TRINITY INTERNATIONAL

A-53/A, Malviya Nagar, Hauz Khas, South Delhi, 110017

Website: https://trinityalgae.com/ Phone No: +91-9717955336

PHYCOREMEDIATION AS AN EFFECTIVE METHODOLOGY FOR LEACHATE TREATMENT

Landfilling remains the ultimate municipal solid waste (MSW) disposal method in the most developing nations due to low expenditure and simple operation. Degradation of the MSW in landfills generates a substantial amount of leachate. Landfill leachate is the high strength wastewater saturated with various compounds leaching out of decomposing municipal waste during degradation and precipitation. It generally comprises a high concentration of dissolved organic and inorganic compounds, toxic heavy metals (THMs), ammonia and xenobiotic organic compounds (XOC), which are highly toxic to living organisms and environment. Leachate generated from the landfill sites poses a serious challenge to the landfill operators and local governing bodies as it percolates through the disposed waste and contaminates the soil and both surface and groundwater.

A Variety of physicochemical treatment methods such as Multi effective Evaporators (MEEs) have been employed for the treatment of leachate. While these conventional treatment systems have good efficiency, they are not sustainable as it involves substantial costs in terms of materials, equipment, chemical and electrical consumption without any remarkable energy recovery.

Consequently, we propose Phycoremediation as a sustainable, nature-friendly technology for the effective treatment of leachate with respect to physico-chemical parameters such as organic load (BOD and COD), inorganics (sulphates, phosphates, nitrates), pH, TDS/TSS, toxic heavy metal contents, coliforms (EC, FC, and TC), xenobiotics and odour. Trinity International has successfully completed a pilot leachate treatment project with Zigma Global Environ Ltd., at its Noida location in Sector 145. The results of the project are given below

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SUMMARY OF THE RESULTS OF LEACHATE TREATMENT BY TRINITY INTERNATIONAL

METHODOLOGY: For the treatment, microalgal cultures were allowed to grow in wastewater samples in a 1:1 ratio under sunlight for 10 days. The higher sedimentation in the sample caused increment in the COD level thus we filtered the sample and then added the microalgae. Therefore, it is suggested that samples should be filtered before the treatment for better results.

RESULTS: Microalgal treatment in wastewater caused a remarkable reduction in COD, BOD, TSS, and EC and increased the DO as compared to the untreated sample.

ADVANTAGE: No nutrients and other energy sources were used during the experiments and no foul smell was found in the water after treatment.

Parameters	Untreated	Treated	% increase or decrease
COD	33600	1280	96.19048
BOD	9500	280	97.05263
TDS	6060	3308	45.41254
TSS	3751	0.4	99.98934
EC	9470	5170	45.40655
TS	9811	3311	66.25217
DO	0.1	2.9	96.55172

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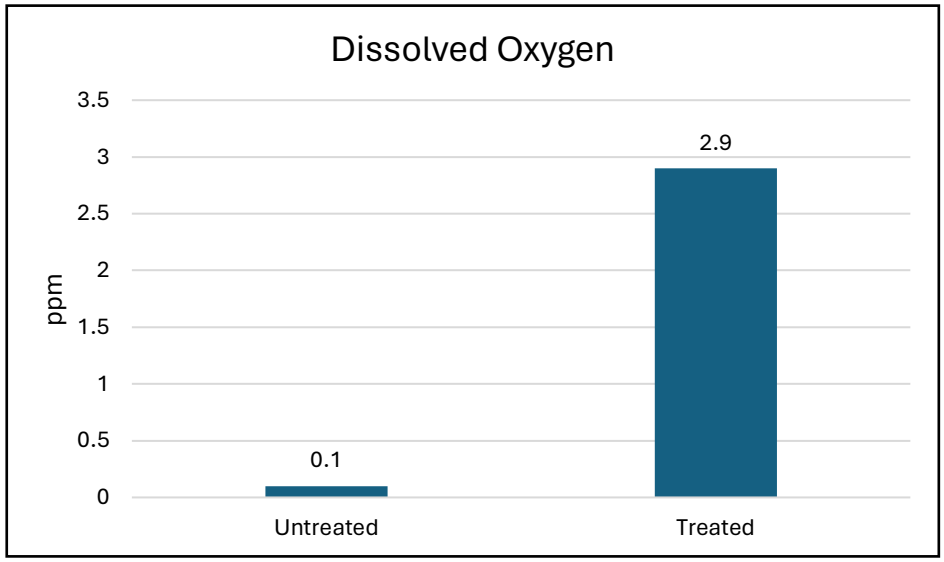

