

SOBAC

For the health of the Earth

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SOBAC International Journal

EDITORIAL

It has already been 28 years since SOBAC was created (February 1992). We are now present throughout France, including overseas territories and most of European countries. It has already been 29 years since Sobac was created (February 1992). We are now present throughout France, including overseas territories and most of European countries. We started our adventure in Ireland in 2012 with 2 distributors, Tom Stapleton from P & T Stapleton based in Co. Kildare and Brendan O'Toole, based in Co. Tipperary. The latter unfortunately left us in 2019 after fighting against the disease for many months and we would like to dedicate this journal to him, he was one of the pioneers of the BACTÉRIOSOL and BACTÉRIOLIT adventure in Ireland and we keep with us his energy, his passion, and his jokes. His clients are now followed by Francis Egan of Soil Life Ltd and Adrian Molloy of Molloy Grassland Services. Forty years after the first uses, we are demonstrating every day the force of our concept, improving the overall profitability of farms, through the improvement of the fertility of the soil and the health on all plant and animal productions. We are proud to be contributing to effectively improving productivity, fertility and the health of different animal productions and plants. All this, while protecting the environment and biodiversity, while providing a better management of water resources and thus giving you a better effective solution to ensure the sustainability of your operation, produce independently and adapt more easily to climate change. Chemistry has been around since the end of the Second World War. Marcel MÉZY Technologies now benefit from 40 years of practice. Thus, our first users, true pioneers of these discoveries, have transmitted to their children healthy farms whether at an economic, social or environmental level. Marcel MÉZY Technologies, the basis of SOBAC solutions has just obtained the Solar Impulse label. This label rewards, on a global scale, solutions that are able to protect the environment while remaining profitable for users. The independent experts, who have chosen our solutions have highlighted «the diversity of the environmental benefits» of the MMT and the «contribution to allowing farmers to have a better production/ha and per year». This label is a new mark of recognition for our solutions, efficient tool to face environmental challenges and fight global warming. Results in France, Germany, Ireland and many other countries are showing us that we are on the right path. Thank you to all of you for your participation in this essential evolution of farming practices for a living planet and a respectful future for people.

« For the soil, for a long time. »

Christophe Mézy - Co-director, Sales Director



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SOBAC'S SOLUTIONS FOR EFFICIENT FARMING



SOBAC develops directly in partnership with farmers a unique recognized ecosystem which improves the fertility and health of the soil, plants and animals to increase the overall profitability of your farm.

MAIN RANGE

SOIL FERTILITY

BACTÉRIOSOL[®]
MARCEL MÉZY TECHNOLOGIES[®]



BACTÉRIOSOL technology is based on the action of certain **micro-organisms spontaneously** arising from **Marcel MÉZY Technologies**. It **recycles the mineral elements** not absorbed by the plants and rapidly increases the humus content of the soil. It boosts **soil fertility** by allowing the soil to release its **natural nutritive potential**, and restores all the necessary elements for **good plant growth**.

Thanks to **BACTÉRIOSOL**, inputs can be sharply reduced, profit margins improved, and self-sufficiency and yields increased. This one-of-a-kind technology focuses on «life» and beneficially **impacts soil health and life**.

It structures and balances the soil, makes it less compact, increases its porosity, **regulates its pH** and creates an environment conducive to fauna development and activity. It thereby promotes a positive « **soil-plant** » **relationship**, reflected in **higher nutritive quality of plant** and animal production.

> Exists for Organic Farming. 

EFFLUENT VALORISATION

BACTÉRIOLIT[®]
MARCEL MÉZY TECHNOLOGIES[®]
Concentré


ORGANIC
SUITABLE
FOR ORGANIC
FARMING[®]



BACTÉRIOLIT is a **100% natural composting additive**. It quickly **activates the biological transformation of manure and slurry** into **humus** and improves their **efficiency**, notably by **reorganising the forms of nitrogen** that they contain.

The minerals contained in farm fertilisers are reorganised and fixed on the clay-humic complex and **restored to plants** rather than being evaporated or leached. Plants thereby obtain more balanced feed over a longer period of time.

BACTÉRIOLIT **reduces smells** in the sheds while **improving the evolution of the effluents into compost** without the need of mechanical intervention. It also **increases the fertilising value of effluents** and **improves sanitary conditions** of the herd thus **fertility on animals**.

Once organic matter applied to the soil with **BACTÉRIOLIT** it has the same benefits on the soil as **BACTÉRIOSOL**.

COMPLEMENTARY RANGE

LOCALIZED FERTILIZATION

To be used in addition to **BACTÉRIOSOL/BACTÉRIOLIT**.

BACTÉRIOSOL[®] **BOOSTER**
MARCEL MÉZY TECHNOLOGIES[®]


ORGANIC
SUITABLE
FOR ORGANIC
FARMING[®]



BACTÉRIOSOL Booster, thanks to spontaneous micro-organisms from Marcel MÉZY Technologies (specifically, fungi and bacteria), **improves the physical, chemical and biological properties of the rhizosphere, to promote :**

- soil-plant exchanges
- root development
- micro-organisms, particularly mycorrhizal fungi
- rhizospheric soil humus as close as possible to the seed.

The plant **can better express its potential**, in terms of **both yield and quality**. It **withstands external aggressions better** and is able to **use the water in the soil more efficiently while using less inputs**.

The action of **BACTÉRIOSOL Booster** is localised at the rhizosphere, while **BACTÉRIOLIT** or **BACTÉRIOSOL**, applied on the surface, **acts over the entire soil**.

> Exists in **Booster 10 (powder)**
Booster 50 (pellets).

QUATERNA PLANT[®]
MARCEL MÉZY TECHNOLOGIES[®]


ORGANIC
SUITABLE
FOR ORGANIC
FARMING[®]



With **QUATERNA Plant**, we go back to agronomic basics, by no longer considering the plant on its own but by taking its entire surrounding agrosystem into account.

Spontaneous micro-organisms, selected from Marcel MÉZY Technologies composts, contained in **QUATERNA Plant**, develop **as close as possible to the roots** and improve the physical, chemical or biological properties of the **rhizospheric soil**.

They form a **true communication network between the soil and the plants from the roots**. The two complementary actions together produce **optimal conditions for crops** to succeed by combining **soil health**, protection, and **plant vigour**. As a result, **soil-plant exchanges are improved**, **roots and mycorrhiza can develop better**, and a **true symbiosis operates**.

QUATERNA Plant acts in **conjunction with BACTÉRIOSOL** in the soil's living universe, on its **natural fertility**, and **plant growth**.

METHANATION

BACTÉRIOMÉTHA[®]
MARCEL MÉZY TECHNOLOGIES[®]


ORGANIC
SUITABLE
FOR ORGANIC
FARMING[®]



BACTÉRIOMÉTHA is mixed into the **substrate before methanisation**, directly into the manure under the animals, into the effluent collection pits, and into **all types of substrates**.

Combining it with the substrates before methanization improves **the accessibility of the organic material in the digester** : it is primarily fungi that break down the long carbon chains. This makes **the carbon more accessible** for the bacteria during the anaerobic digestion phases, thereby **improving energy production**.

Its use also **significantly reduces smells** thanks to the bacteria that quickly reorganize ammonia nitrogen into organic nitrogen thereby **reducing ammonia emissions**. The chain reactions following the use of **BACTÉRIOMÉTHA** **improve the homogeneity** and intermixing of the substrates in the digester and reduce crusts. It also **reduces clumping and promotes the stability and balance of the digestion process**.

HIGH TECH LABORATORY TO STUDY SOIL MICROORGANISMS CLOSER



For several years, Marcel Mézy had in mind to create a research laboratory to scientifically assess the effects of his technologies (quality and quantity), which he had observed in the field over time. This laboratory is also a precious tool for better optimizing his concept which he has refined and improved for almost four decades.

A STATE-OF-THE-ART LABORATORY

So, in December 2015, Marcel Mézy hired, a month after her PhD graduation, Pauline Blanquet, a young doctor in microbiology from INRA in Toulouse, France. She specialized in the interaction of plants and microorganisms. «We were missing this last link because it is essential to measure what we do scientifically and precisely. All those who trusted us deserved that we attain this new level. It was also a way to thank them because without them we would be nothing», Marcel Mézy said.

The laboratory was created in March 2016, in Grioudas, Aveyron, France. A few weeks later, study engineer Chloé Pizzutto joined the adventure. Since then, as new projects emerged, the team continued to grow and now has five members :

- Pauline Blanquet, doctor of microbiology : laboratory manager
- Chloé Pizzutto, research engineer : technical manager
- Benjamin Marvalin, research engineer and statistician, Export manager for MEZAMONDE
- Adeline Angles, research engineer in biochemistry
- Marion Valette, Logistical and Administrative support and quality control.

This entire team works in a laboratory equipped with state-of-the-art technology !

The acquisition of a mass spectrometer makes it possible to push the analysis even further, in fact it makes it possible to detect traces of molecules of the order of ppt (parts per trillion) : «We are able to detect the presence of a molecule on an infinitely small scale and go further in the qualitative characterization of the agricultural productions of our farming partners (nutritional analyses, pesticide residues).» The coming years will be particularly important and decisive, and these investments will quickly bear fruit.

DIVERSIFIED LINES OF RESEARCH ARE BEING CARRIED OUT IN COLLABORATION WITH SCIENTISTS.

Projects are multiplying and are proof of the

various effects of this green technology. When asked what is the primary mission of the laboratory, Chloé Pizzutto lists the main pillars: « **We have to make the link between the quality of the soil (physical and biological structure) and the quality of the products that grow there (pesticide residues, vitamins, sugars, omega, antioxidants, mycotoxins, antibiotics, trace elements ...).** Analyse soil, plants, the effects on animal production and ultimately, the effects of Marcel MÉZY Technologies on human health : our field of investigation is very broad. Since the establishment of the laboratory, we have carried out hundreds of diversified analysis on soils, plants, and animal derivatives to support farmers to fully appreciate their products at their fair value. » A recognition which will surely be financially interesting, but which is above all intellectually symbolic.



