





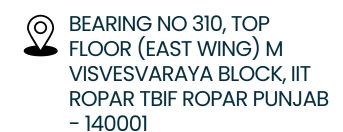
NanoKriti

Nanobubble Technology, IIT Ropar

Lake and Pond Treatment







About Nanokriti, IIT Ropar

Nanokriti is a clean-tech startup from IIT Ropar, founded in 2022. We develop nanobubble-based solutions for water treatment across sectors.

Who are we?

We're a team of professors, researchers, and engineers working together to build clean, sustainable water solutions using nanobubble technology.

what we do?

We design and manufacture nanobubble generators for diverse applications like agriculture, aquaculture, lake rejuvenation, and STP/ETP treatment.







WHAT ARE NANOBUBBLES?



Nanobubbles are tiny gas-filled cavities <200 nm in diameter.

They exhibit unique physical and chemical properties due to their small size.

Unique properties:

- High Surface Area-to-Volume Ratio
- Neutral Buoyancy
- Extended Lifetime

- Efficient Gas Exchange
- Non-Toxic and Eco-Friendly
- Stable



What do nanobubbles look like ?- NTA Video



Nanoparticle Tracking Analysis (NTA) is a specialized instrument used to measure and analyze nanobubbles. Since nanobubbles are extremely small, about 1,000 times smaller than what can be seen with the naked eye or even under a conventional microscope

STATE-OF-THE-ART TOOLS FOR NANOBUBBLE MEASUREMENT & ANALYSIS AT IIT ROPAR







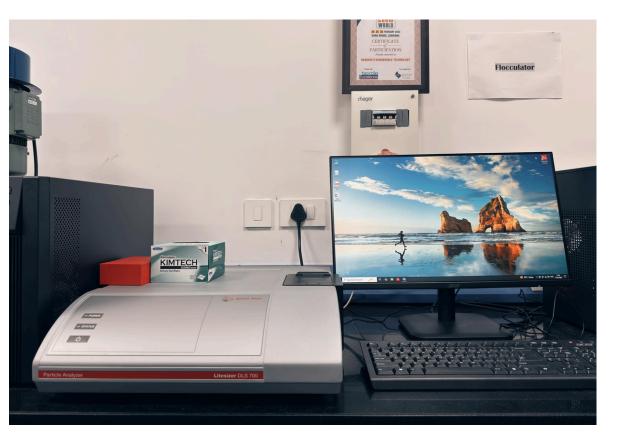
Gas Chromatography identifying, and quantifying volatile compounds in a mixture

Spectro Photometer

For characterising various chemical species



Tracking Analysis



Litesizer DLS

to characterize the size, zeta potential, and molecular mass of nano- and micro-particles in liquid dispersions

PUBLISHED WORK HIGHLIGHTING OUR RESEARCH EXCELLENCE

More than 20 research papers on Nanobubbles



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LANGMUIR Cite This: Langmuir 2018, 34, 10964–10973

pubs.acs.org/Langmuii

On the Existence and Stability of Bulk Nanobubbles

N. Nirmalkar, A. W. Pacek, and M. Barigou*

School of Chemical Engineering, University of Birmingham, Edgbaston, Birmingham B15 2TT, U.K.

LANGMUIR © Cite This: Langmuir 2019, 35, 2188–2195

Article

pubs.acs.org/Langmuir

Bulk Nanobubbles from Acoustically Cavitated Aqueous Organic Solvent Mixtures

N. Nirmalkar, A. W. Pacek, and M. Barigou*

School of Chemical Engineering, University of Birmingham, Edgbaston, Birmingham B15 2TT, U.K.

Soft Matter



PAPER

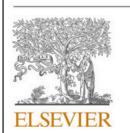
View Article Online View Journal | View Issue



Interpreting the interfacial and colloidal stability of bulk nanobubbles

Cite this: Soft Matter, 2018, 14, 9643

N. Nirmalkar, A. W. Pacek and M. Barigou *



Contents lists available at ScienceDirect

Water Research





journal homepage: www.elsevier.com/locate/watres



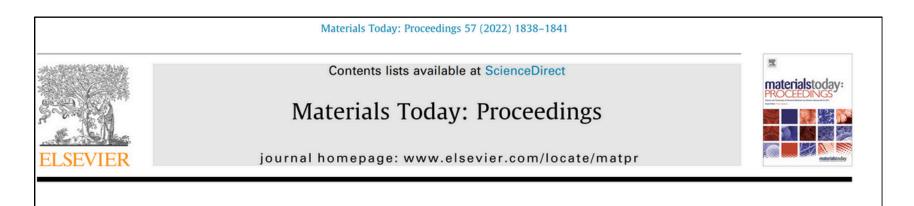
Ozone nanobubble technology as a novel AOPs for pollutants degradation under high salinity conditions

Priya Koundle a, Neelkanth Nirmalkar a, Malwina Momotko b, Grzegorz Boczkaj b, c, *

PUBLISHED WORK HIGHLIGHTING OUR RESEARCH EXCELLENCE

More than 20 research papers on Nanobubbles





Enhanced gas-liquid mass transfer coefficient by bulk nanobubbles in water

Harsh Sharma, Neelkanth Nirmalkar*



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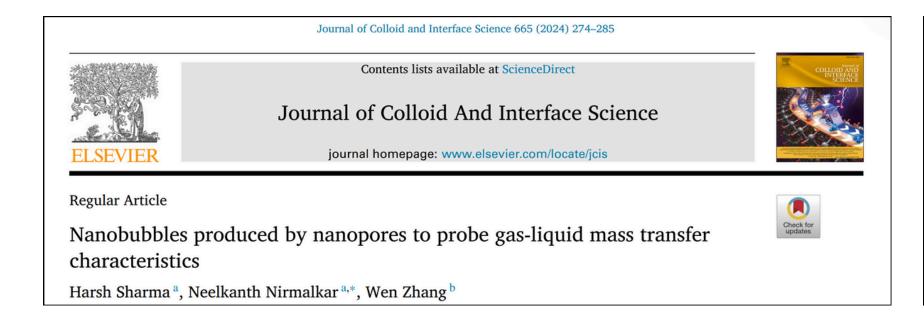
Do Nanobubbles Exist in Pure Alcohol?

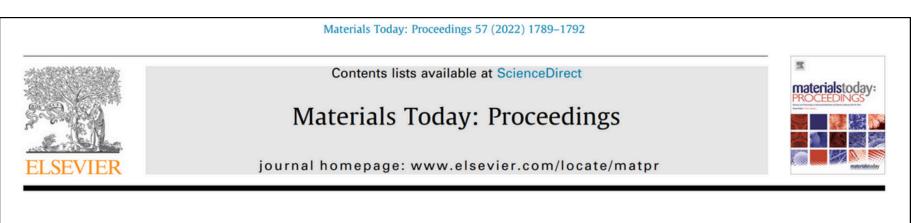
Harsh Sharma, Mohit Trivedi, and Neelkanth Nirmalkar*



Cite This: Langmuir 2024, 40, 1534–1543







Bulk nanobubbles in aqueous salt solution

Kalyani Agarwal, Mohit Trivedi, Neelkanth Nirmalkar*

Sectors We Transform

Driving Cleaner, Smarter, and More Sustainable Practices Industry-Wide



Lake and Pond



Aquaculture



Agriculture



STP and ETP



Our Products

Innovative Solutions for Cleaner, Healthier Water.







