BIACTRO
TECHNOLOGY

From organic waste to fertile soil,
in a continuous cycle and with no environmental impact.

BIACTRO TECHNOLOGY S.L.

Gran Canaria, Spain

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Introduction

In Gran Canaria, in an agricultural valley at the western end of the island, lorries loaded with organic waste enter an industrial plant, and what comes out is the soil on which the next harvest will grow. No waiting, no windrows, no odours. Within the same site.

It has worked this way since 2019.

The technology behind it is called Biactro biocatalysis. It converts any organic matter into a regenerative amendment of the highest category, in a continuous cycle, at ambient temperature, within a sealed system that emits no methane and produces no leachate. One tonne of waste yields one tonne of product.

That product has two uses. It can be returned to agricultural soil to regenerate it, or it can replace that soil altogether: in the intensive growing systems developed by the company, plants grow directly on it, with no soil beneath.

Class A amendment discharged at the outlet of the biocatalysis module.

Where soil has been lost, new soil is produced.

CHAPTER I

Biactro Technology S.L.

Biactro Technology S.L. is a Spanish company based in Telde, Gran Canaria. It develops and operates industrial aerobic biocatalysis plants that convert organic waste into Class A regenerative amendment, the most demanding category under the European regulatory framework for fertilising products.[1]

The technology draws on more than twenty years of research into enzymatic processes and soil microbiology, begun in the early 1990s with a systematic study of composting and its limits. That work yielded two conclusions that shaped everything else. First: composting fails because of the time it requires, since weeks or months of decomposition force material to be stockpiled, and from that stockpiling comes everything that makes waste a problem. Second: composting does not remove the contaminant load of the incoming material either, so pathogens, plant protection product residues and unwanted vegetation seeds are still there when the process ends. Research therefore turned towards a mechanism capable of completing the transformation immediately and of removing that load in full.

Every technology available today for treating organic waste rests on the same assumption: that matter needs time. All of them manage, in one way or another, the interval between what goes in and what comes out.

Biactro biocatalysis removes that interval.

The process reproduces, in accelerated and controlled form, the natural mechanism of digestion, acting on organic matter at molecular level, in a closed circuit and at ambient temperature. What nature takes months to do happens here in an uninterrupted flow. And once the wait disappears, so does the stockpiling: no windrows, no maturation area, no odours, no pests, no leachate reaching the aquifer, no methane released through decomposition in the absence of oxygen, a gas with twenty-five times the global warming potential of carbon dioxide.[2] The environmental consequences of treating organic waste are, almost in their entirety, consequences of the wait.

Three things happen to the same matter inside the circuit.

Sanitisation

The material comes out free of pathogens and of residues of plant protection products, antibiotics and pesticides, and free of the insect eggs and unwanted vegetation seeds that survive incomplete composting. Experienced farmers distrust amendment of external origin for good reason: they fear introducing into their own land the pest or the disease that someone else failed to eliminate. That risk disappears here.

Stabilisation

Waste enters biologically active and comes out fully matured. Mature material does not ferment again, does not generate odours or attract pests, and can be stored or transported without degrading.

Enrichment

The process incorporates selected beneficial microbiota, which restores to the soil the biological life that decades of chemical fertilisation have taken from it, and concentrates the humic fraction of the material, the fraction that sustains long-term fertility and governs the progressive release of nutrients to the plant.

What emerges from the module is living soil, fit to regenerate depleted land or to replace it altogether.

On that basis the company brings together three activities that function as one: treating organic waste where it is generated, producing high-quality regenerative amendment from it, and deploying growing systems that use that amendment as their production medium. Together they form the Biactro Ecosystem.

The deployment of the technology in the Canary Islands has had effective institutional backing. The Canarian public institutions granted aid towards the installation of the plant, and the Cabildo of Gran Canaria provided the land on which it operates. Public money committed to a private technology, following assessment by the competent authorities.

CHAPTER II

Organic waste: a problem with no way out

Every productive activity generates organic waste. Agriculture generates it in fields and greenhouses, livestock farming on its holdings, the food industry on its processing lines, and municipalities in their organic fraction. The more a country produces, the more biomass it accumulates. And across virtually every territory in the world, that biomass has no outlet today that is simultaneously lawful, economically viable and environmentally acceptable.

Burning

Removes the volume and destroys the resource. It releases carbon dioxide and polluting particulates, and is progressively prohibited under most regulatory frameworks.

Landfilling

Displaces the problem in space and in time. Organic matter sent to landfill decomposes without oxygen and releases methane for years, along with leachate that reaches groundwater. To that must be added transport costs and admission charges that keep rising. And in many cases the landfill simply will not accept it.