In order to ensure a quality product for our customers, we carry out quality controls on the products that leave our factories.

Pauline Blanquet, Doctor of microbiology and laboratory Manager

Making the link between the quality of a soil and the products that grow there, and observing the consequences on human health, was the subject of a debate between several renowned doctors and scientists, during a major conference initiated by the «Association pour la Santé de la Terre et du Vivant» (The Association for the Health of Earth and the Living), October 26, 2017, in Rodez, France. More than 800 people attended, proof of the expectation that exists and of the hopes founded in the work initiated by Marcel Mézy's laboratory. Since then, Pauline Blanquet has been asked to speak at various events in order to convey this message, she notably spoke on the program «CO₂ mon amour» (CO₂, my love) by France Inter during the «Salon International de l'Agriculture» (Paris International Agricultural Show).

Team members travel regularly to various trade fairs and conferences to popularize their scientific results and advances to the general public and professionals.

«**In order to ensure quality for our customers, we carry out quality controls on the products that leave our factories. We are in close collaboration with SOBAC and their technical service. We are also working with experts, such as INRA, Purpan's engineering school, to independently validate research advances**» says Pauline Blanquet.

THE POWER OF UNSEEN LIFE IS IMPRESSIVE

When we discuss the very composition of the product, the core of which is manufactured in Bozouls, France and which makes it possible to produce BACTÉRIOSOL and BACTÉRIOLIT, the members of the laboratory respond : «This product is so complex that there is still tremendous room for improvement. We have incomparable results with possible competitors on humic acids, for example. When we apply the concept, we also see that there is better rooting, better germination, better development of the root system...». Little is known about the world of microorganisms. In fact, the concept implemented by Marcel Mézy is a microbial ecosystem composed of an army of workers who will have a specific task and will start to work together in the ground.



Chloé Pizzutto, Marcel Mézy and Pauline Blanquet, in the new MÉZAGRI laboratory

CHALLENGES TO BE MET

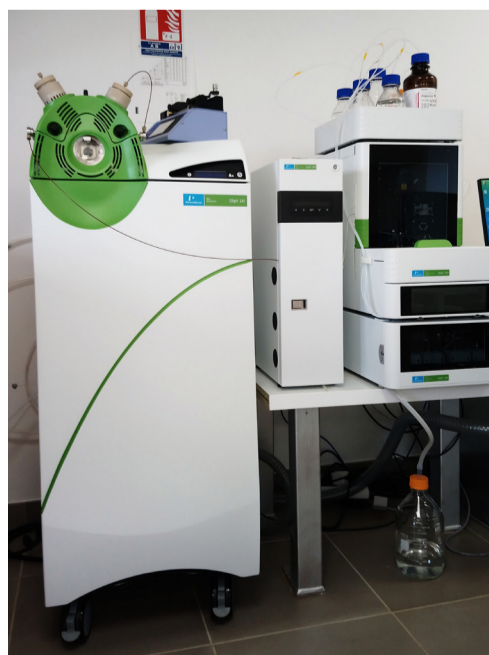
Marcel Mézy's difficulty of finding external partnerships is now a thing of the past. Today, many scientists are very interested in the work in progress in his laboratory. At a time when ecological concerns are increasingly present, the Mézagri laboratory has an essential role to play. **Members of «4 pour 1000»** (4 per 1000), an initiative of the French Ministry of Agriculture which aims to show that agriculture and in particular agricultural soils can play a crucial role in food security and climate change by implementing real actions about carbon storage in soils. Guests of **COP21, COP22 and COP23**, MÉZAGRI and SOBAC are today internationally recognized.

Marcel MÉZY Technologies and SOBAC solutions have obtained **“The International Solar Impulse Label”**. The Solar Impulse Foundation was created following Bertrand Piccard's round-the-world flight in solar-powered plane in 2016. Its vocation is to reward, on a global scale, 1 000 clean and cost effective solutions that combine **technological feasibility, environmental and socio-economic benefits, profitability for users.**

This label is, once again, proof that sowing your soils with Marcel MÉZY Technologies is a profitable action, beneficial to the environment, respectful of the earth and therefore of the health of the living beings.



At the Mézagri laboratory, the challenges are multiple and mainly aim to enhance the quality of the productions of the users of Marcel Mézy's solutions thanks to analysis tools at cutting edge technology: «**We want farmers who have changed their production method by trusting us to be recognized from their soil to our plates**» confides Marcel Mézy.



HOW TO IMPROVE FIELD WATER MANAGEMENT AND RESPOND TO THE CONSTRAINTS OF CLIMATE CHANGE

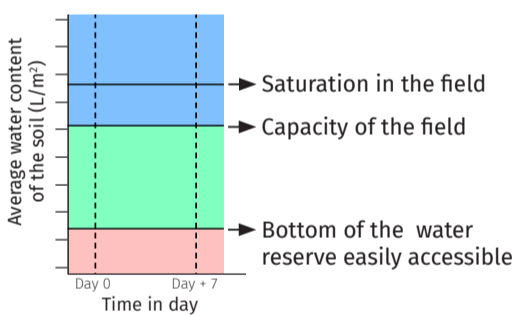
Involved partners : Eau Seine-Normandie-France (Water Agency)
AGRALIS SERVICES, SOBAC.

Climate change must be at the forefront of the water management debate to establish a public policy that meets high societal and environmental expectations. Surface run-off is a major factor in the erosion of agricultural soils. Likewise, the transfer of minerals to soil depths is a key process in the pollution of groundwater and the eutrophication of watercourses. Soils lose their ability to retain rainwater, thereby increasing the risk and size of flooding. By their surface area and their use, agricultural soils concentrate environmental, agronomic and health concerns. The modification of the soil structure and the gradual disappearance of the microorganisms living there are hypotheses that partially explain the decrease in agricultural yields. SOBAC solutions have been created to meet the needs of jointly managing these concerns. These solutions, available under the BACTÉRIOSOL/ BACTÉRIOLIT brands, consist of an ecosystem of microorganisms developed on plant naturally

composted from Marcel MÉZY Technologies (MMT). They allow rapid creation of humus, which is the natural reservoir of water and nutrients for plants. This document synthesizes a comparative observational study over 3 years carried out on an agricultural plot divided in two with a CONTROL part and a part seeded with BACTÉRIOSOL. Quantifications of the water content and the quantity of ions (nutrients in solution) in the soils are carried out and are compared with agronomic results. From 2016 to 2018, on the Auger St Vincent (Northern France) catchment area, two SENTEK capacitive probes, 20 meters apart, measured the conductivity and the water potential of the soil at 3 depths: 15 cm, 35 cm and 55 cm. Monitoring was carried out by Dr. Jean-François Berthoumieu, from the company AGRALIS, which is developing the use of these Australian probes in France. The analysis of the measurements is done blindly to ensure total objectivity of the interpretation.



GRAPHIC READING GUIDE



SURFACE RUNOFF
ASPHYXIATION of plants
WATER CONFORT
STRESS due to lack of water

WATER EXCESS : groundwater recharge
-> **Erosion risks**
-> **Soil leaching risks**
-> **Contamination risks**, nitrates, phosphates and pesticides
Need for IRRIGATION or **LOSS OF PRODUCTION**

CONTROL
BACTÉRIOSOL

In the comfort zone, a diminution of water content is the result of plant consumption (not percolation).

Marcel MÉZY Technologies (MMT) : SOBAC Solutions, BACTÉRIOSOL, BACTÉRIOLIT, QUATERNA



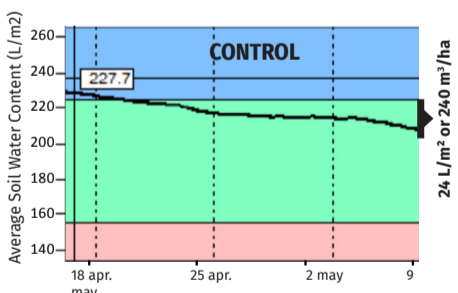
Marcel MÉZY Technologies allow rapid creation of humus, which is the natural reservoir of water and nutrients for plants.

RESULTS AND INTERPRETATIONS

1. BETTER AVAILABILITY OF WATER AND LESS IRRIGATION

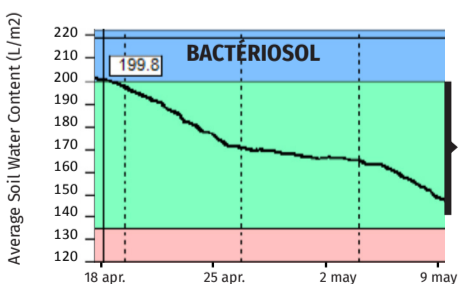
Variation in the quantity of water available in the soil for the plants.

2016



With MMT (SOBAC solutions), water has been 2.5 times more available for the plants. Without (CONTROL), the plants have been restricted in water.

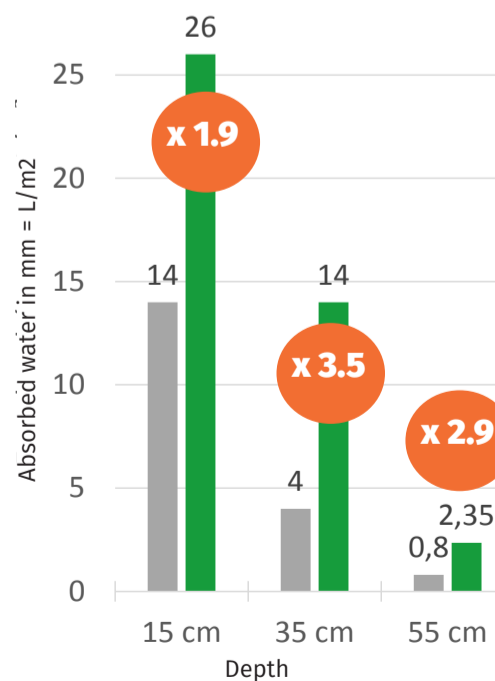
By better using the water reserve of the soil, THE NEED FOR IRRIGATION IS REDUCED BY 30%.