NanoCloud



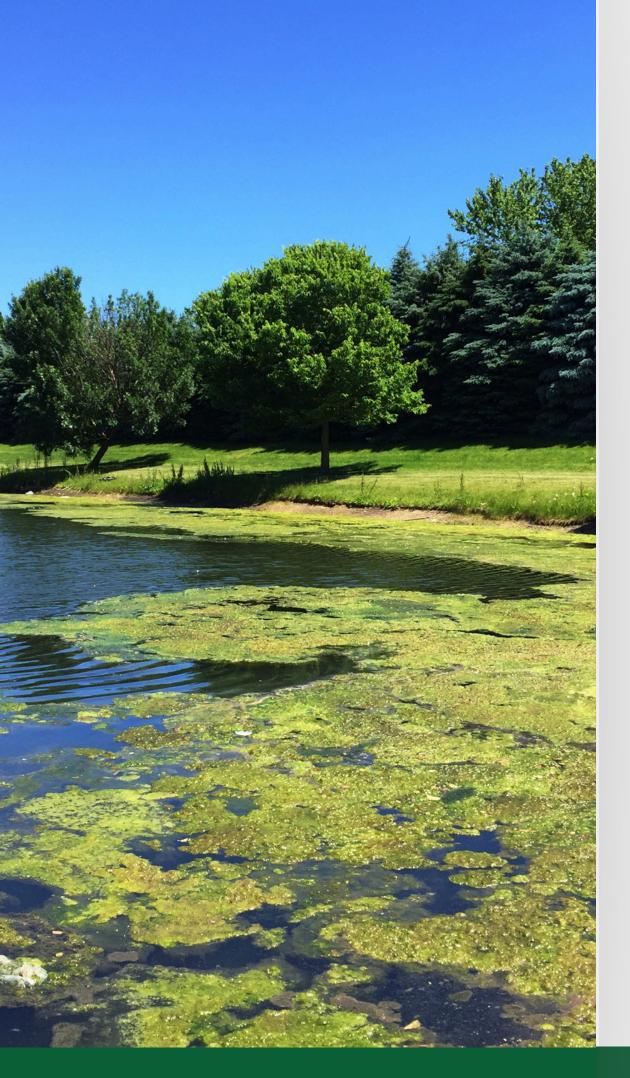
NanoE







Vitus





Problems

- Algal bloom
- Surfactants and household chemicals.
- Pungent odors
- Mosquitoes and diseases
- High bacterial load
- Lack of chemical-free, sustainable solution





Solution: NanoAqua

For Lake and Pond Treatment

NanoAqua is an oxygen-based nanobubble generator with an in-built oxygen concentrator.

- Produces ultra-fine nanobubbles with an average diameter of ~80 nm.
- Delivers a high nanobubble output density of over 1×10⁸ nanobubbles/ml.
- Achieves an excellent Oxygen Transfer Efficiency (OTE) of 75–80%.



Lake and Pond Pilot Projects

NanoKriti has successfully implemented five pilot installations across polluted community ponds and sewage water bodies in Punjab, India.

The pilot locations include:

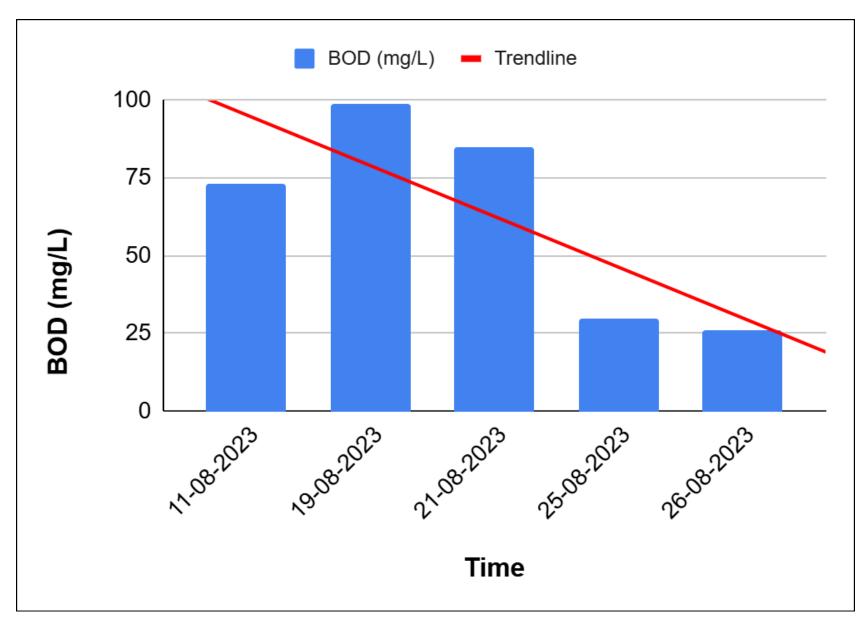
- Mahrauli Village
- Lakhmipur Village
- Ghataur Village
- Mansuha Village
- Phool Kalan Village

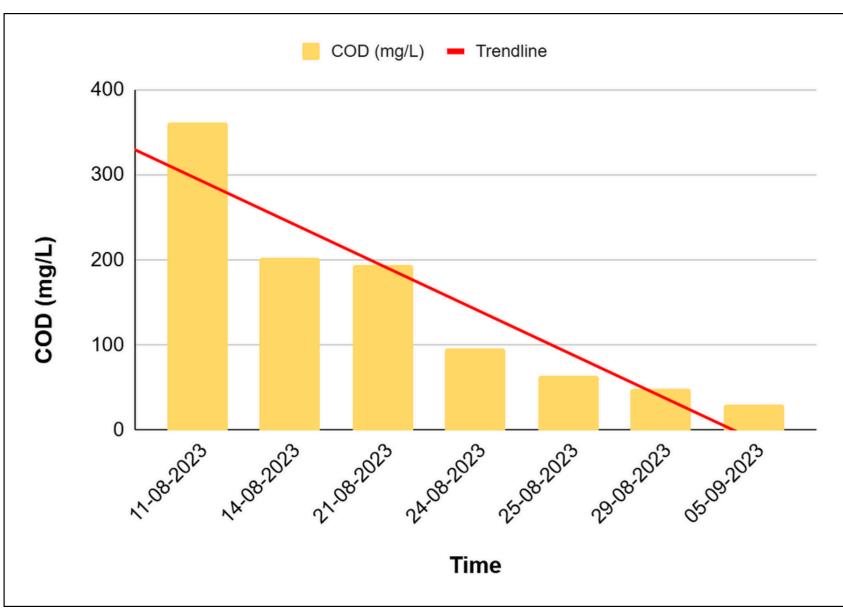


Phool Kalan Transformation



(~0.5 Acres Pond)





Phool Kalan Transformation



(~0.5 Acres Pond)





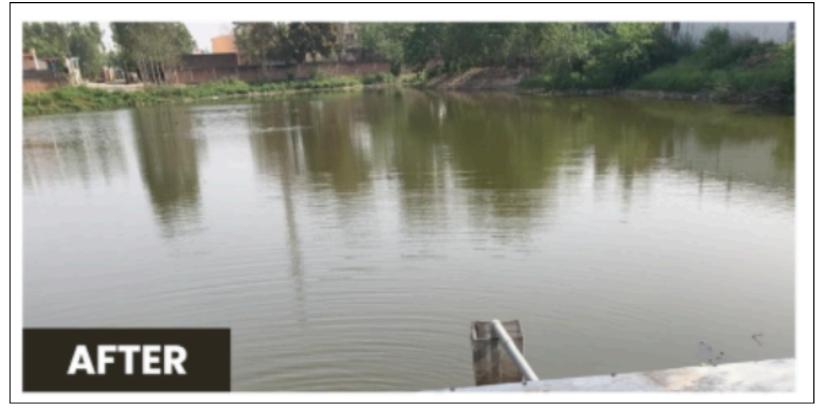


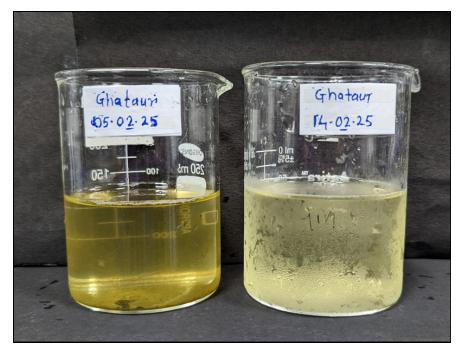
Ghataur

(~2.06 Acres Pond)





