-Propenoic acid, butyl ester	8.832	4.580	--	1.78
5.679	2-Octene, (Z)-	2.771	3.785	---	1.284	5.113	---	1.75
6.726	Dodecane	4.101	4.392	----	2.68	6.720	Benzoic acid, methyl ester	7.92
8.093	1-Nonanol	4.411	5.845	---	1.081	8.077	3-Dodecene, (Z)-	7.77
9.644	Dodecane	2.357	6.726	----	3.801	8.197		2.34
10.880	Cyclododecane	6.883	7.55	-----	0.719	9.616		2.11
10.977	Dodecane	1.751	8.094	Cyclododecane	2.237	9.965		1.81
12.419	Phenol, 2,4-bis(1,1-dimethylethyl)-	37.209	8.992	---	0.774	10.279		3.40
13.352	4-Tridecene, (Z)-	3.19	9.633	---	0.708	10.857	4-Tetradecene, (Z)-	10.65
14.576	--------	21.536	9.976	4-Fluoro-2-methylanizole	1.1	10.955		2.48

15.526	--------	1.146	10.297	Cyclopropane, 1,1'-ethenylidenebis-	1.01	11.035		2.02
16.642	----------	3.945	10.875	4-Tetradecene, (E)-	4.759	11.555		1.20
			10.972	Dodecane	0.934	12.225		2.07
			11.91	-----	1.534	12.402	Phenol, 2,4-bis(1,1-dimethylethyl)-	37.68
			12.236	----	0.759	13.209		2.39
			12.414	Phenol, 2,4-bis(1,1-dimethylethyl)-	19.74	13.335	Carbonic acid, hexadecyl methyl ester; 2-Tetradecene, (E)-; 4-Tetradecene, (Z)-	5.52
			12.82	2-(Hydroxymethyl)norbornadiene	5.662	14.216	----	2.60
			13.215	---	0.8	15.509	---	3.22
			13.346	n-Tetracosanol-1	3.615	16.585	---	1.30
			13.484	1,3-Cyclooctadiene, (Z,Z)-	0.882			
			13.684	Cyclopropane, 1,1'-ethenylidenebis-	0.828			
			14.199	---	1.633			

			14.56	Methanone, (1-hydroxycyclohexyl)phenyl-	21.348			
			15.292	----	0.991			
			15.521	3-(4-Methoxy-phenylimino)-1-phenyl-propen-1-ol	0.731			
			15.578	-----	0.917			
			16.436	-----	0.771			
			16.608	Tricyclo[4.2.1.0(2,5)]nonane, 3-ethenyl-	4.495			
			16.957	Methyl palmitate	3.588			
			18.239	-----	1.79			

------not matched /identified with the library