IMPROVEMENT OF THE DRAINAGE AND RETENTION CAPACITY OF THE SOIL:
- Reduction of the risks of floods
- Better use of the rain water

2. WATER CONSUMPTION AT 3 DIFFERENT DEPTHS

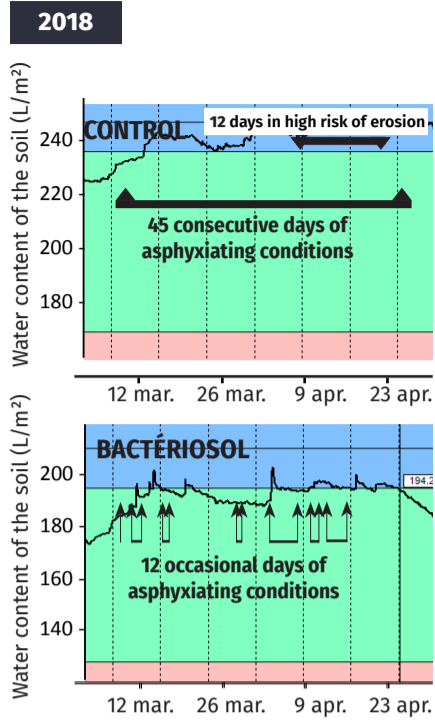
2016



Thanks to the MMT, the strong and wide root system prospecting the 3 depths there is a higher water absorption by the wheat roots on the field managed with BACTÉRIOSOL.

With SOBAC solutions, the water containing the nutrients is more available for plant growth.

3. BETTER MANAGEMENT OF EXCESS WATER.



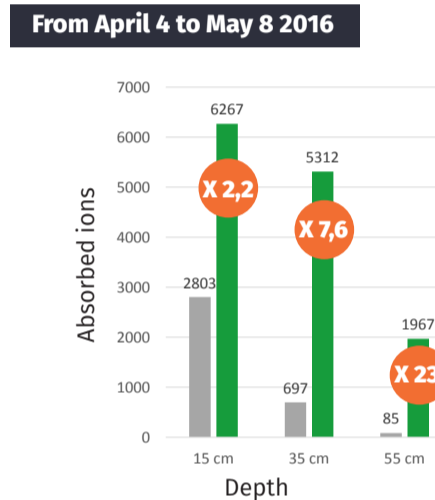
During 7 rainy weeks, the Control part was constantly in ASPHYXIANT CONDITIONS, due to EXCESS OF WATER AND THEREFORE LACK OF AIR. Thanks to MMT, plants have lived only BRIEF EPISODES OF ASPHYXIA.

Benefice for the HEALTH of cultivated PLANTS and better ECONOMIC PROFITS for farmers.

Without MMT, the water absorption capacity is lower, and the risks of soil erosion and washout were very high for 12 days.

Thanks to MMT, SOBAC solutions limit :
- The risks of soil erosion
- The risks of water pollution by nitrates, phosphates, and pesticides
- The nuisance of excess water on crops.

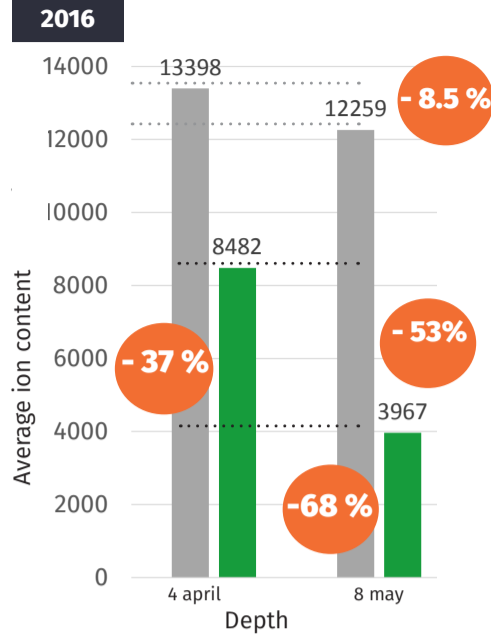
5. ABSORBED IONS AT 3 DEPTHS.



Thanks to the MMT, the strong and wide root system prospecting the 3 depths explains the higher water absorption by the wheat roots on the field managed with BACTÉRIOSOL.

With SOBAC's solutions, the water containing the nutrients is more available for plant growth.

4. AVERAGE ION CONTENT OF WATER DOWN TO 55 CM DEPTH.



Microorganisms from MMT are used to regulate the content of ions (dissolved nutrients) in the soil water made available to plants.

MMT regulate the amount of nutrients in soil water by reorganizing them into organic matter (carbon) stored in the humus. The risk of pollution of groundwater and rivers is reduced.

6. AGRONOMIC RESULTS: WHEAT PRODUCTION.

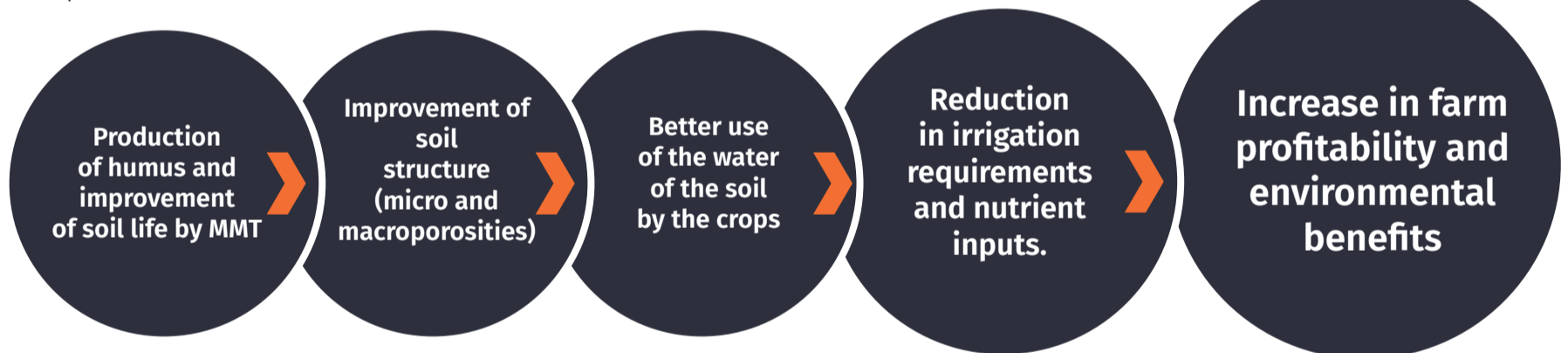


2016 : Weather conditions were cold and humid
2018 : Weather conditions were good

- Better yields thanks to the MMT
- Improved homogeneity of the yield (x2)
- Reduction of nitrogen synthetic fertiliser applied (N)
- Protein content the same in both modalities, both years.

2016
CONTROL : N = 216 kg/ha
BACTÉRIOSOL : N = 161 kg/ha : - 25 %

2018
CONTROL : N = 224 kg/ha
BACTÉRIOSOL : N = 184 kg/ha : - 18 %



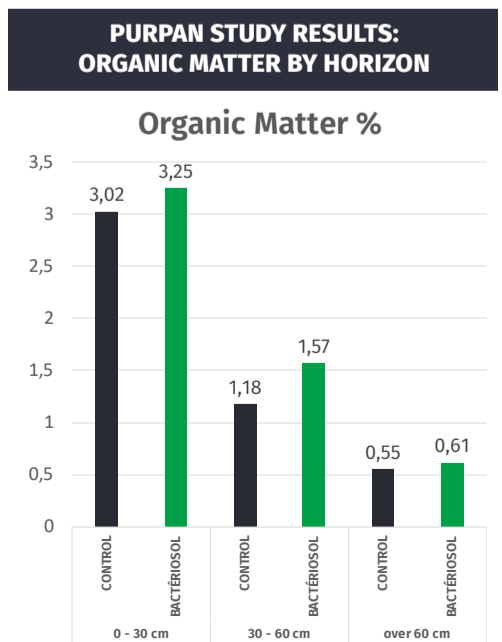
IMPROVING CARBON AND NITROGEN STORAGE IN SOILS THANKS TO MMT

Marcel Mézy, a pionner in many fields, identified the action of his complex of microorganisms on carbon storage in the soil. The first results were observed in a laboratory in closed conditions where wheat was grown in washed river sand. The conclusions show a 6-fold increase in organic matter content in 2 months due to the use of BACTÉRIOSOL. Subsequently, a lot of ad hoc evidence and testimonies from the field have made it possible to validate and consolidate these results.

In 2016, the Purpan school of agronomy in Toulouse, France was asked by SOBAC to measure in a completely independent manner the action of Marcel MÉZY Technologies on the storage of carbon and nitrogen in soils. A set of 10 plots using BACTÉRIOSOL for at least 3 years without adding organic matter and a control zone without BACTÉRIOSOL were thus studied. The results of this study are shown in this article.

Each plot has 2 modalities : BACTÉRIOSOL modality, sown with this technology and conducted according to the recommendations of SOBAC company (application between 3 and 6 years depending on the sites), and a CONTROL modality, conducted according to the usual cultural practices of the farmer. On each modality, 3 soil pits were dug in order to observe and describe the soil profile and take soil samples. From each-

pit, 3 soil samples were taken: 0-30 cm, 30-60 cm and beyond 60 cm (from 60 cm to the depth reached on the shallowest pit on the site). 2 methods (CONTROL / BACTÉRIOSOL) tested on 10 sites in arable crops, viticulture, and arboriculture (same plot cut in half, same tillage) without adding organic matter. 3 soil trenches per category and per site: 60 trenches in total and 180 samples analysed.

