



BIODNA™
NATURE'S CHEMISTRY

Natural Probiotic Solutions



Probiotic Enviro FOG Brick

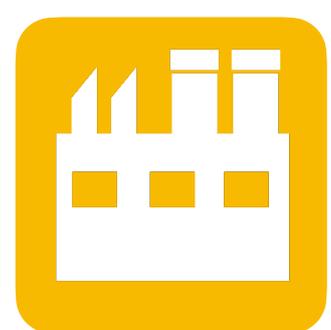


PROBIOTIC ENVIRO

BIODNA Probiotic Enviro Range provides high-quality, performance-driven, environmentally-responsible, solution-specific microbial products. It offers an effective and sustainable alternative to traditional chemicals across a wide range of industries.

We offer comprehensive and effective solutions for use in municipal wastewater treatment, septic & grease collection systems to maximise efficiency, reduce costs and assist in regulatory compliance. Our probiotics use good beneficial bacteria degrading the volatile fatty acids and organic intermediates. They act quickly to neutralise foul-smelling systems, especially at lower pH ranges found in grease traps and grease interceptors. Contaminant levels in wastewater can be greatly reduced through the introduction of our application-specific bacteria strains found in our products.

This product is demonstrably more effective than conventional enzyme products as it is designed to produce a continuous and renewable supply of highly active beneficial bacteria for fat and grease degradation. Unlike enzymes, that have short and limited activity, the good bacteria strains in our Probiotic Enviro Range can adapt to different conditions present and produce the correct enzymes required for optimal and complete FOG breakdown. This continuous bio-film adheres to the system, continually degrading FOG and preventing blockages in drains and malodours in waste treatment systems.



PROBIOTIC ENVIRO - FOG Brick

Natural Probiotics for Wastewater Treatment Systems

BIODNA - FOG Brick is a unique bacterial-laden solid, combining a high bacterial count with slow release technology, for use in degrading organic waste in grease traps & grease interceptors.

Designed using
classical microbiology
& cutting edge
genomics

What is it?

Slow release platform for the control of Fats, Oils & Grease.

Uses

Lift stations, grease traps, interceptors and effluent streams rich in organic materials.

Eco credentials

Contains non-pathogenic Class 1 microorganisms that are both environmentally responsible and safe for the end user.

How it works

Floc forming *Bacillus* with expand the metabolic diversity of a system allowing greater substrate utilisation.

Advantages

-  The naturally-occurring bacteria contained in the brick will reduce odour, sludge, fats, oils and grease build-up.
-  Reducing COD contributions from FOG in effluent.
-  Continuous operation 24 hours per day, increases system efficiency
-  All strains are EEC Class 1. Product contains *Bacillus* bacteria in 100% spore form for extended product life.



PRODUCT AT A GLANCE

Slow release technology of floc forming *Bacillus* with strong heterotrophic growth properties capable of degrading fats, oil and grease fully to CO₂ and water.

Ideal for organic rich effluents such as municipal, dairy and slaughterhouse effluents.

Diverse lipase, esterase and bio-surfactant capabilities make FOG deposits more bioavailable, breaking them down into more digestible components.

Bacteria capable of fully degrading the common components of FOG deposits such as palmitic, stearic, oleic and linoleum fatty acids.

Able to improve COD, bulking and flotation issues associated with fats, oils and grease.

Ideal for organic rich effluents such as municipal, dairy and slaughterhouse effluents.

Diverse hydrolytic enzyme profiles give wide substrate specificity for the degradation of both animal and plants products.

Bacillus able to retain themselves within system via formation of flocs with excellent settling properties.

Safe for environment and end user. Contains non-pathogenic Class 1 *Bacillus* which are free from major toxin genes.

Manufactured in accordance with recognised international standard ISO 9001 to guarantee quality, integrity and reproducibility.

