

# Orange City's Ambazari Lake Water Treatment Using Membrane Bioreactor and Nano-Filtration Hybrid System <sup>†</sup>

Kiran Bhuyar <sup>1,\*</sup>, Vilas Sapkal <sup>1</sup>, R.S. Sapkal <sup>1</sup>

<sup>1</sup> Department of Chemical Technology, Sant Gadge Baba Amravati University, Amravati-444602 (India); kiranbhuyar@gmail.com (K.B.), vssapkal@gmail.com (V.S.), sapkalrs@rediff.com (R.S.S.);

\* Correspondence: kiranbhuyar@gmail.com (K.B.);

<sup>†</sup> Presented at International e-Conference on Green Chemistry and Engineering towards Sustainable Development – An Industrial Perspective (16-18 June 2021), Surat, Gujarat, India

Received: 5.06.2021; Revised: 10.06.2021; Accepted: 12.06.2021; Published: 15.06.2021

**Abstract:** The present state of Orange City Nagpur's Ambazari lake water health is depicted due to the lake's deterioration and environmental health issues, human beings, and surroundings. Hence advanced water treatment methods are needed for good quality of water. A membrane bioreactor (MBR) and nanofiltration (NF) hybrid system was investigated for lake wastewater to study the operating parameters of MBR with NF by instrumental and analytical analysis of Chemical Oxygen Demand (COD), Total Dissolved Solids (TDS), Biochemical Oxygen Demand (BOD), and Permeate Flow Rate (PFR). Instead of only an MBR system, NF is considered a prime water softener method using the hybrid MBR-NF system, which was found very useful for wastewater treatment by considering its pore size, cost, benefits, etc. All parameters are operated batch-wise concerning time for a 5 Hrs batch. The hybrid MBR-NF system obtained the percent COD, BOD reduction, and 95.67% and 94.64%, respectively. 92.33% TDS reduction has been obtained. The highest % MLSS reduction has been obtained 36% for the airflow rates of 1.0 LPM. It has been observed that pH variation at different airflow rates is significantly less. Hence from the above information, we conclude that our experiment to treat Ambazari lake wastewater using the Hybrid MBR + NF combination is successful enough to attain potable water quality with environment protection norms.

**Keywords:** membrane bioreactor; nanofiltration; wastewater; hybrid treatment systems; mixed liquor suspended solid; chemical oxygen demand; biochemical oxygen demand; temperature; pressure etc.

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## Funding

This research received no external funding.

## Acknowledgments

I am sincerely thankful and acknowledge my Guide for their best keen supervision. Also, I am hearty thankful & acknowledge all faculty members of the Chemical Engineering Department of SGBAU, VNIT, Nagpur & PIET, Nagpur, for their technical supports during the experiment work and analysis in the department/Institute.

## **Conflicts of Interest**

The authors declare no conflict of interest.