



BIOFRACTAL: TECNOLOGIA QUE TRANSFORMA SUSTENTABILIDADE QUE INSPIRA

CÂMARA

MOTTA: LÍDERES VÃO DECIDIR SOBRE
VOTAÇÃO DO PROJETO DE ANISTIA
AOS CONDENADOS DO 8 DE JANEIRO

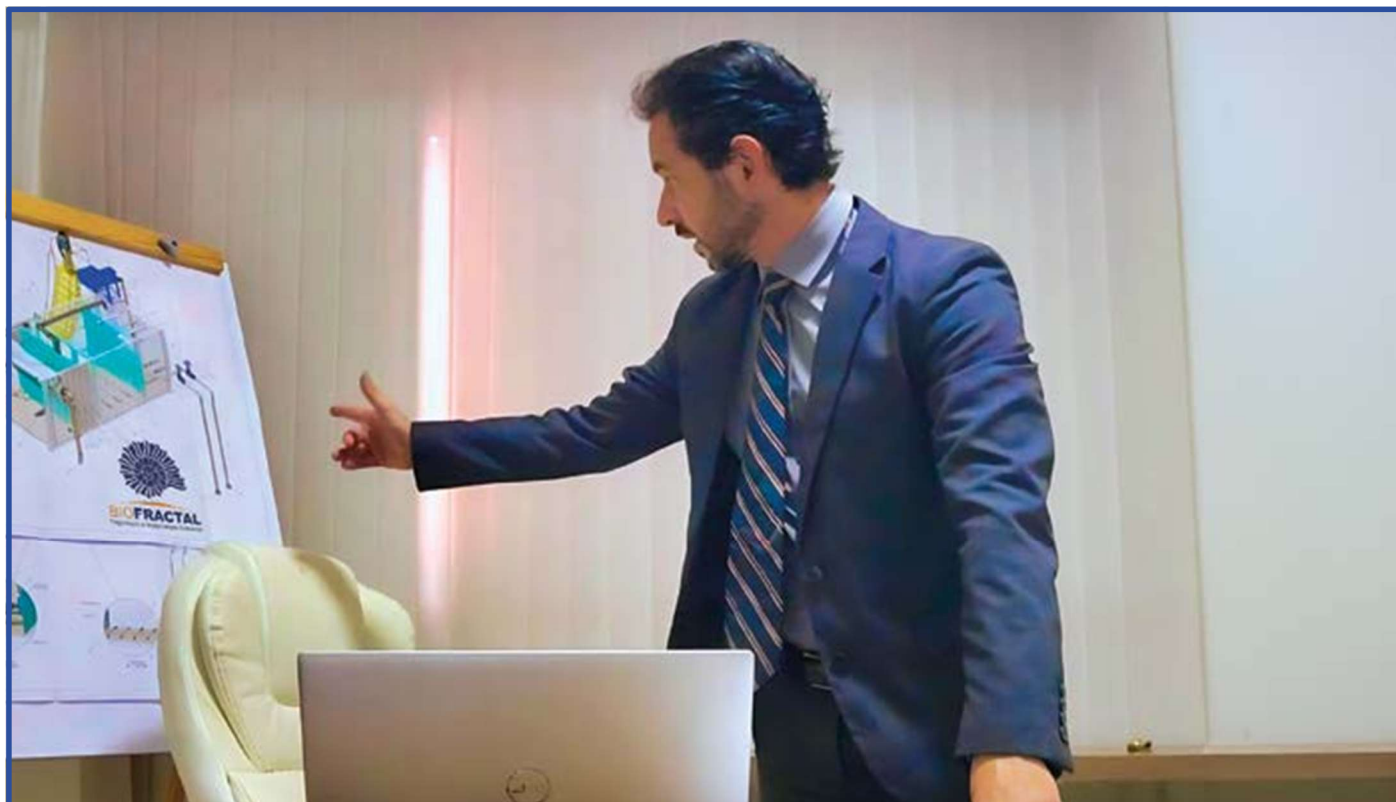
ESTADUAL

PARAHYBA E SUAS HISTÓRIAS
AS PRAIAS DE JOÃO PESSOA

SEGURANÇA

LULA: "A GENTE VAI TER O DOBRO DE
FORÇA PARA COMBATER O CRIME
ORGANIZADO"

BIOFRACTAL: TECNOLOGIA QUE TRANSFORMA, SUSTENTABILIDADE QUE INSPIRA



Basic sanitation is essential for public health, social development, and environmental preservation. Its absence is directly linked to the spread of disease, the degradation of water resources, and the increase in social inequalities. In Brazil, where 49 million people still live without access to sewage collection and treatment, according to data from the 2022 IBGE Census, the need for investment in this area is becoming urgent. Universal sanitation is an infrastructure goal, as well as a strategic measure for reducing infant mortality, improving living conditions, and ensuring sustainability.