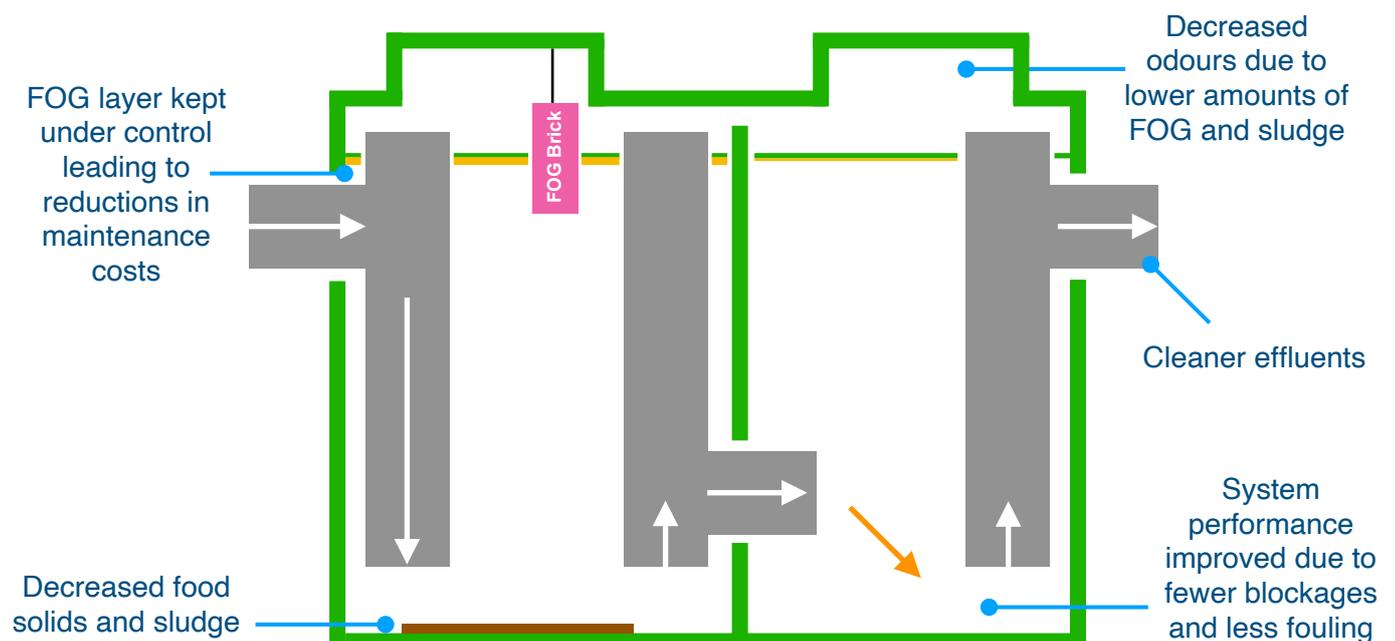
Stable spore formulations offer long term product stability.

Can be used in a wide range of water types including; fresh, saline and brackish.