Composting

This is the conventional answer, and it is only half an answer. It takes weeks or months, and that time forces stockpiling: surface area occupied, odours, insects, rodents and leachate. Quality is also inconsistent, because incomplete or poorly managed composting guarantees neither the elimination of thermotolerant pathogens, nor of plant protection product residues, nor of viable unwanted vegetation seeds.[3] The market produces millions of tonnes of amendment it does not absorb.

Anaerobic digestion

Produces energy at the cost of heavy investment and generates an unavoidable by-product, digestate, difficult to apply directly to soil because of its pathogen load, its phytotoxic ammoniacal nitrogen and its odour. Such facilities also tend to meet social resistance in their surroundings.

The result is a contradiction that repeats itself in every latitude: regulation requires the producer to manage waste properly, without offering any workable route to do so. Farmers, livestock keepers and industrial operators are caught between a legal obligation and a practical impossibility. When authorities regulate, restrict and penalise without providing an alternative, informal dumping stops being a choice and becomes the only outlet available.

There is also a structural reason. The world's waste treatment infrastructure is built on the logic of concentration: accumulate volume, transport it and process it in a few large plants. Yet much organic waste, and agricultural and livestock waste in particular, arises dispersed, remote and in seasonal peaks, and is therefore systematically excluded from that model. Meanwhile, that biomass continues to be accounted for as what it appears to be: a liability, something to be disposed of at rising cost.

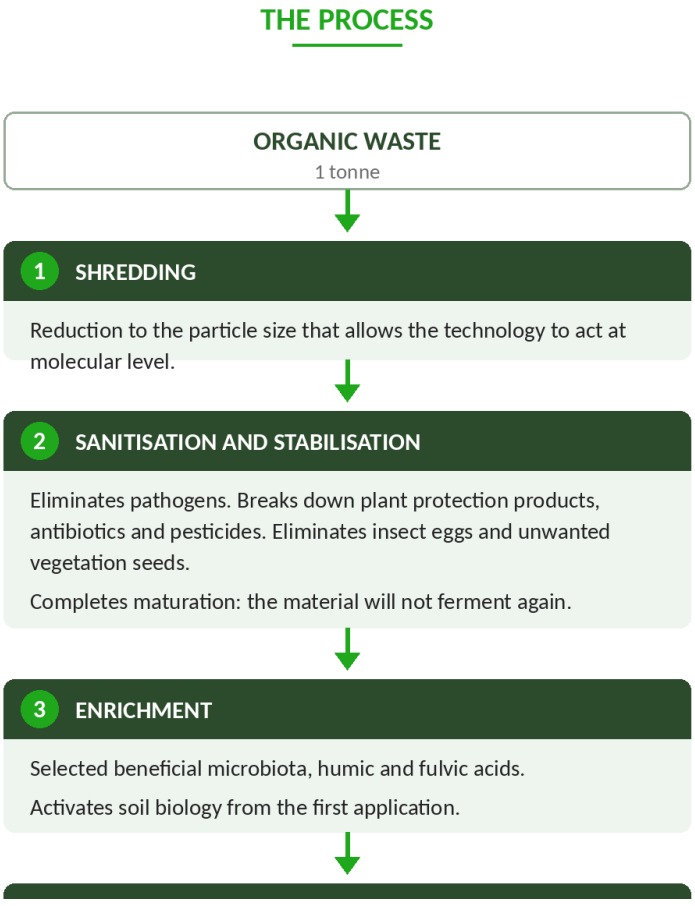
> **It contains precisely the matter the soil is missing.**

CHAPTER III

The technology: aerobic biocatalysis in a continuous cycle

Waste is shredded before entering the biocatalysis module, down to the particle size that allows the technology to act at molecular level.

From there the material passes through a fully sealed circuit and comes out sanitised, stabilised and enriched, as described above.

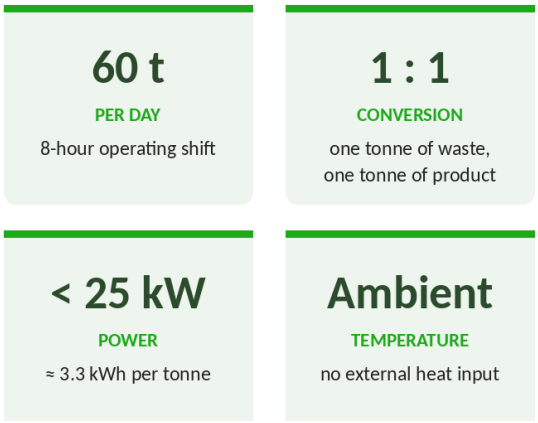


The process operates at ambient temperature with no external heat input whatsoever. Installed power per module is below 25 kW, equivalent to a maximum consumption of around 3.3 kWh per tonne processed at full load. That level of power is compatible with full or partial photovoltaic supply.