In this scenario, specialized professionals and companies play a fundamental role in the search for innovative and viable solutions.

One of the main names in this sector is Fabiano Pontes Mendonça, CEO of Biofractal Engenharia e Biotecnologia Ambiental and Vice-president of the Environment and Sustainability

Council of the FCCE (Federation of Chambers of Foreign Commerce) and Vice-President of the Special Council for COP30/2025. With extensive experience as a researcher, university professor and speaker,



From left to right, Fabiano Pontes Mendonça; Bernardo Cabral, rapporteur of the 1988 Constituent Assembly, advisor to the National Confederation of Commerce; and Adair Roberto Carneiro, current President of the Federation of Chambers of Foreign Commerce.



He stands out for his work on environmental policies and for defending the implementation of advanced technologies for effluent treatment.

"The lack of adequate sanitation is one of the main drivers of diseases such as diarrhea, hepatitis A, leptospirosis, and schistosomiasis, which primarily affect the most vulnerable populations. Sewage treatment is not only an environmental issue, but also an effective strategy for reducing pressure on the healthcare system and improving the population's quality of life. Untreated sewage compromises water security and directly impacts the economy and the environment," notes CEO Mendonça.

According to him, Biofractal is a company that develops technologies for sustainable sewage treatment, contributing to the modernization of the sector. Among its innovations are plug-and-play containerized stations, which enable agile and efficient solutions for urban and rural areas.

"These technologies are essential for municipalities that need rapid and sustainable responses. Implementing modern systems is a viable path for public managers who want to change the sanitation reality in Brazil," explains CEO Mendonça.

Furthermore, the importance of basic sanitation is also at the center of global discussions. The topic is discussed at events such as the G20, which brings together the world's largest economies, and at COP30, the UN climate conference to be hosted by Brazil, in Belém, in 2025. The international debate reinforces the urgency of policies that prioritize the sustainable use of water resources and the advancement of sanitation infrastructure.

Another important fact to remember is the Legal Framework for Sanitation, enacted in 2020, which establishes guidelines to expand access to drinking water and sewage collection in the country. The goal is to ensure that 99% of the population has access to drinking water and 90% to sewage treatment by 2033.

Despite regulatory progress, the challenges for its implementation are great, requiring private investment, modernization of public management and the adoption of new technologies.

In addition to environmental and health impacts, poor sanitation affects education and the economy. Children living without access to treated water and sewage systems suffer from recurring health problems, negatively impacting their academic performance. Workers become ill more frequently, reducing productivity and increasing public health costs.

"Basic sanitation is an investment with a guaranteed return. Healthy populations attend school more, produce more, and have better living conditions. It's a factor that drives economic growth and reduces social inequalities. Investing in basic sanitation, especially in sewage treatment, is more than a government obligation: it's an act of respect for life and the future. For politicians, it's an opportunity to build a positive legacy, promote the health and quality of life of the population, and drive the country's sustainable development. Sanitation is, therefore, the foundation for a more just, healthy, and balanced society," says CEO Mendonça.

To learn more about the technological solutions offered by Biofractal Engenharia e Biotecnologia Ambiental or to schedule lectures, podcasts and interviews with Fabiano Pontes Mendonça, interested parties can contact him by email at comercial@biofractal.com.br or by phone at (19) 3835-5612 or WhatsApp at (47) 99972-0922.

