

Self-Introduction

I, **Santosh Somnath Latnekar**, Director of the **Soil Fertility Institute, Pune**, with an academic background in engineering and over 15 years of experience in the environmental sector. Since 2007, my work has been focused on applied microbiology, particularly in Organic Waste Treatment, Wastewater Treatment and Soil Health Enhancement.

With years of research and practical field experience, we have developed **microbial consortium** which is based on native microbes.

1. Odour Eliminator Decomposer (OED). (Jeevamrut Concentrate)
2. Soil Conditioner. (Jeevamrut Concentrate)

Odour Eliminator Decomposer (OED) is a liquid organic solution derived from cow dung and urine of indigenous cows having Native Bacteria & Fungi, Natural Fungicide and Larvicides known for its instant odor removal and faster decomposing activity.

Salient Features of OED

- Removes bad odour from organic wet garbage, slaughter house waste, Industrial food wastes, Stinking chicken vehicles, Fisheries waste, landfills, RDF etc.
- Decomposes all types of organic waste in a shorter period without smell issues.
- Useful for biological process stabilization in municipal STP's resulting in efficient operation process and clean treated water output.
- Removes foul odour from sanitation systems, Nullahs, Open Gutters, Stagnant water bodies while improving the water quality.
- Enhances biological process of (CBG) compressed Biogas plants and increases biogas generation.

River Water Rejuvenation

Through Optimization of Municipal Sewage Treatment Plants

The Real Problem Statement

River pollution remains a critical environmental challenge despite the widespread installation of municipal Sewage Treatment Plants (STPs). These facilities are designed to treat sewage through biological processes before discharge into natural water bodies. While factors such as population growth and industrialization are often blamed, the underperformance of existing STPs plays a significantly responsible for this situation.

This presentation examines operational inefficiencies in STPs and proposes the Odor Eliminator Decomposer (OED) as a cost-effective and scalable solution to enhance biological treatment processes and improve river water quality.

How did the rivers remain clean for hundreds of years without STP plants?

1. Natural River Self-Purification (Pre-1970 Scenario)

Before 1970, the large population of indigenous cattle played a crucial role in maintaining soil health. Agricultural soils were rich in **diverse native microorganisms**, supported by indigenous cow dung and cow urine, which also served as a nutrient source

for earthworms. These earthworms further enhanced microbial diversity through vermicomposting and natural biological activity.

During irrigation and rainy seasons, these microorganisms were transported into river systems, resulting in **continuous and natural microbial replenishment**. Rivers originating from mountainous regions underwent cascading flows, which promoted **natural aeration** and increased dissolved oxygen (DO) levels.

The combination of **high microbial diversity and adequate dissolved oxygen** enabled efficient natural purification, resulting in significantly lower pollution levels and healthier river ecosystems.

2. Current Wastewater Treatment Processes Overview

Modern wastewater treatment systems—handling domestic sewage, municipal wastewater, and industrial effluents—are primarily based on biological processes such as

- Activated Sludge Process (ASP)
- Membrane Bioreactor (MBR)
- Moving Bed Biofilm Reactor (MBBR)
- Sequential Batch Reactor (SBR)

These systems operate on **suspended growth** or **attached growth** mechanisms. In aeration tanks, microorganisms oxidize organic matter in the presence of oxygen supplied through mechanical aeration systems.

This engineered process closely resembles natural river purification, where **organic load, microorganisms, and dissolved oxygen** interact to degrade pollutants.

3. Key Challenges in STP Operations

a) Shock Load Variations

Organic loads in municipal wastewater vary significantly throughout the day. **These fluctuations disrupt biological stability**, reducing treatment efficiency. Recovery from such disturbances is often slow due to limited scientific standardization in wastewater microbiology.

a) Process Instability

Equipment failure, power outages, or operational errors can disturb microbial activity, leading to incomplete treatment and inconsistent maintenance practices adversely affect plant performance.

c) Odour Generation

Foul odour is a common issue in STPs, **caused by the decaying of accumulated organic matter** in dead zones such as pipe bends, joints, valves, and tank corners. This leads to anaerobic conditions and the release of offensive gases, impacting treatment as well as surrounding communities.

4. Current Gap Between Designed and Actual Performance of STP's

A significant discrepancy exists between the **designed capacity** of STPs and their **actual operational performance**. Although authorities and contractors often report compliance with design parameters, indirect indicators suggest otherwise.

