PRESS RELEASE

IIT Guwahati Researchers Explore Traditional Assamese Fermented Food for Sustainable Industrial Applications

Media Coverage

Researchers from Indian Institute of Technology Guwahati have explored *Panitenga*, a traditional Assamese fermented food, to identify beneficial microbes with industrial potential. Led by Dr. Lalit Mohan Pandey, the team isolated *Bacillus subtilis* SMP-2, a strain capable of producing eco-friendly biosurfactants with applications in oil recovery, bioremediation, and pharmaceuticals. This work highlights how traditional food knowledge can inform modern biotechnology, offering sustainable alternatives to chemical surfactants while advancing probiotic research. Published in Food and Bioproducts Processing, the study also points toward future scale-up efforts, including simulated marine applications and integration with natural adsorbent systems for efficient oil-spill remediation. The story has got wide coverage in more than 50+ news apart from social media platforms i.e. Twitter, Facebook.

IIT GUWAHATI EXPLORES ASSAMESE FERMENTED FOOD FOR SUSTAINABLE INDUSTRY USES

OUR CORRESPONDENT

Researchers from IIT Guwahati have analysed Panitenga, a traditional fermented food from Assam, to identify beneficial bacterial strains with potential industrial applications.

Panitenga is a staple in Assamese cuisine, made by fermenting mustard seeds with acidic extracts from mangosteen, tamarind, or lime juice, the mixture is kneaded into a dough, wrapped in banana leaves, and left to ferment in bamboo containers for one to two weeks. While fermented foods are widely recognized for their probiotic benefits, such as aiding digestion and improving gut health, certain bacteria present in these foods also have the capability to produce valuable industrial chemicals or compounds.

The research team at IIT Guwahati, led by Prof Lalit Mohan Pandey, Department of Biosciences and Bioengineering, identified Bacillus subtilis SMP-2, as a

significant bacterial strain present in Panitenga. This strain has the unique ability to produce biosurfactants, which are natural compounds with diverse industrial and environmental applications.

Surfactants are substances that help mix materials that do not naturally combine, such as oil and water. They are commonly used in products such as soaps, detergents, and shampoos, allowing them to remove grease and dirt. Unlike chemical surfactants, which can be harmful to the environment, biosurfactants are biodegradable, eco-friendly, and effective even under extreme conditions.

IIT-G unlocks industrial potential of traditional Assamese fermented food

CHRONICLE NEWS SERVICE

GUWAHATI: Researchers from the Indian Institute of Technology (IIT) Guwahati have analyzed Panitenga, a traditional Assamese fermented food, to identify beneficial bacterial strains with significant industrial and environmental applications.

Panitenga, a staple in Assamese cuisine, is made by fermenting mustard seeds with acidic extracts from mangosteen, tamarind, or lime juice. The mixture is kneaded into a dough, wrapped in banana leaves, and left to ferment in bamboo containers for one to two weeks. This process enhances flavour and texture while fostering the growth of beneficial bacteria. While fermented foods are known for their probiotic benefits, certain bacteria within them also produce valuable bioactive compounds with industrial potential.

A research team led by Prof. Lalit Mohan Pandey, Associate , Professor, Department of ' Biosciences and Bioengineering, IIT Guwahati, identified Bacillus subtilis SMP-2 as a key bacterial strain in Panitenga. This strain produces biosurfactants—natural compounds with a wide range of industrial and environmental applications.

Surfactants aid in mixing substances that do not naturally combine, such as oil and water. Unlike synthetic surfactants used in detergents, which can be harmful to the environment, biosurfactants are biodegradable, eco-friendly, and effective under extreme conditions. Their applications include microbial-enhanced Oil Recovery (MEOR): Improving oil extraction efficiency from underground reservoirs, Bioremediation: Cleaning up oil spills in oceans and soil,

Cosmetics & Pharmaceuticals: Replacing synthetic additives in skincare and drug formulations and Optimizing Biosurfactant Production.

Prof. Lalit M. Pandey with his research scholar Ms. Smrity Sonbhadra.

Under these conditions, the bacteria produced 8.13 grams per litre of a lipopeptide biosurfactant. This compound effectively reduced water surface tension, demonstrating its ability to break down oil and grease. Additionally, it remained stable across varying pH levels, temperatures, and salt concentrations. Notably, it exhibited 83% crude oil degradation efficiency at 10 g/L concentration, making it highly effective for environmental cleanup. This research bridges traditional food knowledge with modern biotechnology. By harnessing microbes from Panitenga, scientists are not only advancing probiotic research but also developing sustainable industrial solutions. The study, published in Food and Bioproducts Processing, was co authored by Prof. Lalit M. Pandey and research scholar Ms. Smrity Sonbhadra. The team is further working to integrate this process with a hydrophobic biosorbent system to enhance oil adsorption rates before initiating bioremediation. This innovative approach aims to improve oil spill waste management in marine environments, offering a sustainable alternative to conventional cleanup methods.