No batches, no cycles, no stockpiling: the flow is continuous.

Each module processes up to 60 tonnes per day over an eight-hour operating shift, with a ceiling in the order of 18,000 tonnes per year depending on each site's operating calendar. Conversion is one to one: every tonne of waste treated yields one tonne of amendment ready for use.

MODULE PARAMETERS



The architecture is modular. Greater capacity is achieved by adding modules in parallel, without oversizing individual units. Output per unit remains stable and independent of the total number of modules deployed.

The system accepts any organic matter: plant-based agricultural waste, livestock manure and slurry, food industry by-products, pruning residues. It also treats digestate from biogas plants and existing compost that the market does not absorb, raising both to Class A amendment.

The composition of the output is adjusted deliberately. Sanitary quality remains constant whatever the input, while the agronomic profile is calibrated to the destination crop by adjusting operating parameters, even starting from waste of a single origin. Set against rigid processes such as anaerobic digestion, variability in the waste stream ceases to be a limitation and becomes a margin for adjustment.

CHAPTER IV

The product: new soil

What comes out of the module is a homogeneous particulate material, fine-grained, earthy brown in colour, with the smell of damp soil and no ammoniacal or sulphurous note. It can be picked up by hand. It can be applied the same day.

Class A amendment at the module outlet.

And it can be used in two ways.

As an amendment, on existing soil

It works from within. The microbiota penetrates the deeper horizons and reactivates the biological life of the land; the stabilised organic matter restores structure and porosity, and with them the capacity to hold irrigation water. Soil exhausted by decades of synthetic fertilisation recovers the microbiological balance it had lost. Where chemical fertiliser feeds the plant, this material restores the soil that sustains it.

By composition and purity it belongs to the category of high-value organic amendments, with concentrated humic fraction and functional microbiota: the upper segment of the organic fertiliser market and the one most sought after by professional growers.

As soil, with nothing beneath

The material sustains the crop on its own. Biactro has developed technical growing beds designed to operate with it as the sole substrate, with no agricultural soil beneath the plant. Agronomic trials by the cooperative that operates the plant had already confirmed this in the nursery stage: the material matches or exceeds peat at every stage of the propagation process.[5] It performs as a professional growing substrate, and the beds take that capability to production scale.

> **A territory that masters this technology is no longer bound by the fertile land it has. It can manufacture the land it lacks, from what it discards today.**

What the analyses show

The product and the waste it comes from have been analysed by Eurofins Análisis Alimentario Canarias, a laboratory accredited to ISO/IEC 17025:2017.[4] Both samples come from the same batch, one taken at the inlet and one at the outlet, so that the results document the transformation in full.

THE TRANSFORMATION, MEASURED

Eurofins · laboratory accredited to ISO/IEC 17025:2017

PARAMETER	INPUT	OUTPUT
Maturity (Rotegrade test) Stops decomposing altogether	58.3 °C	< 10 °C
Carbon / nitrogen ratio From raw matter to assimilable matter	30.88	13.0
Ammoniacal nitrogen No pungent odour, no root burn	0.18 %	0.08 %
Electrical conductivity No longer saline, fit for direct application	24.3 dS/m	4.0 dS/m
Humic acid Tripled: locks in long-term fertility	2.2 %	6.0 %
Total nitrogen More nutrients available to the plant	1.39 %	2.40 %

SANITARY SAFETY

Escherichia coli below the detection threshold. Salmonella not detected. The maturity of the material turns that absence into a durable property of the product.

Maturation complete. The Rotegrade test measures the maturity of a material by its own heat: matter still decomposing heats up on its own. The incoming waste reaches 58.3 °C, the temperature of a mass in full fermentation, and the outgoing product stays below 10 °C, that of the surrounding air. It has stopped decomposing. And everything else follows from that, because material that no longer decomposes generates no methane, produces no leachate, does not smell and does not attract pests. What composting pursues over weeks or months without ever quite achieving it is resolved here in a continuous process.