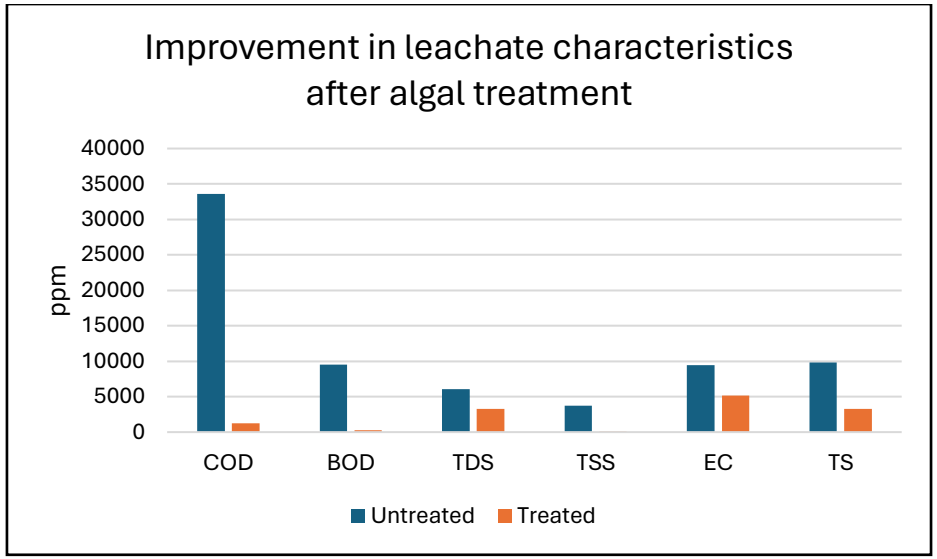

MSW Dumping

Algal IBC tanks of 1L

Settling tank

1st Algal tank

Leachate generated at MSW

2nd Algal tank

Sequential improvement in color with treatment

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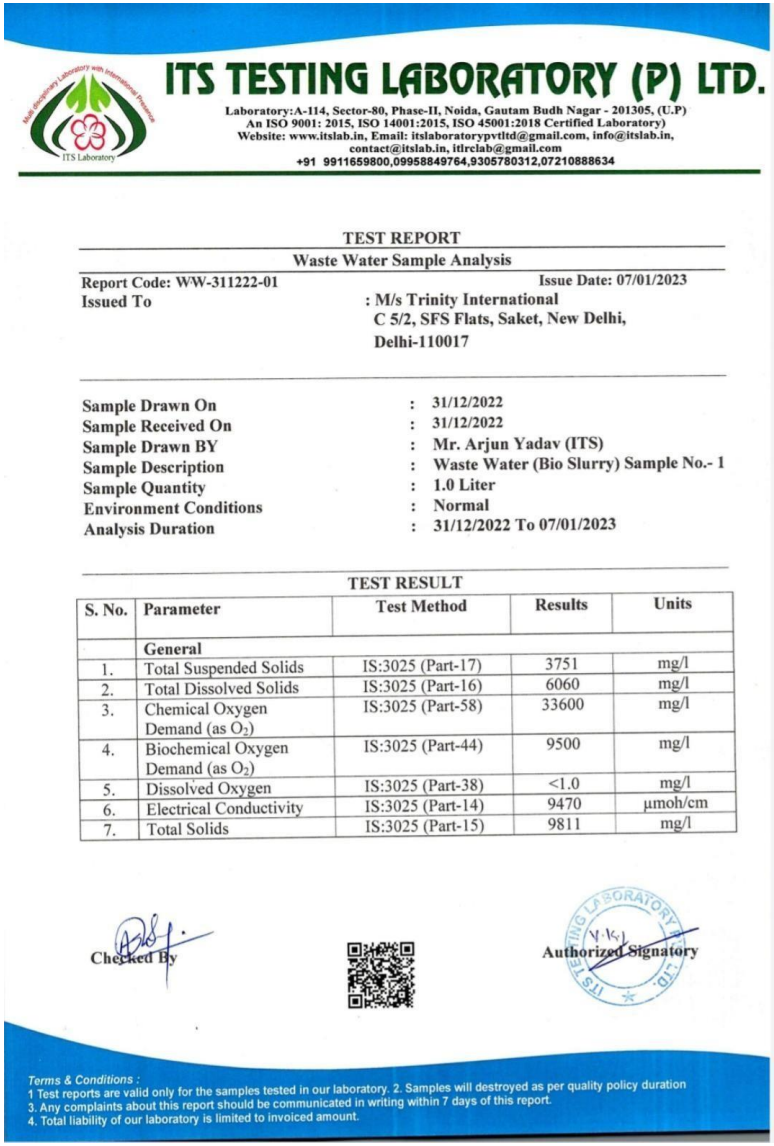

ITS TESTING LABORATORY (P) LTD.

Laboratory:A-114, Sector-80, Phase-II, Noida, Gautam Budh Nagar - 201305, (U.P)
An ISO 9001: 2015, ISO 14001:2015, ISO 45001:2018 Certified Laboratory)
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contact@itslab.in, itlrclab@gmail.com
+91 9911659800,09958849764,9305780312,07210888634

TEST REPORT

Waste Water Sample Analysis

Report Code: WW-311222-01 Issue Date: 07/01/2023
Issued To : M/s Trinity International
C 5/2, SFS Flats, Saket, New Delhi,
Delhi-110017

Sample Drawn On	:	31/12/2022
Sample Received On	:	31/12/2022
Sample Drawn BY	:	Mr. Arjun Yadav (ITS)
Sample Description	:	Waste Water (Bio Slurry) Sample No.- 1
Sample Quantity	:	1.0 Liter
Environment Conditions	:	Normal
Analysis Duration	:	31/12/2022 To 07/01/2023