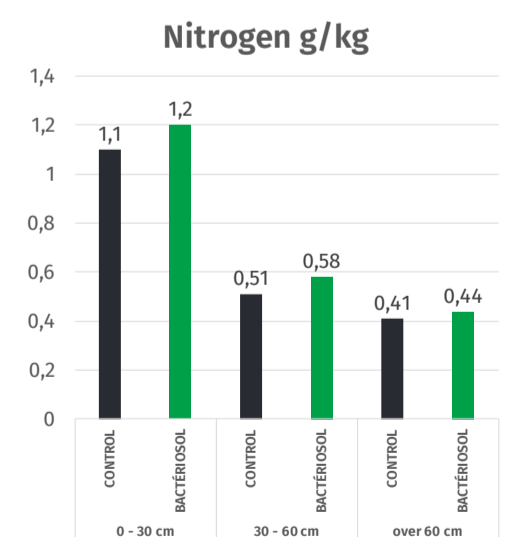


The quantity of the organic matter with BACTÉRIOSOL is higher than the quantity of the CONTROL organic matter. The quantity of the organic matter decreasing with depth (significant effect on the 60 trenches). The results thus show an average carbon gain with BACTÉRIOSOL of + 19.8 t of carbon per hectare which is 14.8 % more than the CONTROL. BACTÉRIOSOL allowed an average gain of 5 ton of carbon per hectare and per year, i.e. 50 ton of manure per hectare and per year in carbon equivalent on this study.

* Manure base. With 1 ton of Bovine MANURE = approximately 100 kg of carbon at 20% OM and 10% Carbon.

The total nitrogen with BACTÉRIOSOL is higher than total nitrogen of the CONTROL. The results show an average total nitrogen gain with BACTÉRIOSOL of + 1 t per hectare, which is 9.4 % more than the CONTROL. BACTÉRIOSOL allowed an average gain of 250 kg total nitrogen per hectare and per year, i.e. 50 t of cattle manure per hectare and per year in nitrogen equivalent in this study.

1 tonne of MANURE = about 0.5% of total nitrogen (cattle manure)



CONCLUSION
All sites combined, and whatever the horizon, the organic matter content of the samples with BACTÉRIOSOL is higher than that of the CONTROL :
> + 5 t/ha/year of carbon or + 14.8 %
> + 250 kg/ha/year total nitrogen or + 9.4 %

METHANATION : HOW DOES IT WORK ?



BACTÉRIOMÉTHA is a complex of microorganisms composed of a flora selected for its properties adapted to the process of anaerobic digestion. The effects of BACTÉRIOMÉTHA are :

An increase in energy production thanks to :
- a better attack of the fibres in the digester,
- the seeding of microorganisms involved in the various processes of anaerobic digestion thus promoting the chain of enzymatic reactions and therefore the production of biogas.

A significant reduction in smells before methanation by blocking nitrogen and carbon in the manure under the animals and during storage.

An overall improvement in the digestion process and consistency in the digester and agitation.



OPTIMIZATION
of the anaerobic digestion process

PROFITABILITY
More energy production



ENVIRONNEMENT
Better smell management before methanation
Better building atmosphere

HOMOGENEITY
More homogeneous substrates in the digester, improved agitation

AN INCREASE IN BIOGAS PRODUCTION

Pioneers in their region, Thomas and Simon Giraud switched to methanisation (anaerobic digestion) six years ago. With BACTÉRIOMÉTHA, they improved the atmosphere in the stables, increased the production of biogas and therefore the electrical income.



SINCE 2016

Thomas and Simon Giraud
in Faye-l'Abbesse (Deux-Sèvres), France

POLY-CULTURE - BREEDING
BIOGAS PLANT = 50 kWh

190 hectares including 20 hectares of cereals and the rest in grass. 160 nursing cows (2/3 Charolaise, 1/3 Limousine)

« We discovered biogas production in an agricultural journal in 2009. There was a call for projects from our region for small installations of 50 kW. We answered.

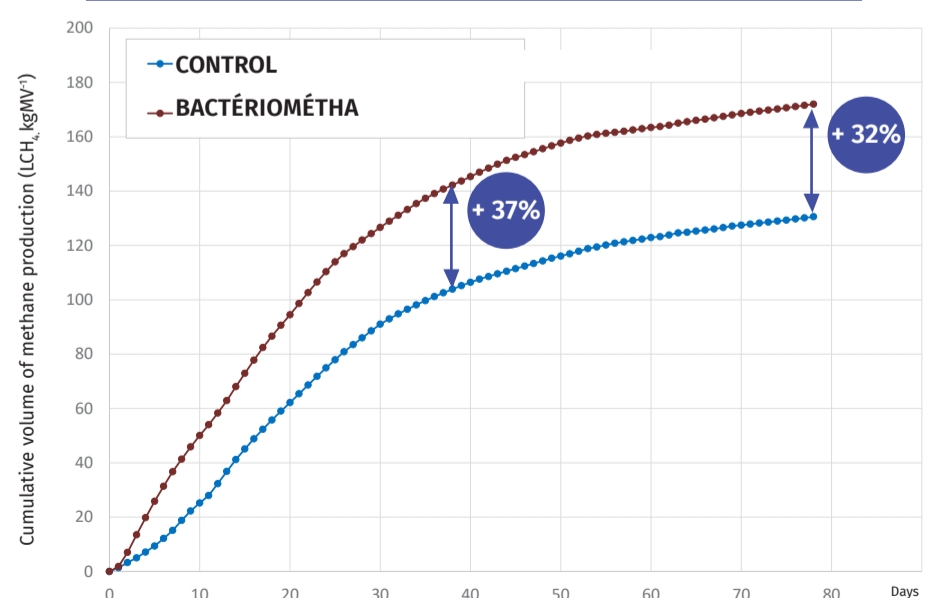
Our installation was launched in 2010 and entered production in 2013. In addition to the electricity sold, it produces heat for calves and for five homes. We have a 15 years contract. Ecologically, we emit much less CO₂ into the air, around 210 tonnes. And in electricity, our daily production is around 1,200 kW. Over the year we produce the equivalent of the consumption of 70 homes. We have also set up a fodder dryer. Autonomy and environment work together. In fact, we wanted to make better use of our livestock effluents. The digestate is better valued by the plant. In the end, we produce electricity, we gain in fertilization and we go in the direction of animal well-being since we clean up stalls more often. It was François Baclé who approached us. He proposed BACTÉRIOMÉTHA to us which must be incorporated in the litters like BACTÉRIOLIT. BACTÉRIOMÉTHA accelerates the decomposition of manure in the digester, homogenizes the whole and allows more efficient mixing. Its use also allows a significant reduction in odours before anaerobic digestion thanks to the blocking of carbon and nitrogen in the substrates under animals and in storage. There is an increase in the production of biogas which has been measured following the contribution of BACTÉRIOMÉTHA within the framework of a study. »

+ 37 % PRODUCTION AT 40 DAYS

The results presented in the graph below support the results observed on a large scale at EARL GIRAUD. They come from an experiment carried out on a control group of cattle manure compared to the same cattle manure seeded with BACTÉRIOMÉTHA at 1 kg/m³ of manure. Manure production was carried out in the same building, on two identical boxes, with the same number of animals separated by a corridor and a feeding area.

The positioning of BACTÉRIOMÉTHA was done in one of the batches, 1/3 on fresh straw and the remaining 2/3 15 days before mucking out. Manure samples were taken and sent to INRA Transfert in Narbonne, France to analyse and monitor the anaerobic digestion of these manures in a pilot anaerobic digestion reactor. The graph below shows the evolution of biogas production from 0 to 80 days of digestion.

METHANE PRODUCTION IN CUMULATIVE VOLUME OVER TIME FOR CONTROL AND BACTÉRIOMÉTHA REACTORS



CONCLUSION

This difference in production can be explained by several phenomena, including :
- The action of BACTÉRIOMÉTHA positioned under animals **which prepares manure and makes organic matter more accessible** during the anaerobic digestion process.
- The establishment with BACTÉRIOMÉTHA of microorganisms involved in anaerobic digestion processes. **This flora accelerates and improves the anaerobic digestion process and thus produces more biogas, in faster and in greater quantity.**

AUTONOMY, HEALTH AND PROFITABILITY



SINCE 2014

Frédéric and Angélique Rozier, GAEC de la Grange Blanche, in Briennon (Loire), France

216 hectares including 15 of cereals, 10 of temporary meadows and the rest in natural meadows, 150 Charolais cows and 40 heifers for replacement.

Testimony collected in autumn 2016.



ECONOMIC STUDY : MEASURE THE IMPROVEMENT OF THE OVERALL OPERATING PROFITABILITY FROM ACCOUNTING DATA AND LIVESTOCK MEASUREMENTS.

	Context	
	BEFORE SOBAC	WITH SOBAC
Work force	2	2
UAA (ha)	143	216
MFA - Main Fodder Area (ha)	140	161
Mineral fertilizer used	14 T (NPK)	4,5 (N)
N° of LSU	164	212
N° of suckler cows	130	150
LSU/ha	0,9	1

Targets
> Improving the health aspect of livestock
> Improving the fodder quality
> Stopping mineral fertilizers
> Gaining in autonomy
> Improving the use of effluents
> Improving the potential of the soil
> Increasing profitability

1. TECHNICO-ECONOMICAL STUDY

Following comparative analysis of forages carried out in 2015 on the same parcel of natural meadow, cut in half, with a control (untreated manure + 30 units of nitrogen) and a SOBAC (manure seeded with BACTÉRIOLIT), with an equivalent yield, it was possible to measure the autonomy in milk and meat production. Note: LSU = Livestock Unit ; MFU = Meat Fodder Unit ; DPI = Digestible Protein in Intestine.