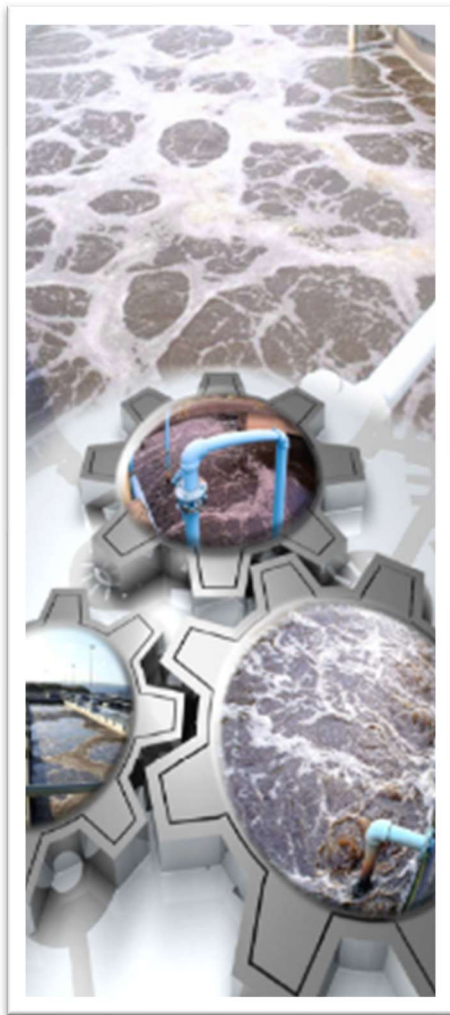
A REVOLUÇÃO NO SETOR DE SANEAMENTO

Founded in 2014, Biofractal was born with the goal of rethinking the country's sanitation infrastructure. Initially, it focused on diagnosing and operating sewage treatment plants, conducting audits, expert assessments, and specialized training. However, the realities of the sector revealed structural problems that went beyond the systems' operation. "The market's pain points were evident: poorly dimensioned systems, high energy consumption, low efficiency, and a lack of analytical and operational training," observes CEO Mendonça.

Faced with this scenario, the company decided to expand its operations and invest in the development of new technologies. In 2016, it launched its first compact sewage treatment units, a milestone in the modernization of the sector. The success of these solutions led to the formalization of strategic partnerships, including a technical cooperation agreement with the Federal University of Santa Catarina (UFSC), enabling joint research and the training of new professionals in the field.



Between 2021 and 2023, we consolidated our positioning in the market, with the launch of the 'Plug & Play Containerized Stations'.



Biofractal entered the public sector in 2017, when it began operating treatment plants in prisons in Rio Grande do Sul, following a request from the Public Prosecutor's Office. This move paved the way for new contracts with city governments and concessionaires, expanding the company's presence to various states across the country.

"Between 2021 and 2023, we consolidated our market position with the launch of 'Plug & Play Containerized Stations.' These units combine efficiency, versatility, and reduced space footprint, facilitating deployment in different urban and rural contexts," recalls CEO Mendonça.

In addition to technological innovations, the company also stands out for its constant pursuit of quality certifications. The implementation of ISO 9001 (quality management) and ISO 14001 (environmental management) standards reinforced Biofractal's commitment to operational efficiency and sustainability.

The company currently operates in nine Brazilian states, serving clients such as city halls, hospitals, condominiums, prisons, and water and sewage utilities. Its business model allows for customized solutions for different demand profiles, ensuring greater efficiency and optimization of water resources. "Our goal is not only to offer cutting-edge technology, but to develop solutions that are aligned with market needs and global sustainability challenges," says CEO Mendonça.

With this vision, Biofractal plans to expand its operations into the international market, broadening its impact and contributing to a broader debate on innovation in sanitation. The company also seeks to develop new fronts focused on water resource management, promoting research and integrated solutions for environmental preservation. "Biofractal is not just a sanitation company. It is a company that believes in transformation through technology, education, and social and environmental responsibility," emphasizes CEO Mendonça.



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The Biofractal Model of Wastewater Treatment

One of Biofractal's main innovations is the adoption of modular containerized systems, which use ISO 40-foot HC and 20-foot Dry standards, facilitating transportation and installation. These systems are designed to meet the specific needs of each client, ensuring compliance with regulatory and environmental requirements.

The Biofractal Wastewater Treatment Model is based on aerobic biodegradation and can operate in up to three stages for the efficient removal of organic matter and nutrients. This process enables an efficiency rate exceeding 90%, making treated effluent suitable for disposal within the required environmental parameters.

The technology used in Biofractal's plants includes advanced physical-chemical systems, allowing the removal of nitrogen and phosphorus, which enables both the safe disposal and the reuse of treated water for various purposes, such as irrigation and industrial processes.

The BFE MBBR 250 B1.0 model, one of the company's highlights, employs Moving Bed Biofilm Reactor (MBBR) technology, combined with lamellar decantation and chlorination disinfection. With a treatment capacity of 250 m³/day, this plant is available in the Intermediate version, offering organic load removal and efficient nitrification for proper disposal into the stormwater drainage network.