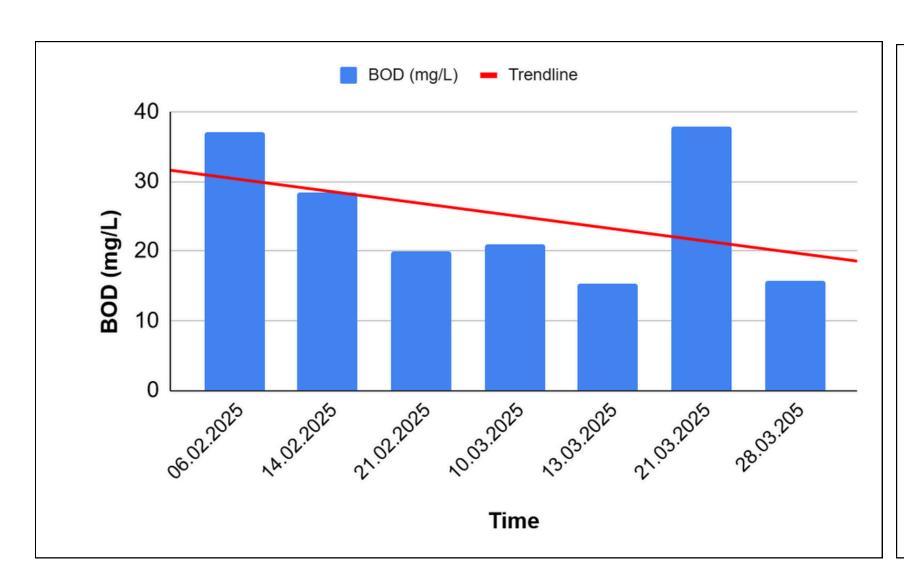


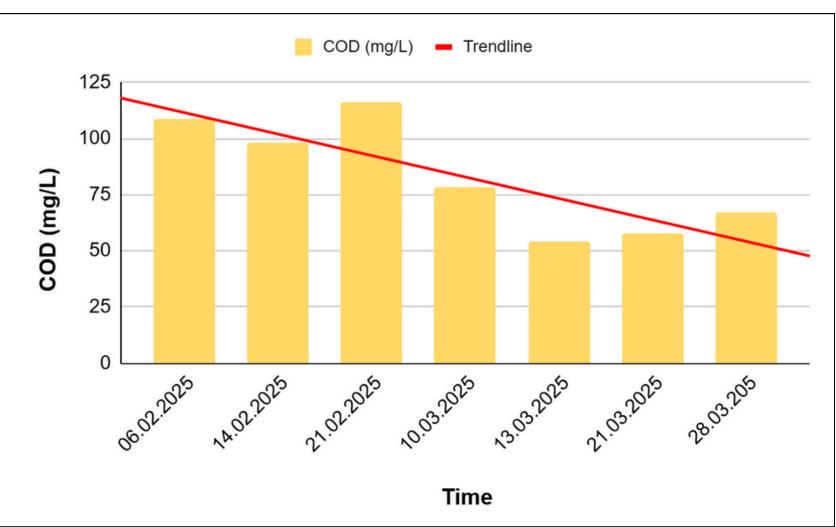






(~2.06 Acres Pond)

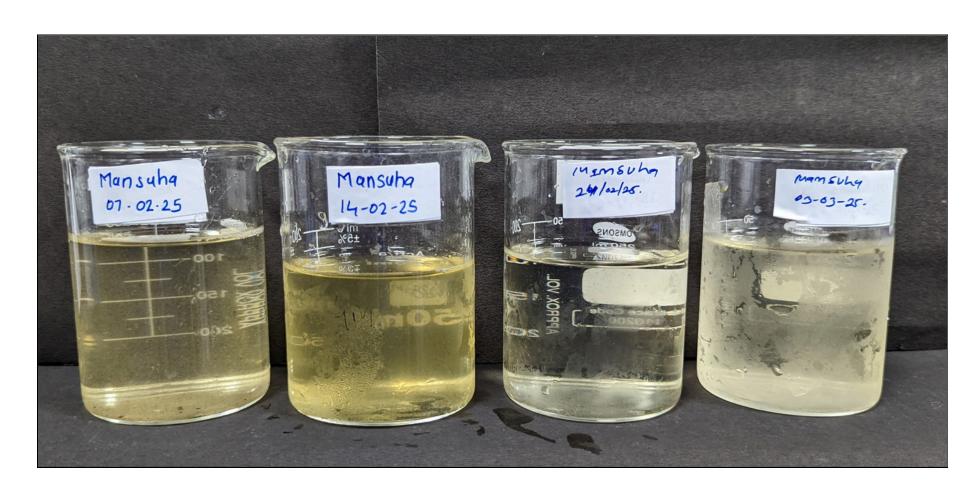




Mansuha

(~1.5-2 Acre Pond)



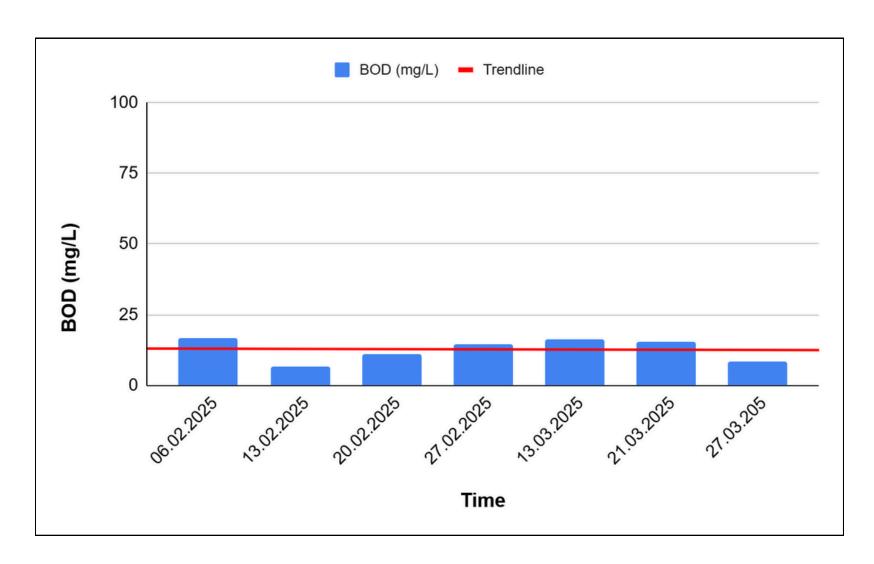


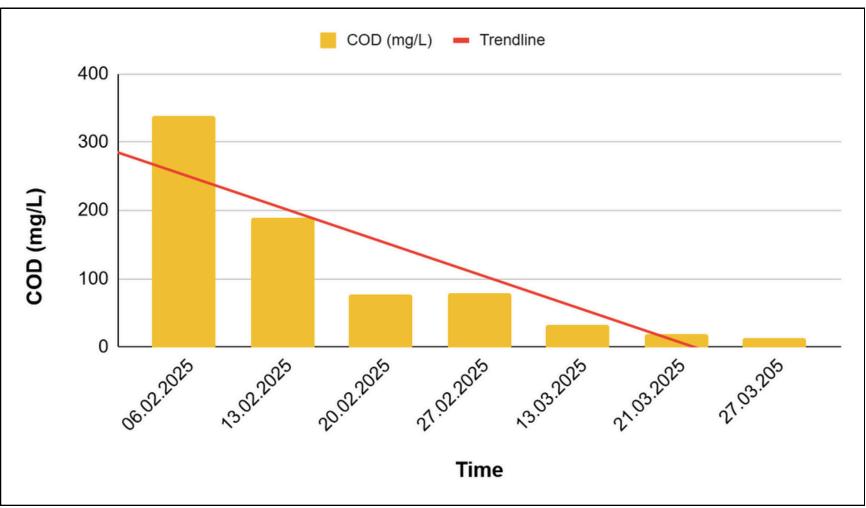


Mansuha

Nanokriti Nanobubble Technology

(~1.5-2 Acre Pond)



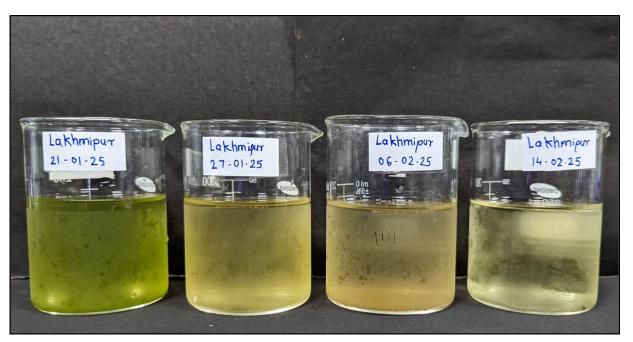


Lakhmipur (~1 Acre Pond)