Prof. Pandey emphasized that his research group has spent over a decade studying biosurfactants derived from bacterial strains found in oil refineries, contaminated soils, and seawater. These bio-based surface-active molecules have demonstrated immense potential for environmental cleanup and biomedical applications.

The study underscores the untapped potential of indigenous fermented foods in developing eco-friendly, industrially viable solutions, reinforcing the significance of traditional knowledge in modern scientific advancements.

IIT-G researchers explore traditional fermented food for industrial applications

GUWAHATI, MARCH 20 /--/ Researchers from the Indian Institute of Technology-Guwahati (IIT-G) have analysed 'panitenga', a traditional fermented food from Assam, to identify beneficial bacterial strains with potential industrial applications. The research team at IIT-Guwahati, led by Lalit Mohan Pandey, associate professor, department of biosciences and bioengineering, IIT-G, identified bacillus subtilis SMP-2 as a significant bacterial strain present in 'panitenga'. This strain, the team claimed, has the unique ability to produce biosurfactants, which are natural compounds with diverse industrial and environmental applications. Surfactants are substances that help mix materials that do not naturally combine, such as oil and water. They are commonly used in products such as soaps, detergents and shampoos, allowing them to remove grease and dirt.

Unlike chemical surfactants, which can be harmful to the environment, biosurfactants are biodegradable, eco-friendly and effective even under extreme conditions.

The potential applications of biosurfactants include: microbial-enhanced oil recovery (MEOR) that improves oil extraction efficiency from underground reservoirs; bioremediation, which helps clean up oil spills in oceans and soil and, thirdly, replacement of synthetic additives in skincare and drug formulations.

Associate Professor Pandey said, "We optimised environmental conditions to maximise biosurfactant production from bacillus subtilis SMP-2. We found that the best conditions were a pH of 6, a temperature of 30 degrees Celsius, and a carbon-to-nitrogen ratio of 3:1, using glycerol as the carbon source and yeast extract as the nitrogen source." "Moreover, the isolated bacteria exhibited a remarkable potential for crude oil degradation (10 g/L), achieving an impressive degradation efficiency of 83 percent," Pandey said.

"Under these conditions, the bacteria produced 8.13 grams per litre of a lipopeptide biosurfactant. This biosurfactant significantly reduced the surface tension of water, indicating its effective ability to break down oil and grease. Furthermore, it exhibited high stability across varying pH levels, temperatures and salt concentrations. Its antimicrobial properties further make it a promising candidate for medical and healthcare applications," he said. EoIC

আই টি গুৱাহাটীৰ গৱেষকৰ বহনক্ষম ঔদ্যোগিক সমাধানৰ নতুন সম্ভাৱনা মুকলি

অসমৰ পৰম্পৰাগত খাদ্য পানীটেঙাৰ পৰা উপকাৰী বেক্টেৰিয়া চিনাক্ত

দৈনন্দিন বার্তাৰ সেৱা, উত্তৰ গুৱাহাটী, ২০ মার্চ ঃ আই টি গুৱাহাটীৰ গৱেষকসকলে বহনক্ষম ঔদ্যোগিক প্ৰয়োগৰ বাবে পৰম্পৰাগত অসমীয়া কিম্বনযুক্ত খাদ্যৰ জ্ঞানক আধুনিক জৈৱ-প্ৰযুক্তিৰ সৈতে সংযুক্ত কৰি বিজ্ঞানীসকলে প্ৰ'বায়'টিক গৱেষণাক আগুৱাই নিয়াৰ লগতে ■ ৮ পৃষ্ঠাত

A few media clip can be seen in:
https://youtu.be/edAdXqnFPEo?t=1550

https://youtu.be/3THi7diV-3k?feature=shared

https://www.youtube.com/watch?v=WjDSJxm3soM

List of consolidated coverage:
Date: 20th March 2025
Media: Millennium Post (Clip attached)
Edition: New Delhi, Kolkata
Page no: 11
Journalist: NA
Professor Mentioned: Prof. Lalit Mohan Pandey
Headline: IIT Guwahati Explores Assamese Fermented Food For Sustainable Industry Uses
URL:https://www.millenniumpost.in/k-reers/iit-guwahati-explores-assamese-fermented-food-for-sustainable-industry-uses-603010

Date: 19th March 2025
Media: The Economic Times
Edition: Online
Journalist: Bikash Singh
Professor Mentioned: Dr. Lalit Mohan Pandey
Headline: IIT Guwahati researchers analyse Panitenga, identify bacterial strains with potential industrial applications
URL: https://economictimes.indiatimes.com/news/india/iit-guwahati-researchers-analyse-panitenga-identify-bacterial-strains-with-potential-industrial-applications/articleshow/119218223.cms

Date: 19th March 2025
Media: India Today
Edition: Online
Journalist: Megha Chaturvedi
Professor Mentioned: Dr. Lalit Mohan Pandey
Headline: IIT Guwahati turns Assamese fermented food into industrial innovations
URL:https://www.indiatoday.in/education-today/latest-studies/story/iit-guwahati-turns-assamese-fermented-food-into-industrial-innovations-2695762-2025-03-19