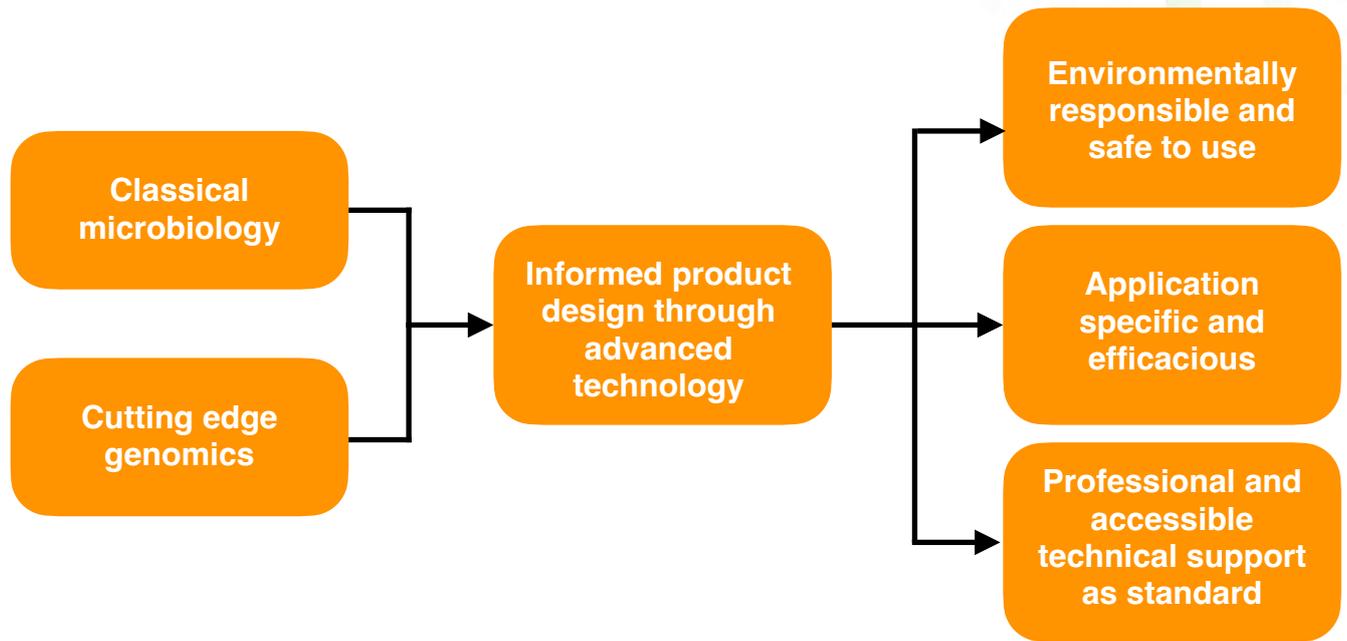
Applications

- Grease traps
- Waste water plants
- Grease interceptors
- Septic tanks

FOG Bricks are ideal for placing in lift stations, grease interceptors or directly into effluent streams. They are available in a range of sizes to suit small to large volumes of effluent.



OUR APPROACH



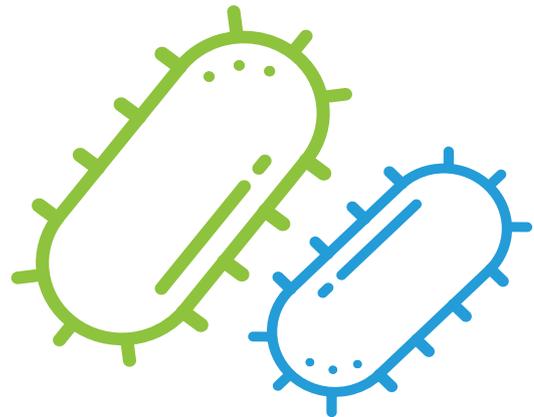
What is Bacillus?

Bacillus are a genus of Gram-positive microorganisms found across the globe in a range of environments.

They are metabolically diverse and with a few notable exceptions are non-pathogenic and safe to use. They are able to survive when conditions move outside of those needed for survival through the production of spores.

Spore formation allows this type of bacteria to be grown in very high concentrations and blended into a stable product with a long shelf-life.

This makes it ideal for industrial applications where often a large amount of *Bacillus* cells are needed to amend a system.



Why is BIODNA different?

Our bacteria is of the highest standards (ISO 9001) so we can guarantee that the *Bacillus* we deliver are correct in both species and concentration and are free from contaminants. We have taken time to design our products to ensure they have minimal impact upon the environment and end user, whilst at the same time offering an efficacious and prolonged result.

As *Bacillus* is one of our main technologies, we ensure that we understand each of our isolates. We have invested in cutting edge genomic techniques to fully comprehend the potential of each of our *Bacillus* species, and in doing so we have created effective and truly application specific technology. All of our products come with expert technical support as standard.

THE TECHNOLOGY

BIODNA - FOG Bricks have been specially formulated to be used as controlled release technology in wastewater treatment systems to boost performance, by improving effluent, odour and sludge parameters. *Bacillus* capable of floc formation are slowly released into a system to help tackle problems associated with organic compounds such as FOG and excess BOD/COD.