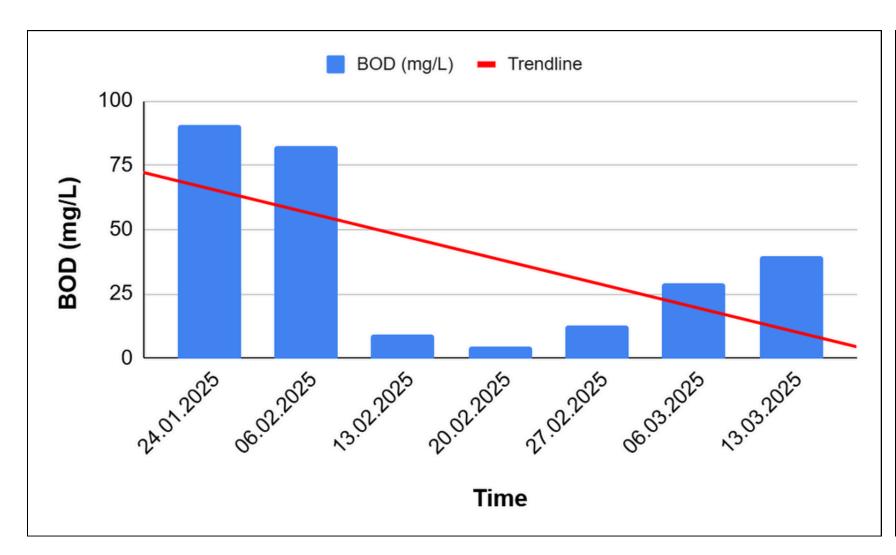


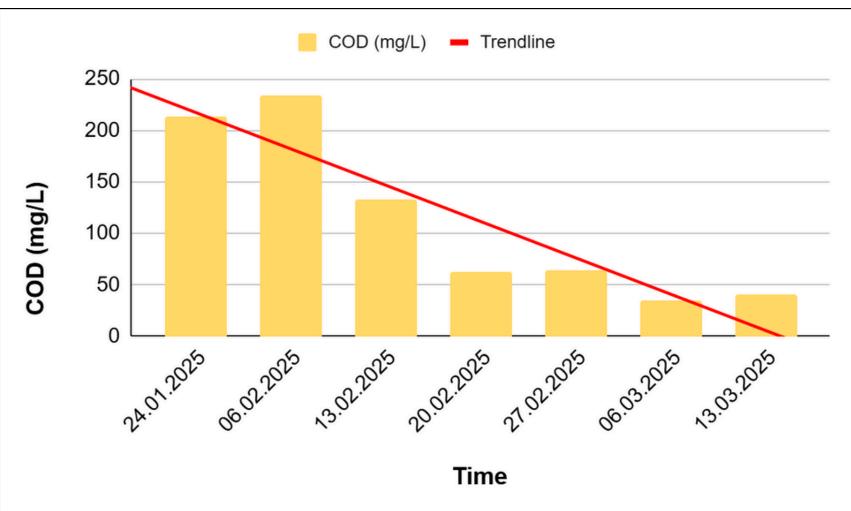






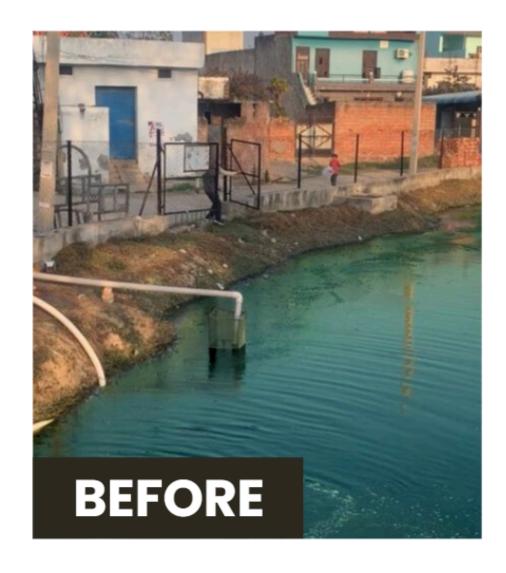






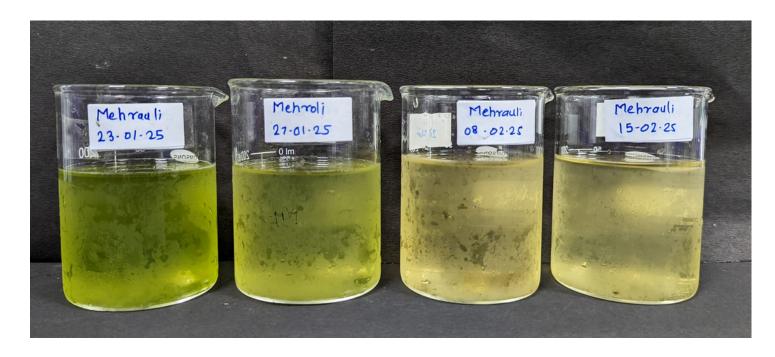
Mehrauli

(~2 Acres Pond)



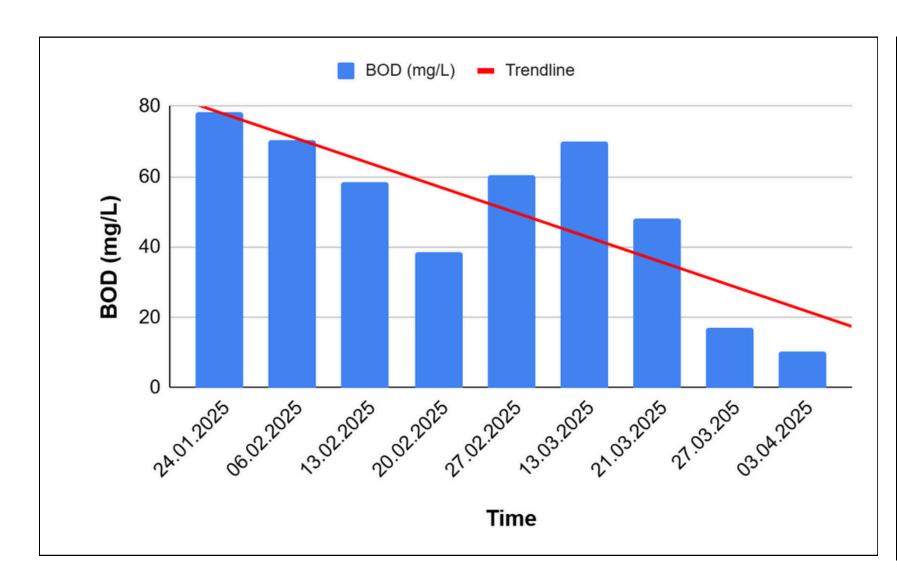


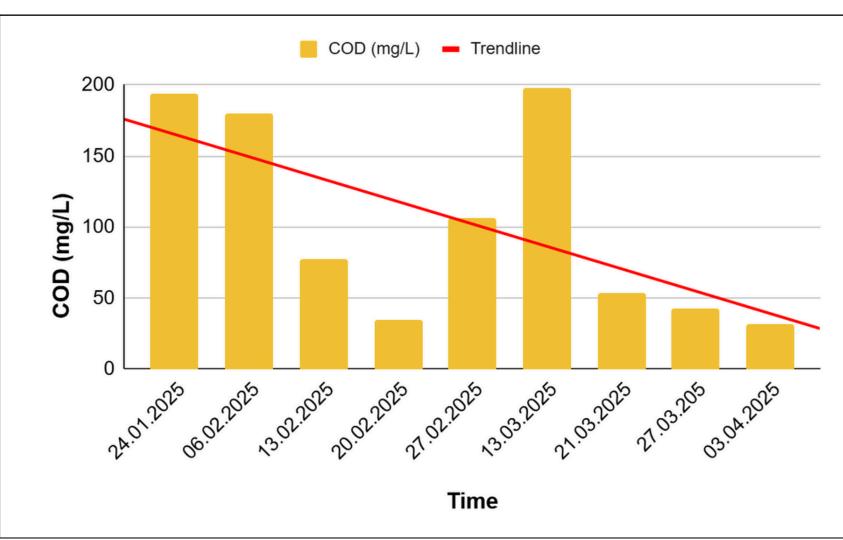




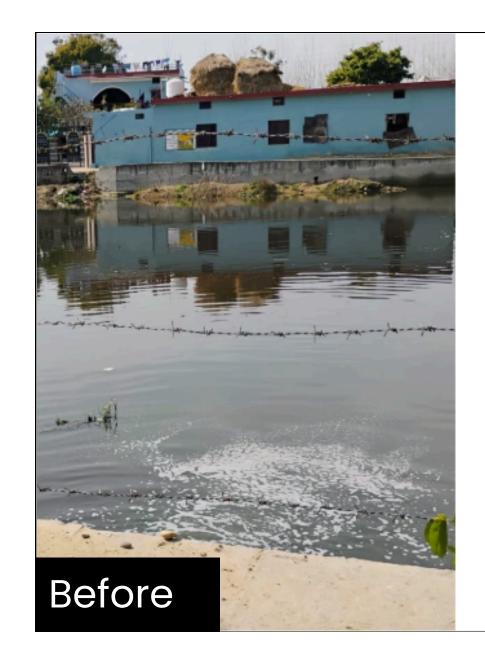
Mehrauli (~2 Acres Pond)