Date: 19th March 2025
Media: HT Syndication
Edition: Online
Journalist: NA
Headline: IIT Guwahati explores traditional Assamese fermented food for industrial applications
URL:https://www.htsyndication.com/nuffoodspectrum/article/iit-guwahati-explores-traditional-assamese-fermented-food-for-industrial-applications/88813429

Date: 19th March 2025
Media: ETV Bharat
Edition: Online
Journalist: NA
Professor Mentioned: Dr. Lalit Mohan Pandey
Headline: IIT গুৱাহাটীৰ নতুন উদ্ভাৱন : অসমৰ পৰম্পৰাগত পানীটেঙাৰ পৰা উপকাৰী বেক্টেৰিয়া চিনাক্ত
URL:https://www.etvbharat.com/as/!state/iit-guwahati-identified-beneficial-bacteria-from-traditional-panitenga-of-assam-assam-news-ass25031905914

Date: 19th March 2025
Media: ETV Bharat
Edition: Online
Journalist: NA
Professor Mentioned: Dr. Lalit Mohan Pandey
Headline: Panitenga, The Staple Assamese Cuisine Has Possibilities For Sustainable Industrial Solutions: IITG
URL:https://www.etvbharat.com/en/!state/panitenga-the-staple-assamese-cuisine-has-possibilities-for-sustainable-industrial-solutions-iitg-enn25031907143

Date: 19th March 2025
Media: Skill Outlook
Edition: Online
Journalist: NA
Professor Mentioned: Dr. Lalit Mohan Pandey
Headline: IIT Guwahati Researchers Explore Traditional Assamese Fermented Food for Sustainable Industrial Applications
URL:https://skilloutlook.com/education/iit-guwahati-researchers-explore-traditional-assamese-fermented-food-for-sustainable-industrial-applications

Date: 19th March 2025
Media: G Plus
Edition: Online
Journalist: NA
Professor Mentioned: Dr. Lalit Mohan Pandey
Headline: IIT Guwahati Studies Assamese Fermented Food For Industrial Use
URL:https://guwahatiplus.com/guwahati/iit-guwahati-studies-assamese-fermented-food-for-industrial-use

Date: 19th March 2025
Media: Edu Advice
Edition: Online
Journalist: NA
Professor Mentioned: Dr. Lalit Mohan Pandey
Headline: IIT Guwahati Researchers Explore Traditional Assamese Fermented Food for Sustainable Industrial Applications
URL:https://eduadvice.in/educational-news-details/iit-guwahati-researchers/8097

Date: 19th March 2025
Media: Infodea
Edition: Online
Journalist: NA
Professor Mentioned: Dr. Lalit Mohan Pandey
Headline: IIT Guwahati Researchers Explore Traditional Assamese Fermented Food for Sustainable Industrial Applications
URL: https://infodea.in/campus-talk/iit-guwahati-researchers-explore-traditional-assamese-fermented-food-for-sustainable-industrial-applications/
Date: 19th March 2025
Media: Borok Times
Edition: Online
Journalist: Tiasha Banerjee
Professor Mentioned: NA
Headline: IIT Guwahati Transforms Assamese Fermented Foods into Groundbreaking Industrial Innovations
URL: https://boroktimes.com/iit-guwahati-transforms-assamese-fermented-foods-into-groundbreaking-industrial-innovations/

Date: 19th March 2025
Media: Northeast News
Edition: Online
Journalist: NA

Professor Mentioned: Dr. Lalit Mohan Pandey
Headline: IIT Guwahati explores traditional Assamese fermented food for sustainable industrial applications
URL:https://nenews.in/assam/iit-guwahati-explores-traditional-assamese-fermented-food-for-sustainable-industrial-applications/21929/

Date: 19th March 2025
Media: Nuffoods Spectrum
Edition: Online
Journalist: Shraddha Warde
Professor Mentioned: Dr. Lalit Mohan Pandey
Headline: IIT Guwahati explores traditional Assamese fermented food for industrial applications
URL:https://nuffoodsspectrum.in/2025/03/19/iit-guwahati-explores-traditional-assamese-fermented-food-for-industrial-applications.html

Date: 19th March 2025
Media: Syllad
Edition: Online
Journalist: NA
Professor Mentioned: Dr. Lalit Mohan Pandey
Headline: IIT Guwahati unlocks industrial potential of traditional Assamese fermented food
URL:https://www.syllad.com/iit-guwahati-unlocks-industrial-potential-of-traditional-assamese-fermented-food/

Date: 19th March 2025
Media: The Shillong Times
Edition: Online
Journalist: NA
Professor Mentioned: Dr. Lalit Mohan Pandey
Headline: IIT-G researchers explore traditional fermented food for industrial applications
URL:https://theshillongtimes.com/2025/03/19/iit-g-researchers-explore-traditional-fermented-food-for-industrial-applications/