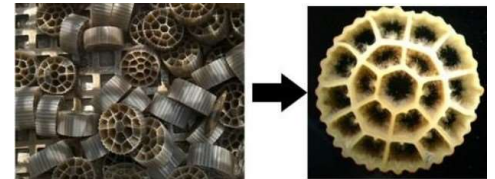
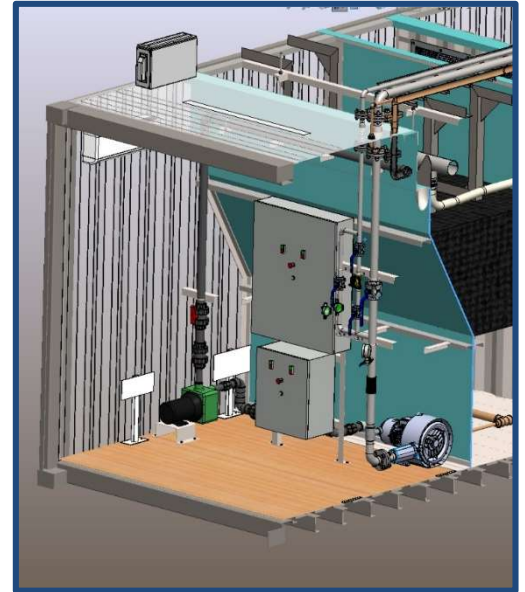
The station manufacturing process includes rigorous structural and sealing tests, ensuring durability and operational safety. The containers are made of Corten steel, with structural reinforcements and intermediate walls to increase their strength. Furthermore, they undergo leak testing, weld inspection, and the application of protective coatings against corrosion, ensuring their longevity even in harsh

environments.

To ensure efficient system control, the stations have a command and control room with a robust industrial structure. The space features lighting, ventilation, and devices that minimize noise and vibration, providing a safe environment for equipment operation.

The systems operate in manual or automatic mode, allowing adjustments according to the client's needs. In automatic mode, the equipment follows predefined programs to optimize energy consumption and treatment efficiency. In manual mode, the devices can be operated independently.

Automation can be complemented with frequency inverters, dissolved oxygen sensors and telemetry, allowing remote monitoring and real-time adjustments, which increases system reliability.





The projects developed by Biofractal strictly follow Brazilian environmental regulations, including Conama resolutions and ABNT technical standards, ensuring that the treated effluents meet the legal requirements for disposal.

With optimized performance, the MBBR 250 B1.0 station achieves 90% efficiency in removing BOD₅, 80% of COD₅ and 95% of settleable solids, in addition to ensuring a 60% reduction in ammoniacal nitrogen and 70% of oils and greases, maintaining the pH of the treated water within the recommended standards.

Biofractal continues to invest in innovation to increase the efficiency of wastewater treatment systems, providing sustainable solutions for a variety of sectors, from city halls and hospitals to prisons and real estate developments.

The systems operate in manual or automatic mode, allowing adjustments according to the customer's needs.



THE SOCIAL AND POLITICAL IMPACT OF SEWAGE TREATMENT



Maria, a 35-year-old teacher, was preparing to return to work after a beach vacation when she noticed a strong odor coming from a stream near her home. The scene was familiar: open sewage, pollution, and a lack of basic infrastructure that compromises the population's quality of life. During her trip, she encountered the same situation on the coast, where the lack of bathing water and overcrowded emergency care units demonstrated the direct effects of the lack of adequate sanitation.

In Brazil, approximately 35% of the sewage generated is untreated, according to the National Sanitation Information System (SNIS). This situation impacts the environment and public health.



Appointment of Vice President of the Environment and Sustainability Council. Presenting the ceremony were Dr. Marco Aurélio Kuhner, 1st Vice President and President of the Environment and Sustainability Council, and Dr. Adair Roberto Carneiro, President of the FCCE.

The World Health Organization (WHO) estimates that the lack of adequate sanitation is directly linked to the spread of diseases such as diarrhea, which mainly affects children and can be fatal.

Poor sanitation also has economic repercussions. A study by the Getúlio Vargas Foundation (FGV) indicates that the presence of sanitation infrastructure can increase property values by up to 30%. This data shows that investing in sanitation not only reduces disease but also increases the value of cities and improves families' economic conditions.

The relationship between sanitation and education is another crucial factor. Children living in areas where sewage is properly treated have lower rates of school absenteeism. Improved sanitation conditions mean fewer absences due to health problems, which improves academic performance and expands future opportunities for this generation.

Responsibility for sanitation infrastructure falls to the government, and the lack of investment in this area reflects political decisions that directly impact the population's well-being. Public administrators are responsible for formulating and implementing policies, allocating resources, and ensuring compliance with legislation. However, the priority given to other areas and the lack of an integrated vision of sanitation's benefits often compromise its implementation.