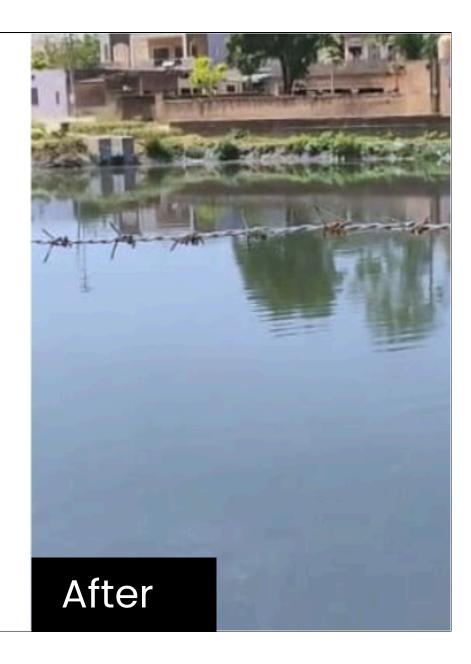


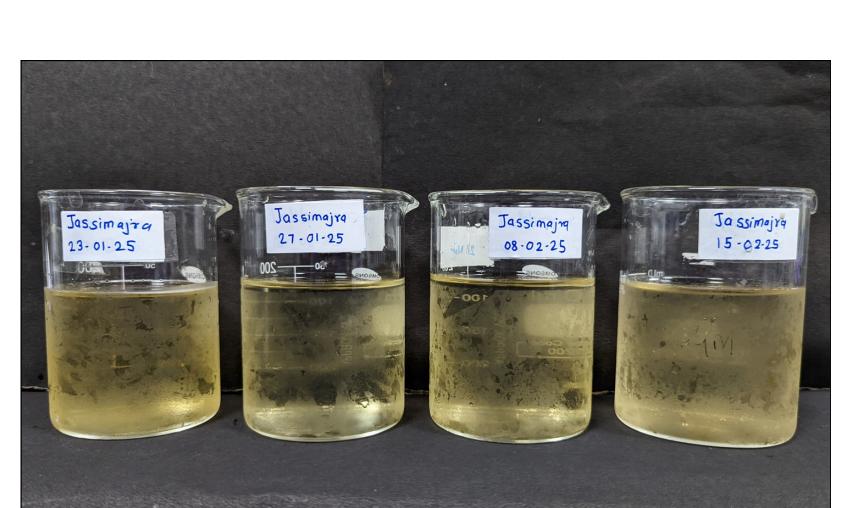




Jasse Majra (~1 Acre Pond)



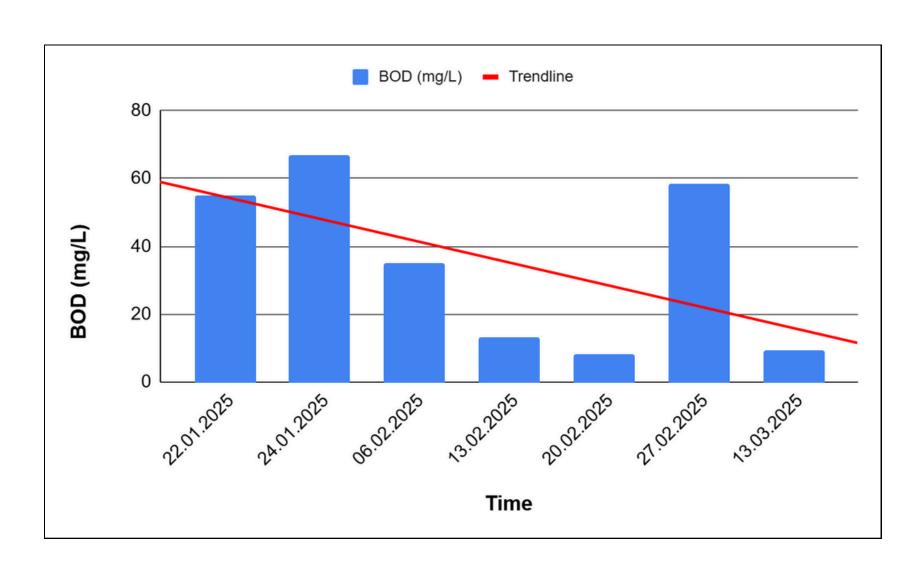


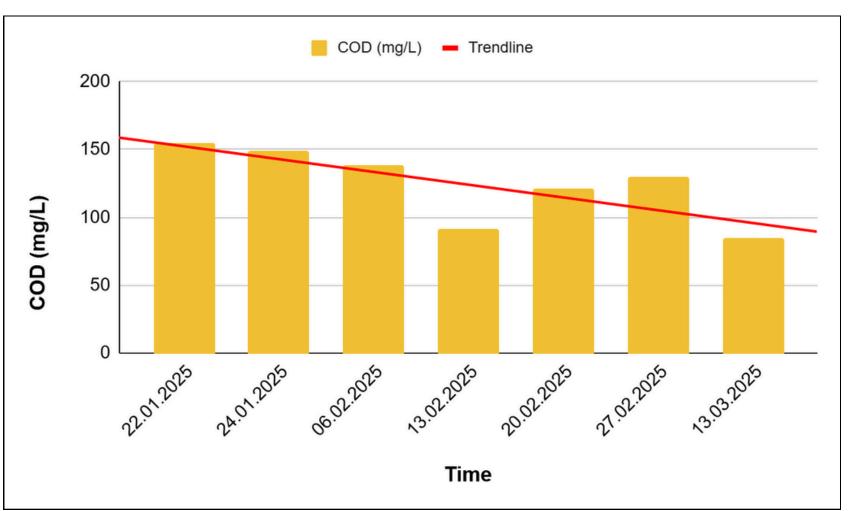


Nanobubble Technology

Jasse Majra (~1 Acre Pond)



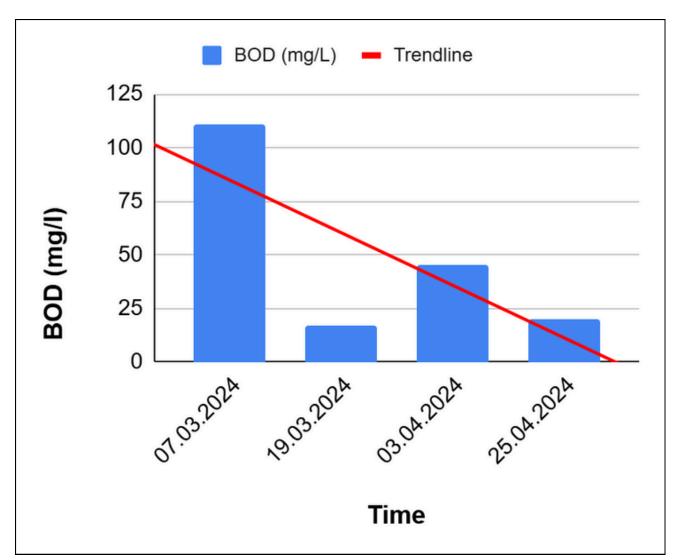


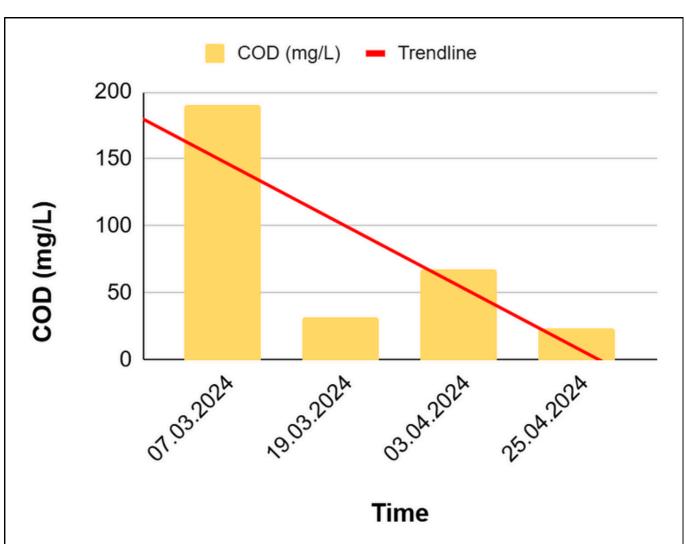


Littran Village

Nanokriti Nanobubble Technology

(~1 Acre Pond)