Theoretical calculations based on an average yield of 6 T Dry Matter / hectare

	CONTROL	SOBAC	EVOLUTION
Fodder Unit (FU) g/kg of DM	0.69	0.83	+ 0.14 g
DPI g/kg of DM (Protein)	57	105	+ 48 g
Milk production per FU/ha	9 410	11 318	+ 1 908 L
Milk production per DPI/ha	7 125	13 125	+ 6 000 L
A calf needs 1 800 L of milk from its birth to 5 months old – a cow produces in average 7 L/day			
Calves fed with milk in terms of FU/ha	5.2	6.3	+ 1.1 calves (0.3 LSU/ha)
Calves fed with milk in terms of DPI/ha	4.0	7.3	+ 3.3 calves (1 LSU/ha)
7 L of milk/day = 1 000 g/day - a calf weights in average 260 kg when weaned			
ADG produced per UF kg/day	1 344	1 618	+ 274 kg (0.3 LSU/ha)
ADG produced per DPI kg/day	1 018	1 875	+ 857 kg (1.1 LSU/ha)

Autonomy in NDPI (Nitrogen Digestible Protein in Intestine) with SOBAC hay : + 48 g/kg dry matter or + 288 kg NDPI / hectare. Knowing that 1 kg of raw 48 soybeans = 331 g of NDPI, to obtain the same value with the control hay:
 > SOBAC hay saves 870 kg of soybeans/hectare
 > 339 €/ hectare savings (basic price: 390 €/T)

The milk production per hectare is higher with SOBAC forages, thanks to a better soil balance, thus allowing more calves to be fed with quality milk. A well-fed calf from the start and in a healthy environment will have good immunity and a good microbiota, and will thus be in better health, contributing to the gain in productivity.

2. FEEDING CATTLE IN AUTONOMY

For a 650 kg cow (450 kg carcass weight), target of 1,2 kg/day, on a fattening period of 150 days. The needs are: 11.2 MFU/day/LSU and 1,120 DPI/day/LSU i.e. 1,680 MFU/LSU and 168,000 DPI/LSU for 150 days of fattening.

Number of LSUs allowed/hectare

	CONTROL	SOBAC	EVOLUTION	SAVINGS
Total MFU with hay	3 600	4 560	+ 26 %	256 kg carcass weight = 922 €/ ha (average price = 3.6 €/kg)
LSU fattened per MFU over 150 days/ha	2.14	2.71	+ 0.57 LSU/ha	
Total DPI with hay	342 000	630 000	+ 84 %	770 kg carcass weight = 2 772 €/ha (average price 3.6 €/kg)
LSU fattened per DPI over 150 days/ha	2.04	3.75	+ 1.71 LSU/ha	

> The more balanced and mineral-rich the fodder, the higher the average daily gain allowed. Here, the farmer earns between 0.57 and 1.71 LSU allowed/ hectare with the fodder unit and DPI measured on the SOBAC side.

> Thus, he gains in autonomy in the face of weather hazards which can affect stocks, but he also has the possibility of increasing the number of LSU / hectare according to his targets.

3. IMPROVED MARGIN IN MEAT SALES

Economic gain per kg of meat with the same fattening time :

	CONTROL	SOBAC	EVOLUTION	WEIGHT GAIN IN KG/LSU
Cows' carcass weight in kg (average over 3 years before and after)	352	368	+ 16 kg = 58 €/cow (average price 3,60 €/kg)	16 kg/LSU = 58 €/LSU
Heifers' carcass weight in kg (average over 2 years before and after)	261	302	+ 41 kg = 168 €/heifer (average price 4,10 €/kg)	59 kg/LSU = 240 €/LSU
Grass-fed calves live weight in kg (average over 2 years before and after)	347	397	+ 50 kg = 130 €/grass-fed calf (average price 2,60 €/kg)	71 kg/LSU = 186 €/LSU

> Improving the atmosphere of the building and the sanitary environment promotes better animal health

> Better start-up of the calves thanks to the improvement of the atmosphere of the building and the quality and quantity of milk produced by the mother from farm fodder produced with BACTÉRIOLIT - BACTÉRIOSOL

> Improved ration efficiency : the ration of grass-fed calves being identical before and after SOBAC, it has higher value via the quality of self-consumed fodder and therefore it makes it possible to produce more meat with the same amount of food.

01 SOIL HEALTH

- Improvement of soil structure
- Improvement of grassland flora
- Equivalent fertilization costs
- Reduction in chemical inputs :
 - * -10 T of mineral fertilizers
- Fuel costs : 15 € / hectare
- Better balance of fodders :
 - * Increase in litres of milk and kilos of meat produced in autonomy
 - * + 0.57 LSU allowed / hectare / MFU i.e.
 - * + 256 kg of meat = + 922 € / hectare
 - * + 1.71 LSU allowed/ hectare /DPI i.e.
 - 770 kg of meat = + 2 772 €/ha

GAIN IN AUTONOMY

02 ANIMALS HEALTH

- More balanced diet
- More sanitary buildings
- Better calf start-up
- Veterinary costs : - 39 €/LSU
- External food costs : - 5 €/LSU
 - * Improved ration efficiency
- Improved carcass weight :
 - * Cows : + 16 kg = + 58 €/cow
 - * Heifers : + 41 kg = + 168 €/heifer
- Improved live weight :
 - * Grass-fed calves :
 - + 50 kg = + 130 €/Grass-fed calf

INPUTS REDUCTION

03 OVERALL PROFITABILITY

- Overall operation :
- Improved carcass weight :
 - * Cow : + 16 kg/LSU > 58 €/LSU
 - * Heifer : + 59 kg/LSU > 240 €/LSU
 - Improved live weight :
 - * Grass-fed calf : + 71 kg/LSU > 186 €/LSU
 - 22 animals sold in 2017 = + 5 512 € (productivity gain)
 - Veterinary costs : - 8 268 €/212 LSU/year
 - Feed costs : - 1 060 €/212 LSU/year
 - Fuel costs : - 3 240 €/year for 216 hectare
- TOTAL SAVINGS : 12 568 €/TOTAL YEAR : + 85.28 € ECONOMIC GAIN/LSU/YEAR**

SUSTAINABILITY

SOIL PROFILE - PUSZTASZABOLCSI AGRAR ZRT - DAIRY POLYCUltURE FARMING - HUNGARY



SINCE 2012

Gergely Sztupa
Hungary

POLYCUltURE-DAIRY FARMING

1 200 hectares : soft winter wheat, barley, sunflower, rye and mixed crop of wheat and rye silage, corn, alfalfa, RGI - **700 Prim'Holstein** cows whose entire production is processed on the farm

OO Gergely Sztupa's testimony on You Tube channel, «Les solutions naturelles SOBAC»

Mr. Gergely Sztupa opened the doors of his farm to us for the third time since he started his adventure with BACTÉRIOSOL and BACTERIOLIT solutions in partnership with our local representatives Sersia Farm Kft.

« The first soil profile on this farm took place in 2012, after two years of use. In 2016, we visited the same plot to see the long term evolution and we did the same in 2018. On this occasion, Sersia Farm Kft had brought together more than 140 Hungarian and Slovak farmers over 3 half days.

A little sceptical before the opening of the profile, Mr. Gergely Sztupa did not think he would see any change because the 2016 profile had already impressed him. Here is his reaction: «It was very interesting and demonstrative. The doubts I had, just vanished ! »

CONCLUSIONS OF CHRISTOPHE FREBOURG, INDEPENDENT EXPERT

« The assesment is carried out live from 9:45 a.m. to 3 p.m. in the presence of around thirty farmers. The 2 profiles have the same soil origins with identical agronomic potential.» Their digging undoubtedly reveals a larger volume of black earth on SOBAC's profile. All this is confirmed by the observations and measurements carried out on SOBAC side which is **1°C higher overall, a sign of higher biological fertility. The pH is completely regulated over the entire profile from 0 to 200 cm.** This phenomenon highlights an homogeneous distribution of biological life, which optimizes conductivity, capillarity, and water management.

Aeration, porosity, and water management by humification are doubled ; this increases the functioning dynamics of the soil :

- Greater bioavailability of all minerals
 - Greater autonomy compared to the use of chemical fertilizers and lower dose of mineral nitrogen
 - Substantial savings
 - Acceleration of biological fertility
- In this case, **the root system exploits more than 80 cm of soil, the equivalent of more than 10,000 t of soil per hectare** : simply enormous! A more powerful root system contributes to building a foliage more resistant to the attacks of cryptogamic fungi : with an economy on phytosanitary and a significant reduction of residual in the soil. In summary, SOBAC's profile has a higher biological fertility, which has an upward impact on chemical and physical fertility.»



It was very interesting and demonstrative. Any doubts I had, just vanished ! (...)



BACTÉRIOSOL - 2012



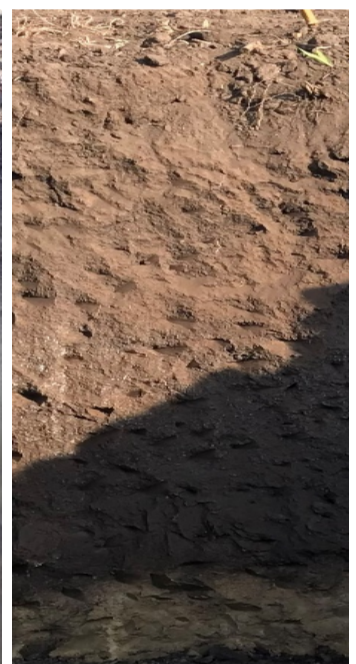
CONTROL - 2016



BACTÉRIOSOL - 2016



CONTROL - 2018



BACTÉRIOSOL - 2018

STUDY CARRIED OUT ON THE FARM OF PUSZTASZABOLCSI AGRAR, BY GERALD DUNST, HEAD OF THE WORKING GROUP ON AGRICULTURE AND HUMUS IN KAINDORF, AUSTRIA.