TEST RESULT

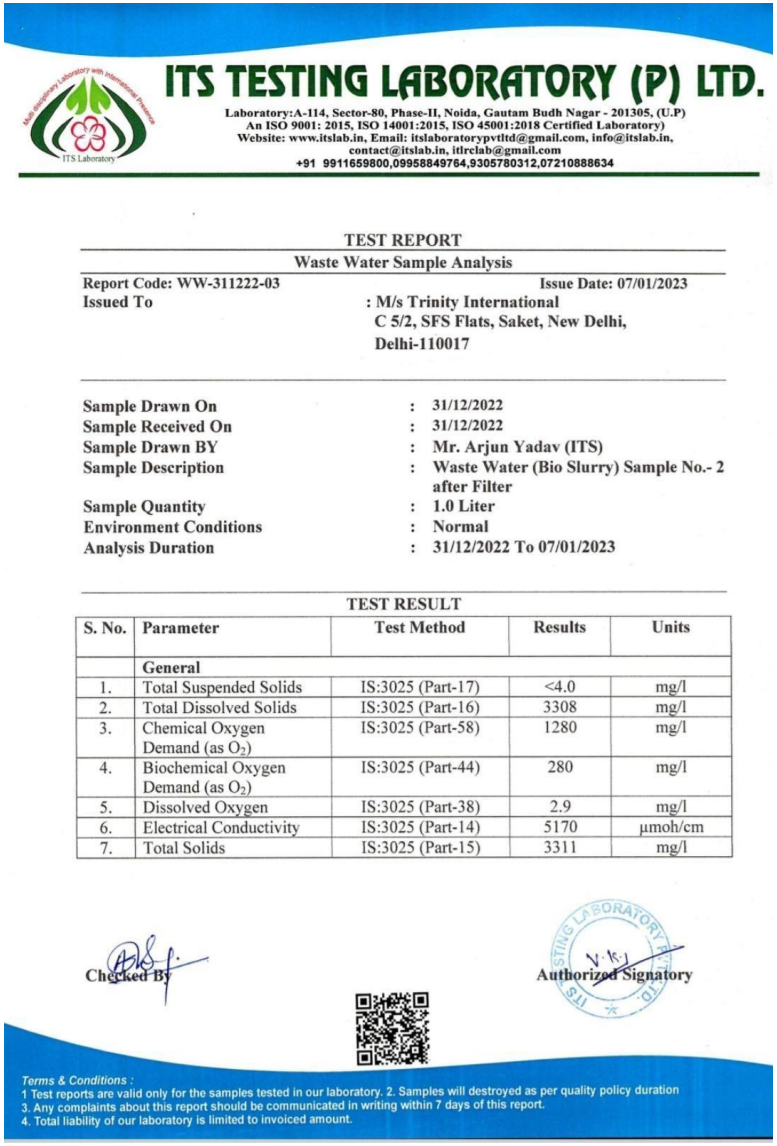
S. No.	Parameter	Test Method	Results	Units
	General			
1.	Total Suspended Solids	IS:3025 (Part-17)	3751	mg/l
2.	Total Dissolved Solids	IS:3025 (Part-16)	6060	mg/l
3.	Chemical Oxygen Demand (as O_2)	IS:3025 (Part-58)	33600	mg/l
4.	Biochemical Oxygen Demand (as O_2)	IS:3025 (Part-44)	9500	mg/l
5.	Dissolved Oxygen	IS:3025 (Part-38)	<1.0	mg/l
6.	Electrical Conductivity	IS:3025 (Part-14)	9470	µmoh/cm
7.	Total Solids	IS:3025 (Part-15)	9811	mg/l

Checked By

Authorized Signatory

Terms & Conditions :
1 Test reports are valid only for the samples tested in our laboratory. 2. Samples will destroyed as per quality policy duration
3. Any complaints about this report should be communicated in writing within 7 days of this report.
4. Total liability of our laboratory is limited to invoiced amount.

Leachate parameters before phycoremediation



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TEST REPORT

Waste Water Sample Analysis

Report Code: WW-311222-03 Issue Date: 07/01/2023
Issued To : M/s Trinity International
C 5/2, SFS Flats, Saket, New Delhi,
Delhi-110017

Sample Drawn On	:	31/12/2022
Sample Received On	:	31/12/2022
Sample Drawn BY	:	Mr. Arjun Yadav (ITS)
Sample Description	:	Waste Water (Bio Slurry) Sample No.- 2 after Filter
Sample Quantity	:	1.0 Liter
Environment Conditions	:	Normal
Analysis Duration	:	31/12/2022 To 07/01/2023

TEST RESULT

S. No.	Parameter	Test Method	Results	Units
	General			
1.	Total Suspended Solids	IS:3025 (Part-17)	<4.0	mg/l
2.	Total Dissolved Solids	IS:3025 (Part-16)	3308	mg/l
3.	Chemical Oxygen Demand (as O_2)	IS:3025 (Part-58)	1280	mg/l
4.	Biochemical Oxygen Demand (as O_2)	IS:3025 (Part-44)	280	mg/l
5.	Dissolved Oxygen	IS:3025 (Part-38)	2.9	mg/l
6.	Electrical Conductivity	IS:3025 (Part-14)	5170	µmoh/cm
7.	Total Solids	IS:3025 (Part-15)	3311	mg/l

Checked By

Authorized Signatory

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Leachate parameters after phycoremediation