Bathinda, Dhelwa Village

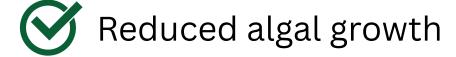
Area ~2.5 Acres



Rangsagar Lake, Udaipur

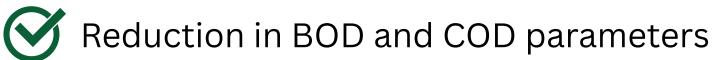


Results and Outcomes



Elimination of foul odors

Improved dissolved oxygen (DO) levels



Cower mosquito breeding

Reduced risk of waterborne diseases



Decrease in algal growth

leading to cleaner, healthier-looking ponds for community use



Remove foul odors

helping nearby residents enjoy a more livable, odor-free environment



Increase in dissolved oxygen (DO) levels

supporting aquatic life and overall water health



Decrease in BOD and COD parameters

improving water quality and making it safer for surrounding ecosystems



Lower mosquito breeding and disease risk

reducing chances of vector-borne diseases like dengue and malaria



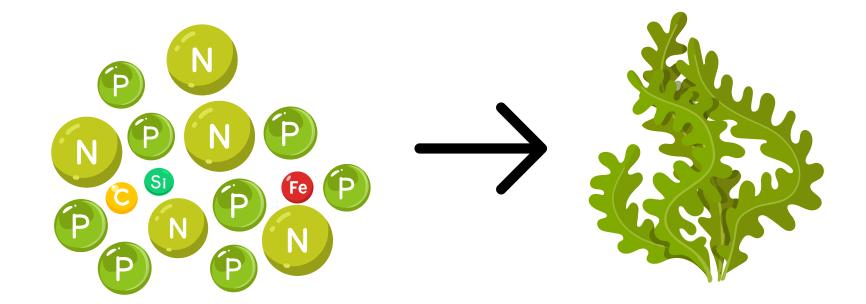
Reduction in bacterial load and organic pollutants

lowering health risks for people who rely on or live near the water source



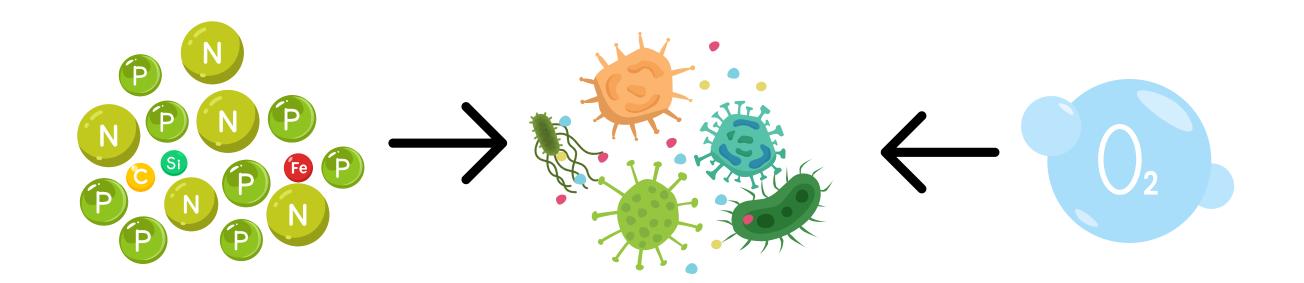
Water contains nutrients like nitrogen and phosphorus that enter the water from farms, sewage, and detergents.

When algae consume these, they grow rapidly and cover the water surface.





Fortunately, natural microorganisms also consume these nutrients, keeping algae under control. But they need oxygen to survive.



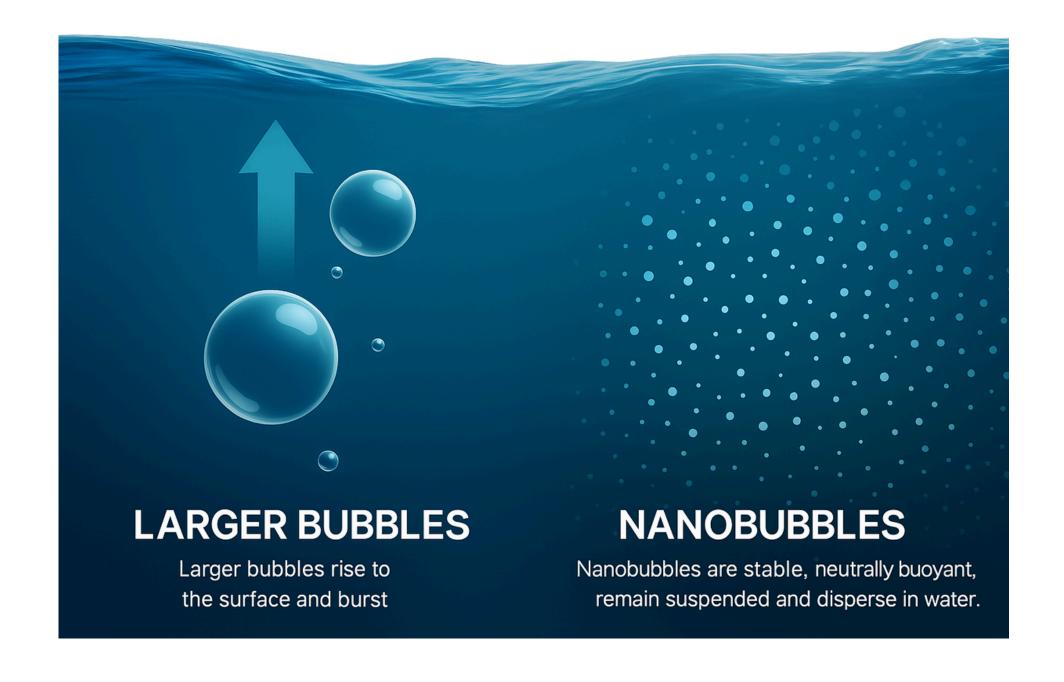
The real problem: lack of oxygen.



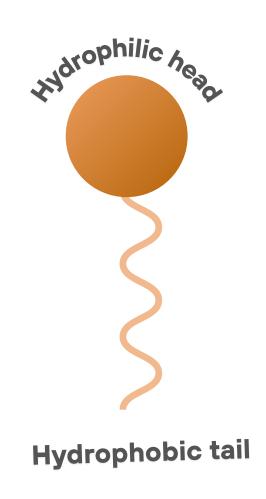
Nanobubbles are 1,000 times smaller than normal bubbles, don't rise or burst, and carry a natural surface charge. This makes them highly stable and efficient in oxygen transfer.

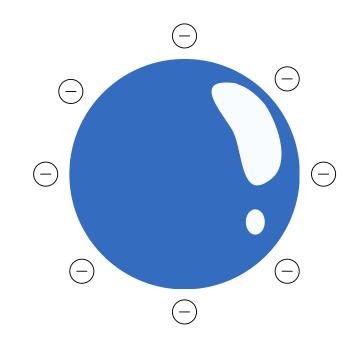
Nanobubbles deliver oxygen deep into the water, keeping microorganisms alive, breaking down waste naturally, and preventing algae growth.