Horizon (cm)	Humus Content		C/N		Density (t/m³)		Quantity of soil m³		C/ha (t)		N/ha (t)	
	CONTROL	SOBAC	CONTROL	SOBAC	CONTROL	SOBAC	CONTROL	SOBAC	CONTROL	SOBAC	CONTROL	SOBAC
0-40	4.4	4.7	10.81	10.58	1.04	1.02	4160	4080	106.16	11.22	9.82	10.51
40-80	1.8	3.3	16.83	11.78	1.34	1.12	5360	4480	55.96	85.75	3.32	7.28
80-120	1.1	2.4	17.37	12.35	1.48	1.22	5920	4880	37.77	67.93	2.17	5.50
120-140	0.6	1.8	17.14	11.84	1.58	1.34	6320	2680	21.99	27.98	1.28	2.36
140-160	-	0.6		15.65		1.58		3160		11		0.70
									221.88	303.87	16.60	26.36
										+ 37 %		+ 59 %



Gerald Dunst, who managed this study, is Managing Director of Sonnenerde company, co-founder of Charline company, head of the working group on agriculture and humus, part of the Kaindorf ecoregion. He is the author of the manuals «Humusaufbau» (2011) and «Kompostierung» (2015) and «Humusaufbau, Chance für Landwirtschaft und Klima» (2019). He has been involved in Terra Preta research since 2008. He built and operates the first biochar production plant in Austria.

Difference on BACTÉRIOSOL side in t over 7 years	+ 81.99	+ 9.75
Average gain per year in t	+ 11.7	+ 1.4
Difference in kg/ha/year on BACTÉRIOSOL side	+ 11 712.86	+ 1 393.46

CONCLUSION

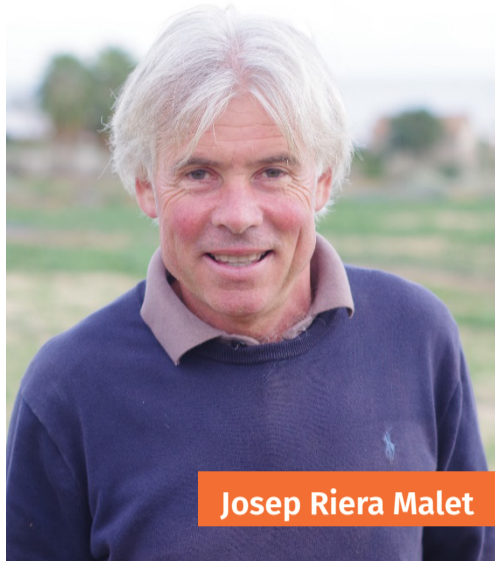
After 7 years of use, the SOBAC plot shows significant gains in carbon and nitrogen compared to the CONTROL :

> + 37 % carbon i.e. + 11.7 t of C/ha/year

> + 59 % nitrogen i.e. + 1.4 t of N/ha/year

The «4 per 1000» initiative launched at the COP 21 in Paris in 2015 states that «an annual growth rate of the carbon stock in the soils of 0.4 %, i.e. 4 % per year, would make it possible to stop the increase in the concentration of CO₂ in the atmosphere due to human activities», let's aim higher, let's see further !

SOIL PROFILE - MR. RIERA MALET - MARKET GARDENER - SPAIN



Josep Riera Malet

SINCE 2016

Josep Riera Malet,
Mataró (Catalonia), Spain
UAA : 4 ha
1,5 hectares in greenhouse
2,5 hectares outdoors (spinach, chard, and radishes)
Sale of products to MERCABANA.
Testimony collected in autumn 2018.

COMMENTS
I did not expect such great results in the soil
JOSEP RIERA MALET

« My farm is in the Maresma area, in Catalonia, we farm 4 hectares in total, 1.5 hectares in greenhouses and 2.5 hectares outdoors. We are dedicated to the production of vegetables, more specifically spinach, chard, and radishes. About two and a half years ago, we tested BACTÉRIOSOL on a few plots, those that were most affected by fusarium and pythium. From the first application, we saw that the attacked plants were doing better and that they were of better quality. Subsequently, we made other applications, **the plots are gradually recovering and getting better.** We used it because all the chemicals we tried did not work, it was useless, there was such a level of infection that it was impossible to sow anything. **Finally, we chose this alternative and it works. On plots where almost nothing was harvested, after one year and several applications, 90-100 % of the production was reached. Now the quality is perfect!** There are no problems, it's like a virgin field. **The recovery is total,** it is a slow recovery, it is not overnight, you must be patient. This makes



it possible to clean up very infected plots in a year, a year and a half, and to harvest 100 % of the production. Before BACTÉRIOSOL, with chemicals, it was the opposite, when a field was infected, it was treated by fumigation or other chemicals. We were wasting a lot of money and harvesting a little less each time, until it was impossible to sow without applying products. **With BACTÉRIOSOL it's the opposite, we forget about chemicals, we don't use them at all, we apply BACTÉRIOSOL and it improves within a year,** a year and a half. Then, we are careful to do as few treatments as possible, when there is a plot with a lot of grass, we apply a little herbicide, but it is not systematic. The first effects of BACTÉRIOSOL we saw were on spinach. In fact, after it was applied, spinach grew but remained very small, rickety. The next ones sprouted with different vigour and when they reached the middle of their cycle, they started to grow again and reached the same point as those who had first grown. It's a process that allows you to ramp up and, at the end of production, you get to

the same point. Before BACTÉRIOSOL, spinach, in this case, would not have developed, would have remained tiny, would not grow, and would end up dying. **I recommend trying BACTÉRIOSOL and BACTÉRIOLIT before applying chemicals, this is the way to the future.** We're used to chemical farming, but we have to move away from that. **You can get 100 % of the crop without using chemicals.** It's healthier for everyone, for the environment, for the market gardener and for the end consumer. **Since I started using BACTÉRIOSOL, the fields speak for me, I can just say that I am at 100 % of my production, and what I say, the plants say it too.»**

SUMMARY

- * Plants less vulnerable to fusarium and pythium
- * Gradual sanitation of plots
- * Better quality and health of plants
- * Return to 100% of production
- * 0 chemical fertilizers on 100% of production
- * Health benefit for soils, plants, and people

SOIL EXPERTISE AT JOSEPH RIERA MALET ON A FIELD OF SPINACH BY FREBOURG AGRO RESSOURCES



CONTROL				SOBAC			
Observations	T°C	pH	in cm	pH	T°C	Observations	
Coarse sand, little silt and clay, few odours	16	7.4	-10-	7.0	17.6	Very beautiful layer, coarse sand with more clay than the Control. Greasy to the touch, darker, mushroom odour, aluminium silicate, and micas. Beautiful texture	
Same as layer 1 with a little more clay	15.7	7.1	-20-	7.1	17.4		
Clay rate increasing (1 to 2%)			-30-				
Very compacted layer, little porosity, more gravelly	17.8	7.0	-40-	7.1	18.9	Coarse sand and more gravels, gradual colour change, same colour as layer 1, aluminium silicate	
			-50-				
			-60-				
Orange and ochre yellow colour change, layer very compacted by tools and insufficient biology, organic matter fossilized in petroleum			-70-			Colour change (35 cm deeper than the Control trench), homogeneous orange colour, very beautiful porous perspective	
			-80-				
			-90-				
Increasing clay content, more porous, redder colour (manganese)	19.8	6.0	-100-	6.9	20.1	Physical characteristics of the soil : sandy with little clay	
			-110-				
			-120-				
	20.4	5.9	-130-	6.9	20.7		
Physical characteristics of the soil : sandy with little clay							
18° at 15:40		Air		18.4° at 16:30			
6.7		Medium pH		7			
1.5		Variation pH		0.2			
3.54		Compaction index		1.43 -> -21.1 %			
240 m²		Number of earthworm		780 m² -> X 3.25			
13 cm		Root depth		48 cm -> +370 %			
Anecic, few aboveground and soil		Dwelling		Anecic fauna +++, few aboveground			
Little evolved		Debris		Well evolved			
Presence of micas		Others		Lot of micas, aluminium silicate, and mushroom odour			

- Very friable
- Friable
- Light compaction
- Semi compaction
- Strong compaction

AGRONOMIC ADVICE FROM THE EXPERT

« Continue to work on improving biological fertility. To reduce the compaction of the CONTROL, a biological intervention will be faster and above all more durable than the use of tools. The structure of the SOBAC trench is magnificent. This soil should be worked as simply as possible knowing that 80 % of the biological activity is located from 0 to 15 cm.

The use of phytosanitary products must be reduced, knowing that all the products are harmful for micro and macro fauna, especially for mushrooms. The « chemical » past has greatly reduced the aboveground fauna (small red manure worms). »

CONTROL		SOBAC
7500 m² field cultivated since 2003		1000 m² greenhouse field cultivated for 30 years
Spinach Alfalfa before spinach	2019	Spinach : 20 kg of BACTÉRIOSOL Concentré per plantation for 1 000m² + 6m³ of horse manure
Radishes : 45 m³ of horse manure for 7500 m²	2018	Radishes : 20 kg of BACTÉRIOSOL Concentré per plantation for 1 000m² + 6m³ of horse manure
Chards : 45m³ of horse manure for 7500 m²	2017	Chards : 20 kg of BACTÉRIOSOL Concentré per plantation for 1 000m² + 6m³ of horse manure

6 to 8 plantations/year
> 1.6 t/ year of BACTÉRIOSOL Concentré

COMMENTS FROM CHRISTOPHE FREBOURG, INDEPENDENT SOIL EXPERT

« The two trenches have the same soil origins with identical agronomic potential. The digging of the SOBAC trench reveals a much less compacted and darker earth. We notice strong odours of mushrooms while the CONTROL pit is odourless. The depth was limited to 1.30m as a safety measure because the CONTROL pit had significant potential to collapse. The SOBAC trench could have been dug to 2 meters, being richer in clay. All this is confirmed by the observations and measurements carried out in the presence of Mr. Riera Malet. **The pH is almost regulated in the SOBAC trench** with a variation which went from 1.5 to 0.2. The pH of the soil is almost reached. This evolution is due to a **very large improvement in biological fertility.** The aeration, porosity and management of water bound by humification has more than tripled and **the compaction was reduced by 21.1%. The root system is denser, and its health status is improved.** The roots are well rounded which optimizes the supply of soil solution.