Agronomic fitness. The carbon to nitrogen ratio falls from 30.88 to 13.0, the shift that in agronomic terms separates raw matter from matter the plant can assimilate. Ammoniacal nitrogen, which gives fresh manure its pungent smell and burns roots, is reduced by more than half, while total nitrogen rises from 1.39% to 2.40%. And electrical conductivity, which measures dissolved salt concentration, falls from 24.3 to 4.0 dS/m: the incoming waste would burn the roots of any crop, whereas the outgoing product falls within the range fit for direct application to soil. For territories losing land to salinisation, that last figure means being able to bring back into production land that is currently out of use.

A more stable humic fraction. Humic acid triples, from 2.2% to 6.0%. Total humic extract holds at around 16% while fulvic acid falls from 13.9% to 9.5%: the quantity of humic substances does not increase, their quality improves, as the fraction evolves towards its most stable and durable form.

Sanitisation that holds over time. Microbiological analysis confirms Escherichia coli below the detection threshold and no Salmonella detected. What matters is that this absence should last, and it does so because of the maturity of the material: immature matter retains available food and, given moisture and warmth,

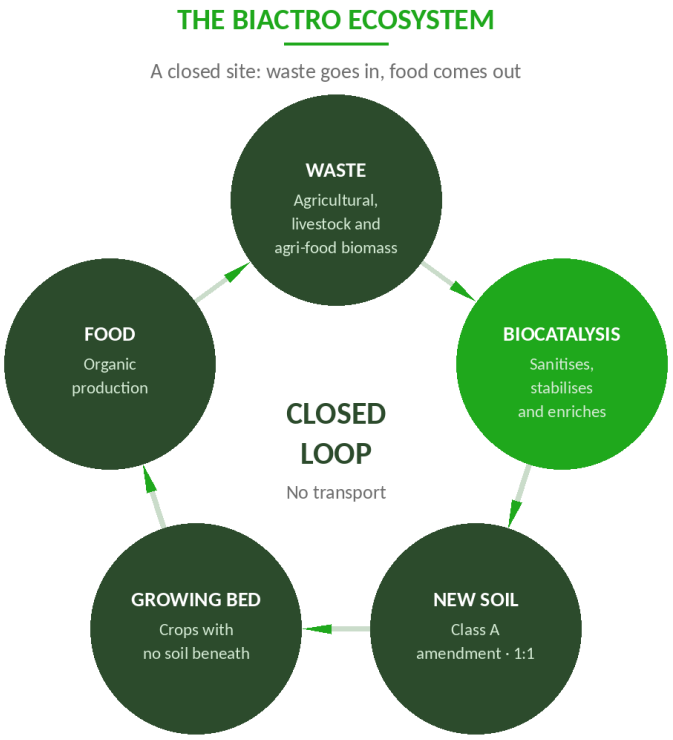
bacteria multiply again; in mature matter, with the labile organic fraction already consumed, that door stays shut. The absence of pathogens ceases to be a snapshot of a single day and becomes a property of the product.

CHAPTER V

The Biactro Ecosystem

A closed site. Waste enters at one end and food leaves at the other. In between, nothing crosses the perimeter.

That is the Biactro Ecosystem: the integration of the treatment plant and agricultural production within a single space, so that one season's waste becomes the soil in which the next one grows. No treatment plant on one side and fields on the other. No transport in between. No mileage.



The growing beds

Technical growing beds are cultivation systems designed to operate using the product of biocatalysis as their sole substrate, with no agricultural soil beneath. Within the bed, that material serves at once as physical support for the plant, stabilised organic reserve, active biological medium and plant nutrition system.

The difference from hydroponics is fundamental. A hydroponic system depends on chemical nutrient solutions that must be bought, dosed and replenished continuously. Biactro beds work from their own microbiological ecosystem, incorporated into the substrate during enrichment, which makes nutrients available to the plant progressively and sustains root activity without external input. It is an autonomous and renewable system, compatible with the principles of organic farming.

The plant draws what it needs when it needs it, and dependence on chemical fertiliser falls sharply.

Biactro growing beds. Crops grow directly on the product of biocatalysis, with no agricultural soil beneath.

Water

Here is the figure that changes the equation in dry territories.

Where conventional soil is entirely replaced by the regenerated substrate, its water-holding capacity is fully exploited. The documented saving against previous irrigation consumption stands at between 50% and 60%, with yields maintained or improved.[6] To that are added notable results in growth rate and in the organoleptic quality of the harvest.

> **Producing more with less water stops being an aspiration and becomes a characteristic of the system.**

The cell

The whole constitutes an autonomous, replicable unit. It is installed wherever two conditions meet, conditions that recur in thousands of settings around the world: organic waste that has to be removed, and a shortage of fertile land.