As the brick is exposed to effluent, the bacteria within the structure are conditioned to the effluent characteristics and when released they have no need for a prolonged acclimation phase. This allows the *Bacillus* microbes to immediately begin augmenting the system by delivering their metabolic activity to digest materials such as FOG, proteins, DNA, plant materials and various other polymeric substances.

Rather than using a carrier to induce floc formation, the *Bacillus* within the product have been selected due to their unique ability to form flocs on their own. These flocs, which typically have a Sludge Volume Index (SVI) of <100 , are well suited for the activated sludge system offering compact structures with excellent settling properties.

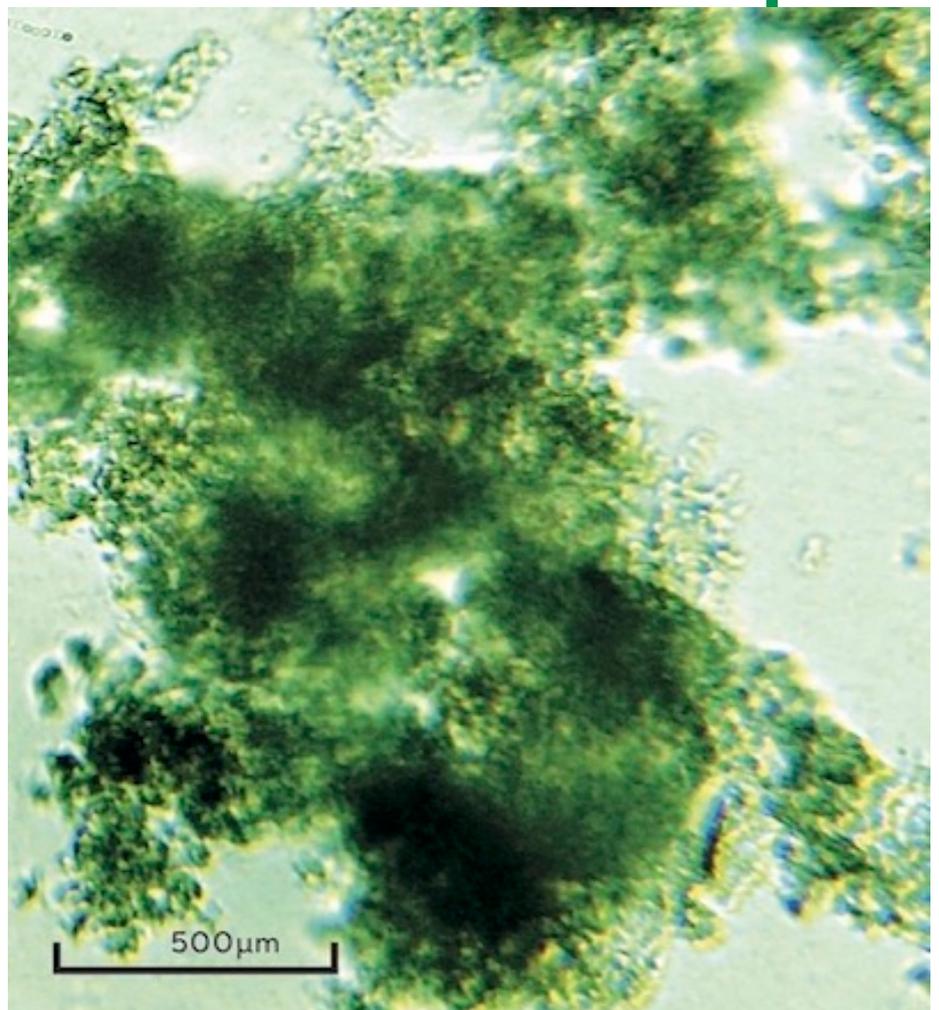
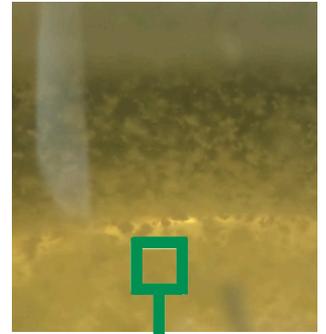
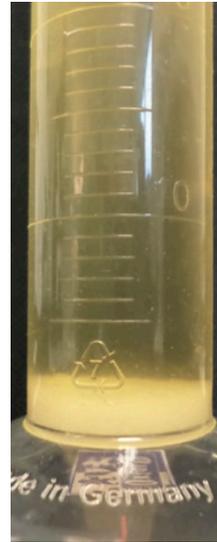