All these improvements have a very positive impact on the dynamics of soil functioning, namely : **greater bioavailability of all minerals stored** throughout the profile. For example: K + O₂ + Bacteria = K₂O potassium oxide assimilated by plants. The same applies for all minerals, except phosphorus which needs mycorrhizae and fungi: P + O₂ + mushrooms = P₂O₅ naturally absorbable phosphoric anhydride even with a pH different from 7. All forms of organic matter evolve better and faster into humus. We then see an acceleration of the creation of humic acids, fulvic acids and humin which reinforces the action of root exudates to attack the sand and create newly formed clay. This increases the volume of useful land, therefore the natural reserves of the soil. In just 3 years, the depth of the topsoil has increased by 35 cm (81 vs 46), which makes more than 4 500 t of more soil per hectare. **Clearly, the applications of BACTÉRIOSOL have increased the biological fertility of the SOBAC trench, which also acts on its physical and chemical fertility. »**

FEEDBACK AND TECHNICAL RESULTS OF MR. WENK, FRUIT PRODUCER IN SOUTH WEST, FRANCE



Jean-René Wenk

SINCE 2014

Jean-René Wenk
in Moncrabeau (Lot et Garonne), France

36 hectares including 20 hectares of cereals (wheat, sunflower), 1/2 hectare of above-ground strawberries and 16 hectares of arboriculture: 2 hectares of cherries, 1 hectare of apricots, 3 hectares of organic apples, 9 hectares of organic kiwi fruit, 1 hectare of plums, in organic conversion this year.

Testimony given in autumn 2019.

BACTÉRIOSOL allows a balance of the soil to optimise its functioning

DEVELOPED RHIZOSPHERIC FLORA

- Increased development of the root system
- Optimization of crop nutrition in water and minerals
- Improved crop protection

AUTOTROPHIC FLORA

- Capture C and N from the air
- Reorganization of the mineral forms of the soil into organic forms

HUMIFICATING FLORA > HUMUS CREATION :

- Act as a spring : better water drainage (recharging of the water reserve), better oxygenation: better biological activity, better chemical exchanges, reduction of soil waterlogging and root asphyxia
- Retention role : retained water linked to humus water SAVING + DAMPING of dry periods and optimized nutrition (the plant does not eat, it drinks!) + excess management
- Role of refrigeration : nutritive reserve ++ = easier access to minerals
- Balancing role : balancing of the soil mix = balanced plant nutrition

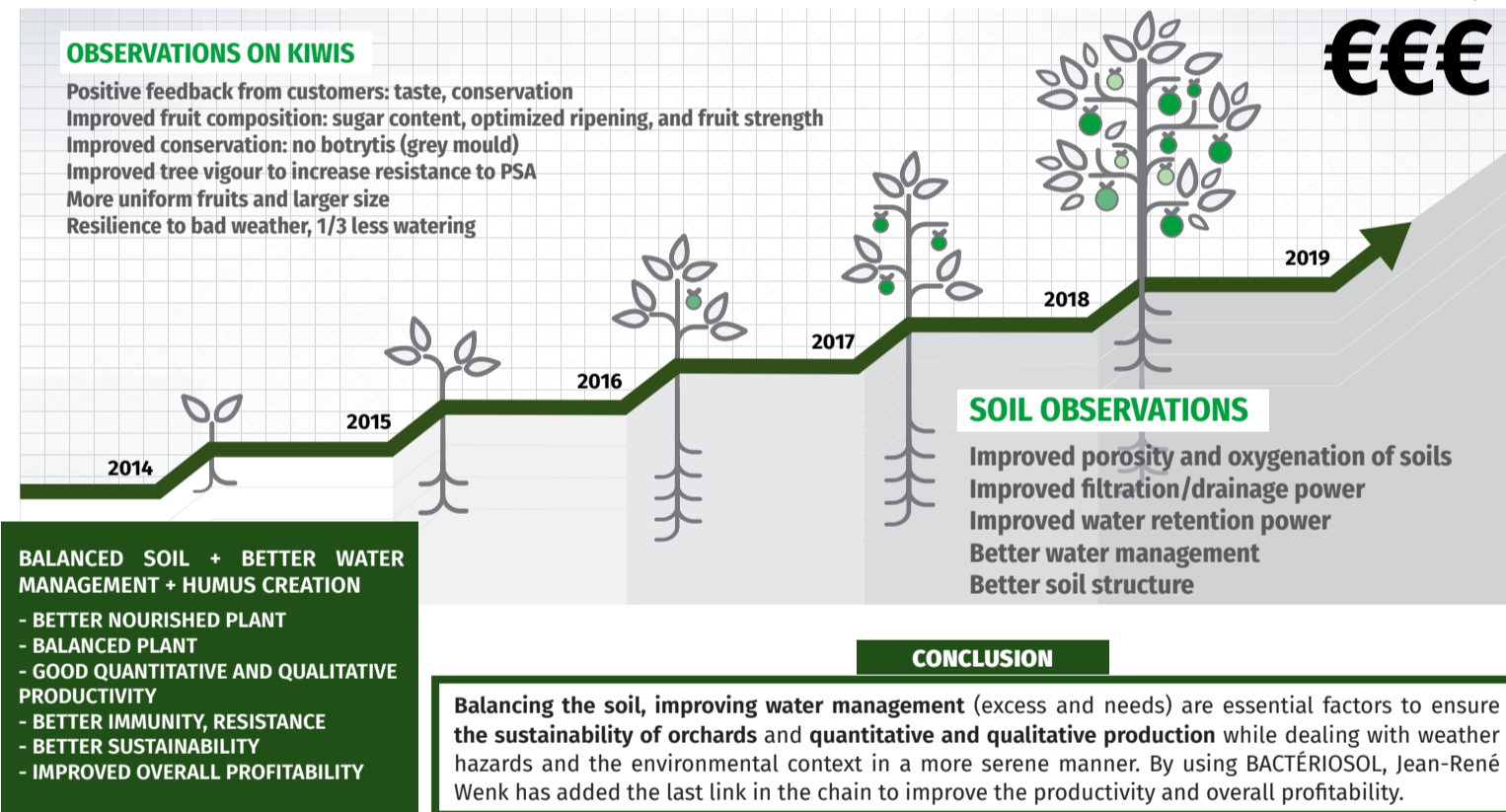
« I have improved my turnover »

Jean-René Wenk has solved several problems by adopting SOBAC's concept : fewer diseases on fruit trees, more homogeneous and tastier kiwis and especially soils that revive, like him, after difficult times.

« SOBAC fell on me like hail. Alain, the salesrep, came down here like a tornado and presented the product to me. I told him about my specific problems with clay-loam soils with a high surface-sealing index. They are cold in winter; they find it difficult to warm up in the spring and they pack down a lot. They were waterlogging soils with water all the time on the surface while kiwis need more aerated soils. I was also confronted with PSA (Pseudomonas Syringae Actinidae), a bacterium that grows on fragile trees. There are no means of control other than copper. With four treatments per year, we contain the disease, but that's it. We are not solving the problem. So, I wanted to restore vigour to my trees and Alain offered BACTÉRIOSOL which he presented as an amendment full of natural microorganisms that are there to revive life. I have always done soil tests. I knew that all the elements were present but were blocked. I started by treating one hectare

for two years. When I saw the results, I did not ask any more questions. In the second year, where I used BACTÉRIOSOL, no kiwi plants were affected by PSA. I am not saying it is the cure, but I am finding that the extra strength it brought helped fight PSA. « One third less watering ». In addition, in winter, I had no more water on the ground which had become more porous. The soil has regained its retention power and therefore in hot weather, I need much less water: almost a third less watering. After two years of testing, I changed all the kiwis to BACTÉRIOSOL and organic. On an orchard changed to BACTÉRIOSOL a year ago, the fruits are already much more homogeneous, it looks like they are calibrated on the tree. In addition, I have noticed a marked improvement in cold storage conservation. And I no longer have a development of Botrytis, a mould that can do big damage. I work a lot in direct sales and all customers comment the flavour of my

fruit. They are superior in sugar content ; they ripen well and they hold better. I participated in a flavour and quality competition for the Nouvelle Aquitaine region with my apple juice two years ago. I was not ranked. Last year, after two years of BACTÉRIOSOL, I did the same competition again with the same apple juice and I won the bronze medal. When I see my results, I would never go back. I only regret one thing; it is to not have known SOBAC earlier. I am starting my fifth year with BACTÉRIOSOL. I have improved my turnover per hectare. Everything is direct selling and people are only looking for one thing: the taste quality. Everyone noticed the change. For the soil, I see the difference from one plot to another. The ground breathes and this is a novelty. At the beginning, I limited usage for economic reasons, but my goal is to have all the exploitation in organic and BACTÉRIOSOL. »



90 % LESS CHLOROSIS AND MUCH LESS BREAKAGE IN THE WIND.

Life in our soils, it is every day that we see it coming back. With less disease pressure, Sylvain Chobet is now working with more resistant vines, particularly resistant to breaking due to the wind, which is not trivial in this region.



SINCE 2015

Sylvain Chobet
in Portel-des-Corbières (Aude), France

WINE PRODUCER

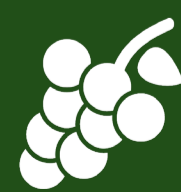
15 hectares of vines. Member of the Rocbère Cooperative Caves in Portel-des-Corbières. Employee at the winery Domaine de la Genetière, amateur beekeeper

« I had chlorosis problems that I couldn't control. I once spoke to a friend who was using BACTÉRIOSOL. I started by seeding three hectares and then the rest the following year. I reduced chlorosis by 50 % in the first year and the wood ripened completely. The fall of the leaves was also delayed. In the third year, I had 90 % less chlorosis. Before I had a plot of vines where in winter, the water could stay 15 or 20 days on the surface. Now, following precipitations, the water is gone. It means that the earth has regained its porosity. These are loamy soils that now drink water. With the sales representative from SOBAC, during the follow-up of the plots, we dug the plots with shovels, and it was crazy to see how life had resumed. As for drought, I have a vine that has been seeded with BACTÉRIOSOL since its planting and its yield has smoothed to within 100 kilos.