Where there is a disposal problem today, this technology installs the capacity to produce food, and with it a local economic fabric: direct employment, lower costs for the grower and a product with real commercial value where there was only a liability. High-density organic agricultural production, on degraded or non-fertile ground.

The site also functions as a demonstration and training space: the place where the model is taught to farmers, technicians and students, not through an explanation but through the fact of seeing it work.

> **Circular economy and food sovereignty stop being concepts on paper and become a site you can walk in twenty minutes.**

CHAPTER VI

La Aldea: the ecosystem already built

At the western end of Gran Canaria, hemmed in between mountain and ocean, farms Coagrisan, the largest tomato-producing cooperative in the Canary Islands.

It generates some 7,000 tonnes of organic waste a year and for decades had nowhere to put them: burning was prohibited, the island's treatment complexes were far away and would not accept it, and what remained was informal dumping, with spontaneous fires, pest infestations and enforcement proceedings.

The Biactro plant has operated there at full capacity and without interruption since 2019, on land provided by the Cabildo of Gran Canaria. Waste arrives from the farms of the valley and leaves as Class A amendment that returns to those same fields. Next to the plant, a growing-bed hall produces crops directly on the material. Treatment and production, within the same site.

Agricultural waste being fed into the process line.

In June 2026 the cooperative issued an institutional report signed by its general management documenting the joint operation and expressly authorising its use before third parties, including public bodies and parties with an interest in the international development of the technology.[6] What follows is its content.

Treated plots bring the harvest forward by seven to ten days in tomato and by two to three weeks in banana. They cut irrigation by 50% to 60% while maintaining or improving yields, and they sustain the crop through periods of water restriction that left control plots wilting. They produce more per hectare, with better calibre and shelf life. In the cooperative's internal organoleptic testing, produce from treated plots shows a superior profile in taste, aroma and texture.

Two effects weigh more heavily than yield. Having its own traceable organic fertiliser has allowed the cooperative to convert holdings to certified organic production, a transition that was unfeasible with imported inputs, and which it now intends to extend across its entire output. And it has brought back into the fertilisation programme land that had been left out because market fertiliser was prohibitively expensive.

The cooperative also confirms how the installation behaves: it operates without odours, close to inhabited areas, without a single complaint from neighbours since it was commissioned. No pests. No methane. No leachate.

Biocatalysis module in operation. La Aldea de San Nicolás de Tolentino, Gran Canaria.

Years of continuous operation, on real waste and under real conditions.

CHAPTER VII

An open conversation

The technology described in this document has run at full capacity since 2019 on real waste, under real conditions, and its results are documented by an accredited laboratory and confirmed in writing by the industrial client that uses it daily.

Every territory, every waste stream and every operation is different. The volume available, its composition, its seasonality, the local regulatory framework and the intended destination of the product all determine how a facility is configured and what form the collaboration takes. No two cases are alike, and that is why Biactro starts from a conversation rather than from a fixed proposal.

> **That is the next step, if what you have read strikes you as relevant: to talk it through.**

Documentation available

The analytical reports, the industrial client's institutional endorsement and the remaining documentation cited in the references are available on request.

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References

1. Regulation (EU) 2019/1009 of the European Parliament and of the Council of 5 June 2019 laying down rules on the making available on the market of EU fertilising products.
2. Clean Air Task Force. Waste Methane. Methane has twenty-five times the global warming potential of CO_2 over a hundred-year horizon. catf.us
3. Tiquia, S.M. & Tam, N.F.Y. (2002). Characterization and composting of poultry litter in forced-aeration piles. Bioresource Technology, 83(1), 37-45. Deportes, I. et al. (1995). Hygienic reliability and maturity assessment of composted urban organic wastes. Waste Management & Research, 13(6), 565-574. eOrganic / USDA (2020). Composting to Reduce Weed Seeds and Plant Pathogens.
4. Eurofins Análisis Alimentario Canarias, laboratory accredited to ISO/IEC 17025:2017 (ENAC no. 563/LE1047). Analytical reports on samples 26011547 (untreated waste) and 26011546 (treated product), July 2026.
5. Agricultural Technical Service, Cooperativa Agrícola de San Nicolás de Tolentino, 5 September 2017. Report on the suitability of Biactro fertiliser for tomato cultivation.
6. Coagrisan, Sociedad Cooperativa Canaria. Institutional endorsement report on the operation of Biactro technology at Coagrisan. La Aldea de San Nicolás de Tolentino, 16 June 2026. Signed by the General Management.

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