Figure shows a mature floc formed by the FOG Brick consortium and the result of an SVI30 test, where the solids have settled into a compact layer resulting in a clear supernatant.

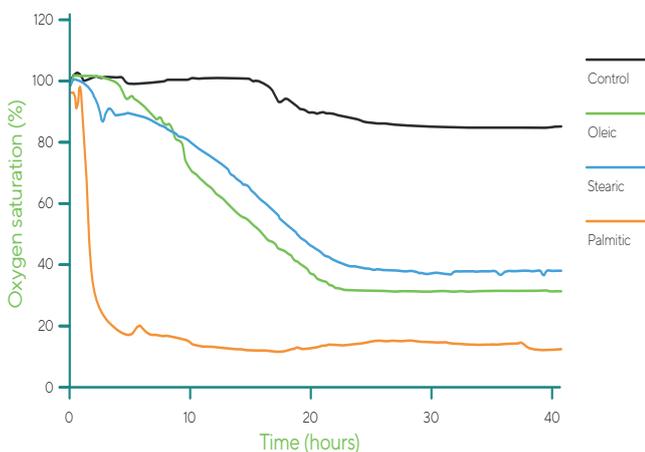
THE TECHNOLOGY

The use of several *Bacillus* species which grow synergistically provide a consortium that are not only metabolically diverse but capable of performing over a range of temperature and pH ranges. With good growth rates under both high strength industrial type effluents and lower strength municipal wastewaters, FOG Bricks give the operator a versatile technology to tackle a multitude of scenarios at both large and small treatment works.

Typically, the resident microbes within a wastewater system lack the capability to fully degrade FOG leading to deposits rich in fatty acids such as the saturated fatty acids palmitic and stearic acid and unsaturated fats such as oleic and linoleic acid. This can lead to issues associated with clogging, bulking and floc formation.

Developed using both classical microbiology and cutting -edge genomic investigations, the FOG Brick combines *Bacillus* strains which secrete a diverse range of enzymes and bio-surfactants to break different FOG types down to more digestible components.

Graph shows the diverse extracellular enzyme profiles translate into an enhanced ability to polymeric substrates often associated with wastewater effluents.

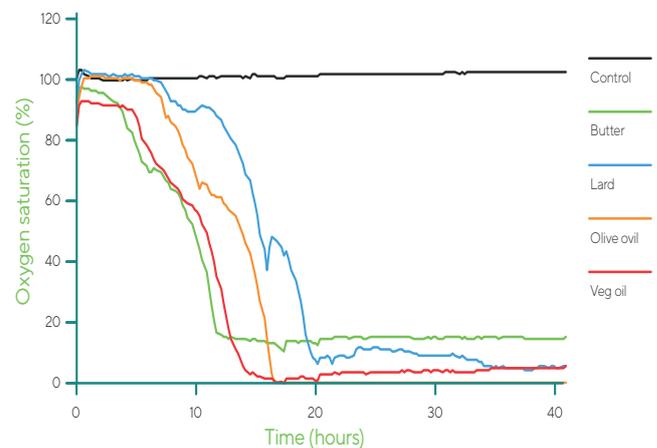


Thus allowing the *Bacillus* within the product to colonise a system and utilise the FOG as their food source, potentially out-competing filamentous organisms such as *Norcararia sp.*