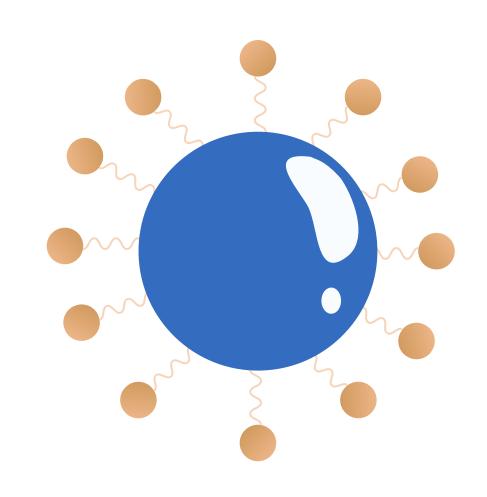
This restores balance, removes foul odor, and brings life back to the pond.











 Surfactants are amphiphilic molecules

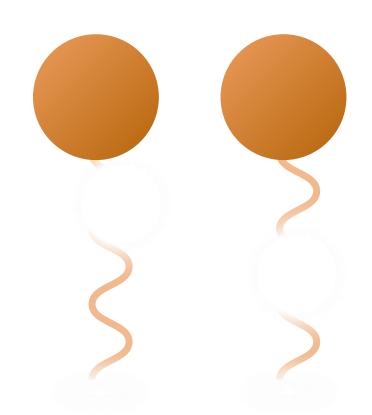
- Hydrophobic and charged surface
- High internal pressure

Nanobubbles attract and trap surfactants





 Nanobubbles collapse and releases pressure



 Breaks apart the surfactants at a molecular level

Some Recent Achievements





First Place at L&T Future Tech Aqua Hackathon for wastewater treatment

Nanokriti Nanobubble Technologies (IIT Ropar) won 1st place and ₹3 Lakhs at L&T Water & Effluent Treatment IC's Future Tech Aqua Hackathon, Kancheepuram, competing among 118 startups.

Best Startup Exhibition Award at AgriTech Innovation Hub Launch

Team Nanokriti showcased its nanobubble technology for sustainable agriculture at SVPUAT, Meerut, among 21 innovative startups, and was honored with the Best Startup Exhibition Award.

The event saw 700+ attendees and the presence of key leaders, celebrating farmer-first, tech-driven agriculture.



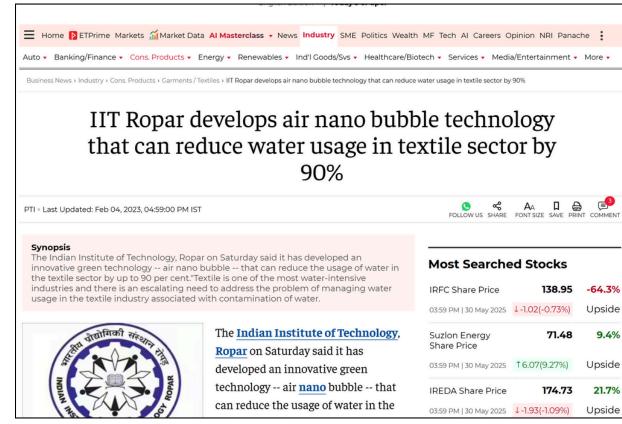
Nanokriti In News





CHANDIGARH: A pilot initiative aimed at cleaning village ponds through the use of a nano bubble generator, developed by the Indian Institute of Technology (IIT) Ropar, was launched on Wednesday in village Jasse Majra, in collaboration with the department of water supply and sanitation.

Ropar MLA Dinesh Chadha said that water samples will be taken before and after the process to check



साहू पोखर में पानी साफ करने के लिए लगी मशीन

मुजपफरपुर. साहू पोखर पर पानी को क्लीन करने के लिण् एक नोबेल तकनीकी मशीन का फीता काटकर केंद्रींय राज्य मंत्री राजभूषण निषाद ने उद्घाटन किया. तालाब में पल रहे बैक्टीरिया और पानी को क्लीन करने की एक पूरे प्यूरी फायर मशीन की तरह काम करेगी. भारतीय सेवा दल के अध्यक्ष

विक्रम सर्राफ ने बताया कि यह नैनो कीर्ति मशीन उत्तर बिहार में पहली मशीन है, जो साहू पोखर पर लगी है. मौके पर मेयर निर्मला साहू जी ,शिव शंकर साहू ,डॉ संजीव गुप्ता जी ,डिप्टी मेयर मोनालिसा , राजेश हनुमान ,, सांसद प्रतिनिधि विकास गुप्ता , इंजीनियर सुमित , नैनो बॉल कंपनी के विनय कुमार सहित कई उपस्थित थे.

Nanokriti In News



FRI,18 APRIL 2025 **EDITION: BATHINDA BANI, PAGE NO. 3**

ਸੂਬਾ ਸਰਕਾਰ ਪਿੰਡਾਂ ਦੇ ਵਿਕਾਸ ਲਈ ਵਚਨਬੱਧ ਤੇ ਯਤਨਸ਼ੀਲ : ਮਾ. ਜਗਸੀਰ ਸਿੰਘ

ਸਿੰਘ ਮਾਨ ਦੀ ਯੋਗ ਅਗਵਾਈ ਵਾਲੀ ਸਬਾ ਸਰਕਾਰ ਪਿੰਡਾਂ ਅੰਦਰ ਹੋਣ ਵਾਲੇ ਵਿਕਾਸ ਕਾਰਜਾਂ ਤੋਂ ਇਲਾਵਾ ਛੱਪੜਾਂ ਦੀ ਸਾਫ-ਸਫਾਈ ਦੇ ਨਾਲ-ਨਾਲ ਵਾਤਾਵਰਣ ਦੀ ਸ਼ੁਧਤਾ ਨੂੰ ਮੁੱਖ ਰੱਖਦਿਆਂ ਪਾਰਕ ਬਣਾ ਕੇ ਵਿਸ਼ੇਸ਼ ਪਹਿਲ ਕਦਮੀਆ ਕਰ ਰਹੀ ਹੈ।

ਇਨ੍ਹਾਂ ਗੱਲਾਂ ਦਾ ਪਗਟਾਵਾ ਵਿਧਾਇਕ ਭੁੱਚੋ ਮੰਡੀ ਮਾਸਟਰ ਜਗਸੀਰ ਸਿੰਘ ਨੇ ਜ਼ਿਲੇ ਦੇ ਪਿੰਡ ਢੇਲਵਾਂ ਵਿਖੇ ਨੈਨੋਂ ਬਬਲ ਤਕਨਾਲੋਜੀ ਤਹਿਤ 9 ਲੱਖ 44 ਹਜ਼ਾਰ ਰੁਪਏ ਦੀ ਲਾਗਤ ਨਾਲ ਪਿੰਡ ਦੇ ਛੱਪੜ ਦੇ ਗੰਦੇ ਪਾਣੀ ਨੂੰ ਸਾਫ ਕਰਨ ਲਈ ਲਗਾਈ ਮਸ਼ੀਨ ਦੀ ਸ਼ੁਰੂਆਤ ਕਰਨ ਮੌਕੇ ਕੀਤਾ। ਇਸ ਪੰਚ, ਜਗਸੀਰ ਸਿੰਘ ਪੰਚ, ਗੁਰਸੇਵਕ ਸਿੰਘ ਪੰਚ, ਮੱਖਣ ਸਿੰਘ ਮੈਕੇ ਉਨ੍ਹਾਂ ਦੇ ਨਾਲ ਡਿਪਟੀ ਕਮਿਸ਼ਨਰ ਸ਼ੌਕਤ ਅਹਿਮਦ ਪਰੇ ਅਤੇ ਵਧੀਕ ਡਿਪਟੀ ਕਮਿਸ਼ਨਰ (ਵਿਕਾਸ) ਮੈਡਮ ਕੰਚਨ ਵਿਸ਼ੇਸ਼ ਤੌਰ 'ਤੇ ਮੌਜੂਦ ਰਹੇ।