Detailed Project Reports (DPRs) specify expected energy usage for full-capacity operation. One such indicator is **electricity consumption**:

- The first important indicator is the electricity usage—often far below expected levels—suggesting underutilization.
- Second indicator is sludge generated which is much below the expected levels. These lead to partially treated wastewater being discharged into rivers

This gap indicates that plants are not operating at their intended capacity or efficiency, leading to inadequate treatment of wastewater. Consequently, partially treated or untreated effluents are discharged into rivers, contributing to environmental degradation.

5. The Proposed Solution

Odour Eliminator Decomposer (OED)

To address both biological process instability and odour issues

The Odour Eliminator Decomposer (OED) is to be applied/dosed in the **equalisation tank (first reactor)**, where we can introduce a diverse microbial population at the initial stage of treatment. These microorganisms propagate throughout the plant and:

- Enhance decomposition of organic matter
- Reduce sludge accumulation across the system
- Significantly minimize odour generation

Application Guidelines: OED can be applied through:

- Direct dosing into inlet sewage
- Recommended dosage: **10 litres of OED per day for a 1 MLD STP**
- Dosage may be adjusted based on influent load and plant capacity
- Spraying or mixing with biodegradable waste streams

Key Benefits of using OED

- Improved efficiency and performance of STPs
- Improved water quality which further reduces river pollution
- Stabilization of biological processes
- Faster troubleshooting and recommissioning
- Lower load on tertiary treatment systems
- Reduced mosquito and odour-related issues

6. Case Study

50 MLD Municipal STP in PUNE CITY (ASP Technology)

Background

During my tenure as O&M In-Charge (2007–2010), the plant was operating significantly below its design capacity.

Key Challenges

- Heavy sludge accumulation (55–60 tonnes) in raw sewage pumping station
- High inlet BOD levels
- Inefficient blower performance due to design limitations
- Fouled diffusers affecting aeration efficiency
- Suboptimal sludge management

Interventions

- Removal of accumulated sludge, resulting in **20–25% reduction in inlet BOD**
- Replacement of undersized heat exchanger, restoring airflow efficiency
- Cleaning and reinstallation of diffusers
- Improved maintenance and operational practices

Breakthrough Innovation

The introduction of microbial culture (OED) in the **Primary Settling Tank** significantly reduced the organic load entering the aeration tank. This resulted in:

- Improved biological stability
- Achievement of design capacity
- Superior outlet water quality compared to design parameters

This marked the successful implementation of the **Odor Eliminator Decomposer**

Experience and Clients

Following this success, the OED approach was applied in the commissioning and optimization of **70–80 wastewater treatment plants (2011–2019)**.

The system is compatible with:

- All treatment technologies
- Any plant capacity
- Anaerobic digesters and biogas systems

In several cases, treated water parameters were recorded **below detectable limits**, demonstrating high efficiency.

Clients

Our OED solution has also been effectively applied for **odour control in solid waste management**, successfully eliminating offensive odours at landfill sites and biodegradable waste facilities across **15 municipalities in Odisha** and more than **6 cement plants utilizing Refuse Derived Fuel (RDF)**.

Additionally, OED has been supplied to three industrial units of [Reliance CBG Industries](#) for odor removal of pressed mud and has proven effective in sanitation systems, where it helps control flies and mosquitoes due to its natural larvicidal properties.

7. Conclusion

River rejuvenation efforts must go beyond infrastructure expansion and focus on **optimizing the performance of existing assets**. The current inefficiencies in municipal STPs represent a critical gap that can be addressed through targeted interventions.

The Odor Eliminator Decomposer (OED) offers a **sustainable, economical, and scalable solution** to enhance biological treatment processes. By enabling STPs to operate at or near their design capacity, OED can play a pivotal role in improving river water quality across urban India.

“Optimizing the already exists STP’s is the fastest route to cleaner rivers.”

Santosh Somnath Latnekar

Soil Fertility Institute,
Hadapsar, Pune 411028

Mobile 9561325565

Email soilfertility8@gmail.com

Website www.soilfertility.in

YouTube https://youtube.com/@Soil_Fertility_Institute

Facebook <https://www.facebook.com/bhu.mitra.7>

LinkedIn <http://linkedin.com/in/santosh-latnekar-844771356>