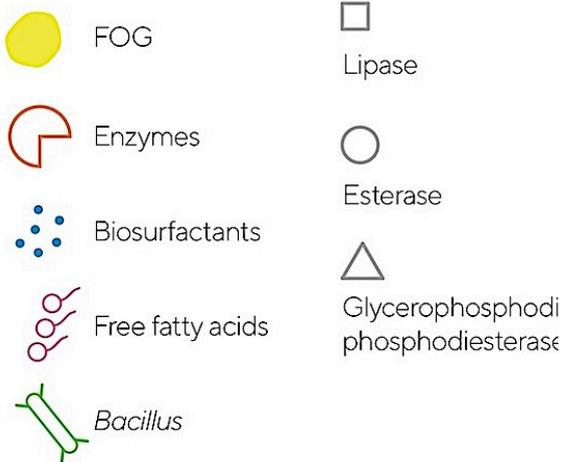
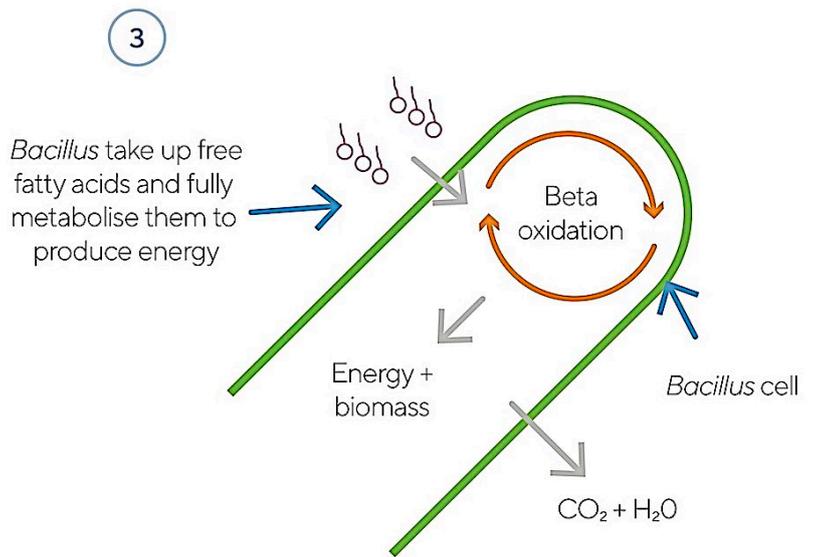
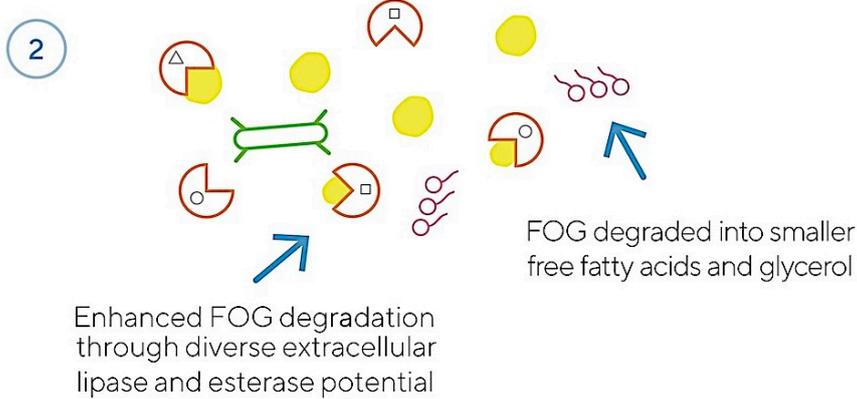
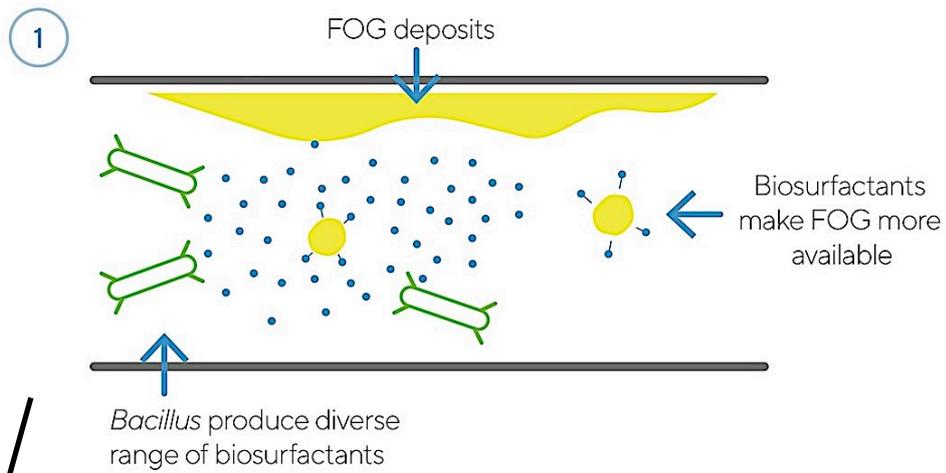
Enzymes, chemical and poorly designed products may only facilitate the dislodging of FOG moving it downstream, causing the formation of hard 'FOG scale'. At BIODNA we have ensured that our *Bacillus* consortia not only have the tools to make FOG more bioavailable but also fully degrade FOG and its intermediates to CO₂ and water. In addition, the *Bacillus* in the BIODNA FOG Brick possess diverse extracellular enzyme profiles, facilitating broad substrate utilisation and enabling the degradation of both animal and plant materials resulting in improved effluent and sludge parameters.