ਇਸ ਦੌਰਾਨ ਡਿਪਟੀ ਕਮਿਸ਼ਨਰ ਨੇ ਪਿੰਡ ਵਾਸੀਆਂ ਨਾਲ ਵਿਕਾਸ ਕਾਰਜਾਂ ਸਬੰਧੀ ਚਰਚਾ ਕਰਦਿਆਂ ਪਿੰਡ ਦੀ ਪੰਚਾਇਤ ਵੱਲੋਂ ਕੀਤੇ ਗਏ ਕੰਮਾਂ ਦੀ ਸ਼ਲਾਘਾ ਕੀਤੀ।ਉਨ੍ਹਾਂ ਕਿਹਾ ਕਿ ਜੋ ਵੀ ਪਿੰਡ ਲੋਕ ਭਲਾਈ ਤੋਂ ਇਲਾਵਾ ਪਿੰਡ ਦੇ ਵਿਕਾਸ ਲਈ ਚੰਗੇ ਕੰਮ ਕਰਨਗੇ ਅਤੇ ਉਸ ਪਿੰਡ ਦੀ ਪੰਚਾਇਤ ਨੂੰ ਵਿਕਾਸ ਕਾਰਜਾਂ 'ਤੇ ਖਰਚ ਹੋਈ ਰਾਸ਼ੀ ਤੋਂ ਇਲਾਵਾ ਜ਼ਿਲਾ ਪਸ਼ਾਸਨ ਵੱਲੋਂ ਦੁਗਣੀ ਰਾਸ਼ੀ ਪਿੰਡ ਵਾਸੀਆਂ ਨੂੰ ਨੇ ਪ੍ਰਾਜੈਕਟ ਨੂੰ ਨੇਪਰੇ ਹੋਰ ਵਿਕਾਸ ਕਾਰਜਾਂ ਲਈ ਮਹੱਈਆ ਕਰਵਾਈ ਜਾਵੇਗੀ

ਨਥਾਣਾ, 17 ਅਪ੍ਰੈਲ (ਬੱਜੋਆਣੀਆਂ)-ਮੁੱਖ ਮੰਤਰੀ ਪੰਜਾਬ ਭਗਵੰਤ ਭਵਨ ਵਿਖੇ ਸਮੂਹ ਪਿੰਡ ਵਾਸੀਆਂ ਦੀਆਂ ਸਾਂਝੀਆਂ ਸਮੱਸਿਆਵਾਂ ਸਣਨ ਤੋਂ ਇਲਾਵਾ ਪਿੰਡ ਅੰਦਰ ਚੱਲ ਰਹੇ ਅਤੇ ਹੋਣ ਵਾਲੇ ਵਿਕਾਸ ਕਾਰਜਾਂ ਸਬੰਧੀ ਜਾਣਿਆ।

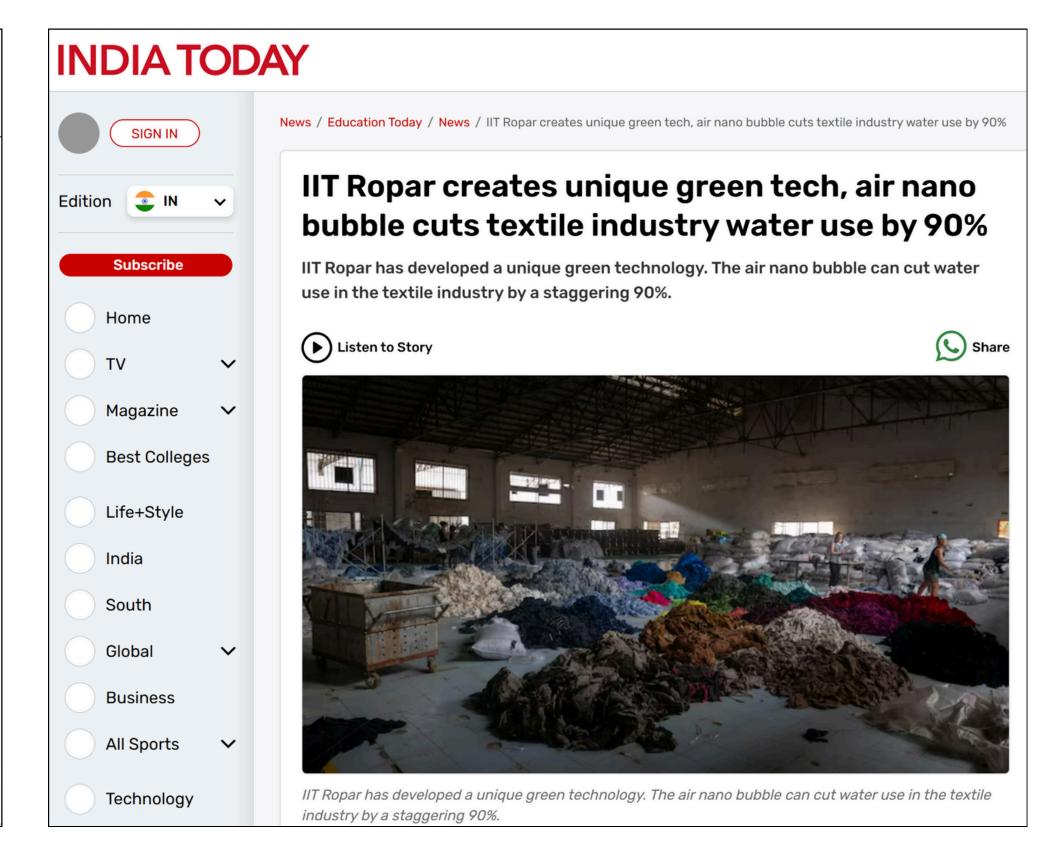
> ਇਸ ਮੌਕੇ ਪਿੰਡ ਵਾਸੀਆਂ ਵੱਲੋਂ ਸੋਲਰ ਲਾਈਟਾਂ ਤੇ ਸਰਕਾਰੀ ਮਿਡਲ ਸਕਲ ਦੀ ਨਵੀਂ ਇਮਾਰਤ ਬਣਾਉਣ ਦੀ ਵੀ ਮੰਗ ਰੱਖੀ। ਇਸ ਮੌਕੇ ਡਿਪਟੀ ਕਮਿਸ਼ਨਰ ਨੇ ਉਨ੍ਹਾਂ ਨੂੰ ਭਰੌਸਾ ਦਵਾਉਂਦਿਆਂ ਕਿਹਾ ਕਿ ਉਨਾਂ ਦੇ ਕੰਮਾਂ ਨੂੰ ਪਹਿਲ ਦੇ ਆਧਾਰ 'ਤੇ ਕੀਤਾ ਜਾਵੇਗਾ।

ਇਸ ਮੌਕੇ ਮਨਜੀਤ ਕੌਰ ਸਰਪੰਚ, ਗਰਚਰਨ ਚੰਨੀ ਮੀਰਾਬ ਪੰਚ, ਚਮਕੌਰ ਸਿੰਘ ਗਿੱਲ, ਅਮਰਜੀਤ ਕੌਰ ਪੰਚ, ਅਮਨਦੀਪ ਕੌਰ ਪੰਚ, ਸੂਰਜੀਤ ਕੌਰ ਪੰਚ, ਜਵਾਹਰ ਸਿੰਘ ਪੰਚ, ਗੂਰਲਾਭ ਸਿੰਘ ਸਾਬਕਾ ਸਰਪੰਚ, ਗਰਜੇਟ ਸਿੰਘ ਮਾਨ, ਗਰਲਾਭ ਸਿੰਘ ਸਿੱਧ, ਡਾਕਟਰ ਇੰਦਰਜੀਤ ਸਿੰਘ, ਪਿਆਰਾ ਸਿੰਘ ਪਧਾਨ, ਹਰਪੀਤ ਸਿੰਘ ਨੰਬਰਦਾਰ, ਬਾਬਾ ਬਲਬੀਰ ਸਿੰਘ ਦਰਵੇਸ਼ , ਜਸਵੰਤ ਸਿੰਘ

ਮਿਸਤਰੀ, ਰੁਲਦੁ ਸਿੰਘ ਸਿੱਧੂ, ਪੱਪੀ ਸਿੰਘ ਨੰਬਰਦਾਰ ਆਦਿ ਚੜ੍ਹਾਉਣ ਲਈ ਅਹਿਮ ਰੋਲ







Other Installations















Other Projects and case studies



- 1. Rangasagar Lake, Udaipur, Rajasthan https://www.nanokriti.com/case-study-lakes-and-ponds-3/
- 2. Community Sewage Pond Ghoga Village https://www.nanokriti.com/case-study-lakes-and-ponds-4/
- 3. Community Sewage Pond Litran Village https://www.nanokriti.com/case-study-lakes-and-ponds-2/