Investing in basic sanitation has direct and indirect benefits for society and for public officials themselves. In the health sector, reducing diseases transmitted by contaminated water relieves pressure on the health system and improves the population's quality of life. Furthermore, improving sanitation infrastructure strengthens the image of government officials committed to effective public policies.



Another positive consequence is job creation. Sanitation projects mobilize workers from different sectors, boosting the local economy and expanding job opportunities. The economic impact extends over the long term, with cities becoming more structured and better able to attract investment.

Sanitation is also directly linked to sustainable development. Contamination of rivers and aquifers by untreated sewage compromises water supplies and affects entire ecosystems. Implementing efficient wastewater treatment technologies contributes to the conservation of natural resources and improves environmental conditions.

By reducing social inequalities, sanitation also acts as a factor of inclusion. Regions without adequate sanitation infrastructure are home to mostly low-income populations who face greater exposure to disease and precarious housing conditions. Improving access to sanitation is an essential step toward promoting social justice.

Civil society also plays a key role in demanding improvements in sanitation. Public engagement and pressure on public officials are essential to ensuring that this issue is treated as a priority.

When society actively participates, public policymaking tends to be more efficient and aligned with the population's real needs.

Basic sanitation should be seen as an infrastructure investment as well as an essential right. Ensuring clean water and treated sewage for the entire population should be a priority on the political agenda, reflecting a commitment to dignity, public health, and sustainable development.

"Investing in basic sanitation is investing in Brazil's future. It's an opportunity to promote public health, increase property values, improve education, and, above all, guarantee dignity for millions of Brazilians.

Maria, looking at the polluted stream, dreams of a future where her community can thrive, where health and education are priorities, and where politics unites for the collective well-being," explains CEO Mendonça.

PATHS TO A SUSTAINABLE BRAZIL



To address the challenges of basic sanitation, several public policies can be implemented, ensuring that sewage treatment is a priority for government investments.

One of the fundamental strategies is the creation of specific funds for sanitation, ensuring continuous financial resources for sewage infrastructure expansion projects. These funds can be comprised of federal, state, and municipal funds, as well as partnerships with the private sector to leverage investment.

Furthermore, ensuring that sanitation is prioritized in public budgets can accelerate the universalization of sewage treatment.

Allocating minimum percentages to this area in budget plans can reduce the sector's historical gap and prevent essential investments from being postponed.

Another relevant mechanism is tax incentives for companies that invest in sanitation technologies. Granting tax exemptions or credits can stimulate innovation and increase the adoption of more efficient and sustainable solutions for the sector.

Public-private partnerships (PPPs) also play a strategic role in infrastructure expansion. By joining forces between the government and the private sector, it is possible to facilitate large-scale projects, accelerate the implementation of sewage treatment plants, and share the financial risks of the operation.

"Basic sanitation isn't just a necessity; it's a right. And with available technological solutions, the future can be brighter than ever," reinforces CEO Mendonça.

In addition to investing in infrastructure, it is essential to train professionals and promote research into new sewage treatment technologies. Partnerships between governments, universities, and research centers can generate innovative solutions and improve existing systems.

Support for local initiatives should also be considered. Small projects adapted to regional realities can be crucial for communities that still lack access to sewage treatment using Biofractal's compact containerized solutions.

To ensure that investments are well spent, implementing monitoring and evaluation systems can provide greater transparency and efficiency in resource management.

Continuous monitoring of projects and services can optimize investments and direct improvements. As campanhas de conscientização são outro fator essencial. Educar a população sobre a importância do saneamento pode contribuir para o uso adequado das redes de esgoto e para a mobilização social em torno do tema, pressionando o poder público para a implementação de políticas eficazes.

If these policies are successfully implemented, the impacts would be far-reaching. Maria's life and that of millions of Brazilians living with open sewage would be radically changed.

The availability of sewage systems would reduce the spread of disease, improve the urban environment, and raise the quality of life in communities.

"Children, including Maria's children, would have a brighter future, with fewer school absences due to health problems. Women, who often take on the responsibility of caring for the home and family, would also benefit. With less time dedicated to health problems resulting from poor sanitation, they could invest more in education, work, and personal development," explains CEO Mendonça.

In addition to the direct impact on health and quality of life, the implementation of these policies would have positive economic effects. A cleaner, more structured urban environment attracts new investment and improves real estate values.

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