Via both cell cytotoxicity assays and genomic screens for toxin production, we can confirm that all species and strains within the product are safe to use, harbour no toxicity towards humans or animals and do not have a negative impact upon the environment. From analysing the DNA of our strains we can confirm a lack of mobile genetic elements, which strongly indicates a low potential for transmission of antimicrobial resistance (AMR) genes.

Graph showing degradation of both animal and plant-based fats.



MECHANISM OF FOG DEGRADATION BY *BACILLUS*



CONSIDERATIONS, LIMITATION & SPECIFICATIONS

BIODNA - FOG Bricks are supplied in 220g, 1kg and 5kg brick sizes.

These can be placed in to wet wells (lift stations, manholes), grease traps or interceptors and/or directly into effluent streams. For dosing instructions please contact technical support with details of your flows and ads.

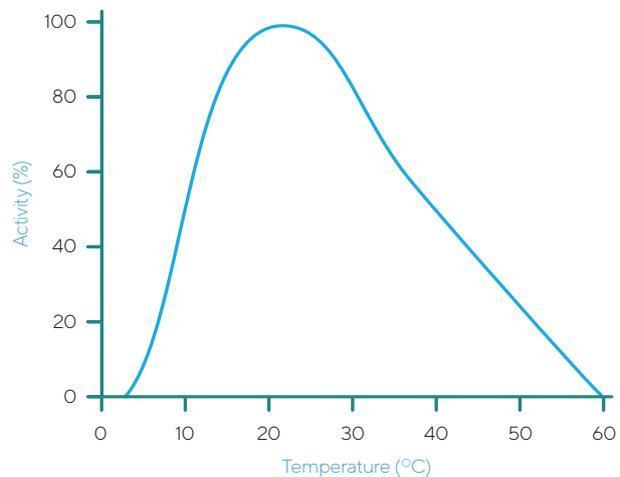
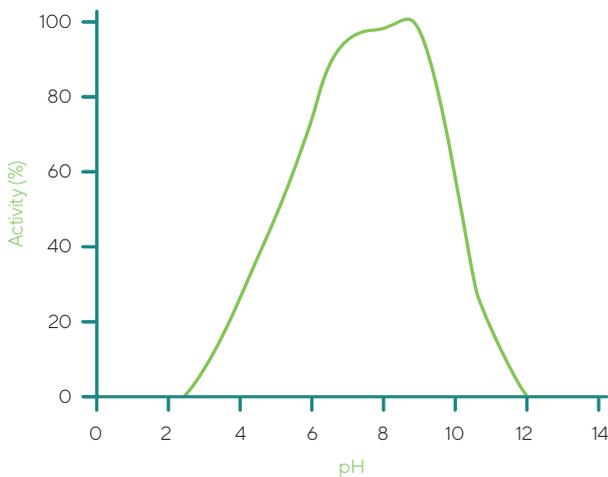
Recommended Effluent Types

FOG Bricks should be used in systems dealing with organic rich waste waters that contain materials such as proteins, carbohydrates and fats, oils and grease such as municipal plants, bakeries, breweries, dairies and slaughterhouses.

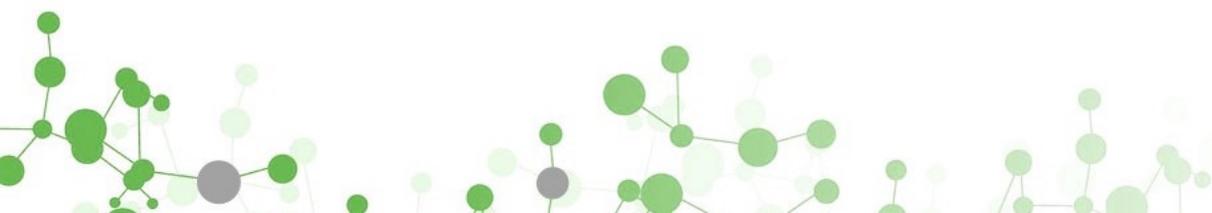
Limitations

The product will perform poorly in highly alkaline (>pH 10) and highly acidic (<pH 3) effluents and will also lose activity at low (<10°C) and high (>45°C) temperatures (see curves below for reductions). Effluent types rich in phenolic and hydrocarbon species such as those from wineries, olive mills or heavy industry are not suitable for this product. For specialised effluent types contact our technical department for alternative solutions and more information.

Both graphs show performance of BIODNA FOG Brick under simulated conditions with varying pH and temperature



Bacteria count	7.00E+09 cfu/g Bacillus spores
Formula properties	Red solid with mild surfactant odour
Effective pH range	4.0 - 11.0
Temperature range	5 - 50 °C
Packaging	Available in 220g, 1kg, 5kg blocks. Shelf life of 24 months in original unopened container.



RECOMMENDED PRODUCTS



BIODNA - Odour Neutralizer is a liquid concentrate which combines unique chemistry and application specific bacteria to offer a proven, innovative and effective long term approach to odour control.



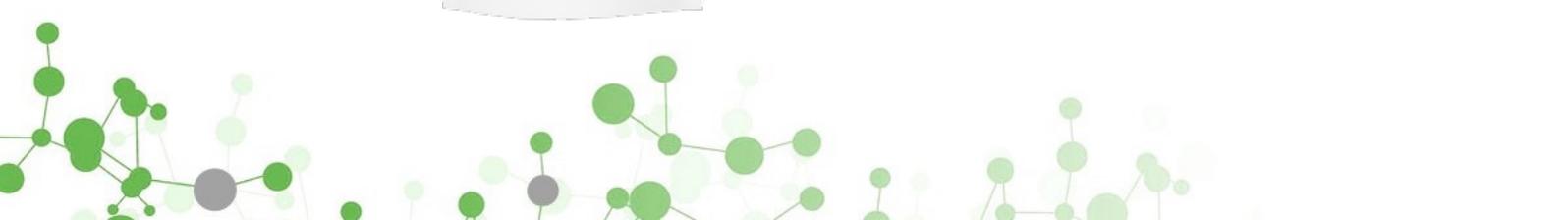
BIODNA - Boost Powder is a highly concentrated, specialised blend of application-specific bacterial cultures selected to degrade municipal, food processing and high fats, oils and grease waste.



BIODNA - Waste Water Block is a unique bacterial-laden solid, combining a high bacterial count with slow release technology, to dose bacteria into wastewater & effluent handling facilities.



BIODNA - FOG Brick is a unique bacterial-laden solid, combining a high bacterial count with slow release technology, for use in degrading organic waste in grease traps & grease interceptors.



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