And it keeps its leaves much longer. We find BACTÉRIOSOL is one tool among many, and it accompanies us comfortably. As the plant is more robust, I have much less breakage in the wind and this is especially important in regions like here. Since life returned to the soils, I have many more gulls and crows following the tractor. I work on some plots at night so that they don't eat all the earthworms ...! With SOBAC, we are not let loose once the contract is signed. There is a real follow-up. I have a vine in a basin that has been worked with BACTÉRIOSOL for two years. Colleagues ask me what I have used to make it so beautiful. There is juice, wood, it's amazing. The vines won't stop producing. It is going slowly but surely, and that's what's important to us. There is much less stress on the plant. There is wood, so there is strength. »

CONCLUSION

- > Improve soil's life
- > Better soil structure
- > 90 % less chlorosis in 3 years
- > More robust plant
- > Better drought resistance
- > Increase grapes' quality,



REDUCING PHYTOSANITARY PRODUCTS AND FERTILIZERS WITH BACTÉRIOSOL



TARGETS OF THE FARM

- Gain autonomy
- Reduce inputs on the farm
- Improve soil fertility and homogenize yields
- Improve water management to decrease irrigation
- Reduce fuel consumption linked to traction
- Anticipate the arrival of carbon footprint and environmental standards
- Improve health and sustainability of production
- Maintain a high level performance



The 4th year nitrogen and phyto reduction test platform: wheat, harvest 2018

During 4 years a platform has been carried out at M. Bouillon's farm to study the impact of the reduction of phyto treatments and nitrogen application on yields and gross margin. 5 modalities for fertilisation and 2 modalities for phyto treatments were set up (50 % and 100 %) Results of the platform after 4 years, harvest 2018, wheat

SINCE 2008

Didier Bouillon
Polyculture livestock farming
GAEC du Buisson,
in Vieuvicq (Normandy), France

- Human resources :

2 Units of Human Worker + 2 employees 2/3 time.

- Useful agricultural area :

364 hectares

122 hectares of soft wheat; 15.5 hectares of rapeseed; 64 hectares of barley ; 13 hectares of corn ; 7 hectares of rye seed ; 17 hectares of garden peas ; 7 hectares of meadow ; 17 hectares of fallow land.

Of which 30 hectares are owned, the rest are rented.

- Distribution of the area on 6 municipalities

On a perimeter of 22 km

Pumping irrigation from the river, where possible, over 150 hectares.



1- PHYTO TREATMENTS AND NITROGEN REDUCTION PLATFORM

	Fertilisation/ha	Yield (t/ha)	Income in € 165 euros/t	Expenses (excl. machinery)	Margin/ha in €
50 % PHYTO	100 kg BACTÉRIOSOL in spring + 0 N	6,8	1020	180	840
	100 kg BACTÉRIOSOL in spring + 50% N	8	1280	263	1 017
	100 kg BACTÉRIOSOL in autumn + 75% N	8,8	1452	305	1 147
100 % PHYTO	100 kg BACTÉRIOSOL in spring + 100% N	9,1	1501	381	1 120
	NPK 100% N	8,6	1419	387	1 032

After 4 years, with the same reduction on each strip of phyto treatments and nitrogen on a rotation Wheat – Rapeseed – Wheat -Wheat, the results show that Marcel MEZY Technologies make it possible to **maintain a high level of production while reducing nitrogen inputs and phyto treatments by 50%** and therefore improving the profitability of the farm : 1147 euros/ha or + **115 euros/ha** compared to conventional fertilisation Which represents in total + **14 030 euros** for the 122 ha of wheat

2- ECONOMICAL STUDY OF THE FARM BEFORE AND WITH SOBAC

For the purpose of this study, we analysed the average application of units of fertiliser on the farm over 2 periods of 3 years (BEFORE / SOBAC) :

- From 2006 to 2008 : conventional fertilisation => BEFORE

- From 2008 to 2016 : transition to SOBAC

- From 2017 to 2019 : 100% SOBAC on the farm => SOBAC

	BEFORE	SOBAC	Difference
Average units of N / ha	250	180	- 70 u
Average units of P / ha	63	0	- 63 u
Average units of K / ha	67	0	- 67 u
Average t of lime/ ha	0,676	0	- 0,676 t

Nitrogen savings	Economy of PK		Economy of lime	Phytos reduction	Investment BACTÉRIOSOL
70 uN/ha (35 liquid units) (35 ammonia units)	-63 uP/ha	-67 uK/ha	- 0,68 t/ha	- 7 €/ha	+ 117 €/ha
Liquid 0,6 € x 35 U = 21 € (reference price 181 €/t)	300 kg 0-21-17	400 kg 0-21-17			
Solid 0,8 € x 35 U = 28 € (price 265 €)	350 kg 0-21-17 = 101 € (price 290 €/t)		25 € x 0,68 = 17 €		
- 49 €/ha	- 101 €/ha		- 17 €/ha	- 7 €/ha	+ 117 €/ha
TOTAL SAVINGS = 57 €/ha					

This technology allowed to save 57 € on inputs per hectare or € 19,600 on 345 ha. This, without taking into account fuel cost that we would estimate around 15% or 5,000-6,000 € (traction + irrigation).



CONCLUSION

The scheme using 100 kg BACTÉRIOSOL Concentré + 100 % N + 100 % phytos gives the best yield, but the scheme with BACTÉRIOSOL concentrated + 75 % N + 50 % phytos has given the best margin. **With BACTÉRIOSOL, we can therefore permanently reduce fertilizers and fungicides and increase our gross margin.**

These results are very promising for cereal producers who are looking for solutions to be more eco-friendly or even organic . These results prove that BACTÉRIOSOL allows a **significant reduction of nitrogen inputs and use of phytosanitary chemicals while maintaining yields**, thereby improving overall profitability of the farm.

TOTAL SAVINGS/year =
19 600 € on 345 ha



« WE HAVE SPREAD NO LIME, NO PS AND KS IN 3 YEARS AND THE FARM IS FLYING. »



Sean Mc Dermott

SINCE 2012

Sean Mc Dermott
in Eyrecourt, Ballinasloe,
(Co. Galway), Ireland

Dairy Farmer

Testimony given in autumn 2019.

Myself and Nollaig have been farming here for about 12 years now. We were at sucklers and sheep, and then 9 years ago we went into milking cows. Up to now, we are milking just around 100 cows. The farm is all in grass and we use very little meal. Calving is in February March, it is all Spring calving.

We started with SOBAC about 3 years ago. We came on it through Brendan O'Toole who was running a meeting at the Meadow Court, Co. Galway. We had, previously, soil sampled our land. We were in REPS (Rural Environmental Protection Scheme) and our Ps and Ks were very low. We had started spreading a bag of 0-7-30 at the start of the year and a bag at the end of the year. When we started with Brendan then, we stopped all that and did not spread any lime. We are working only with SOBAC since. First, we spread 3.5 tons of the pelleted stuff and then we went on to the BACTÉRIOLIT through the slurry, that's what we are mainly using now. We spread 2 500 gallons to the acre and we would usually use it as we are closing the paddocks in October. This year, we spread it in March, we injected it straight into the ground. We just tried it out to see would it work any better during the growing year. I am happy enough with the product so far.

In the first year now, we did not see an awful lot of difference, but **from last year until this year now, we have started to see a major difference in the farm, the cows are cleaning out paddocks way better.** I can't say that our milk solids or anything have changed because every year we have been climbing up in numbers, so it is just hard to say if SOBAC is having an effect on that or not. It is just when number stabilize that we will be able to say that at ease. **Apart from that, the grass is growing, we have no problem growing grass, we have spread no lime, no Ps and Ks in 3 years and the farm is flying.** In April 2015 we did a soil profile. I think there were 50 or 60 people here. We dug the holes with the digger and we could not believe there was such a difference in it. **The grass, and the roots of the grass went down so far into the ground. We have fierce worm activity as well. It was an eye opener for me to see what was going on down under the ground.**

Since we started the process, I have said that we will give it at least 3 years. If we were to use it the first year and weight up against Ps and Ks we would have probably gone back to Ps and Ks but we decided we would give it a chance and we left it for 3 years and we have seen a major improvement on the farm. **Weighing one against the other, cost wise, I think we are working out a bit better with SOBAC than going with our Ps and Ks and lime.** We are happy enough so far. We are going forward with the product. **We have seen an improvement in the land.** Like this farm here, the field we are standing at the minute, we took it over last year, and it got no Ps and Ks, no lime for years. We have grazed it 4 times, I have taken 25 bales of silage and we have grazed it once and it is ready for grazing again. We have no problem with the product, it is standing on its own. »

« REDUCTION OF FUEL COSTS BY 10 % AND INCREASE IN YIELD. »



SINCE 2014

Wiggert Family
Hämmerleweg 24
79843 Löffingen, Germany
300 hectares of cereals and maize

« Improving the soil sustainably, the results of the past few years speak for themselves. Only a soil that works well and that is alive gives you better yields. We are very open and we always try a lot, but it must be profitable. With the help of BACTÉRIOLIT, we are improving our profitability and sustainability goals. »

This is the philosophy of Wolfram Wiggert, who runs his family business from Haslachhof in Löfflingen with his wife Eva, his father Herbert and his brother Markus in the Black Forest. With more than 300 ha in organic farming and a biogas plant, they also raise 40 Hinterwäldler mother cows which they market directly in their farm store.

The Wiggert family has been in organic farming for 14 years. They have thought a lot about improving their rotation with the goal of improving their soil. Now the yields are almost at the conventional level.

« It was the article in the DLG-Mitteilungen newspaper that introduced us to SOBAC. The DLG is not really known for offering alternative methods. If they write about a concept, it must be serious. »

REDUCTION OF FUEL COSTS BY 10 % AND INCREASE IN YIELDS.

« In 2015, we beat the odds with a yield practically similar to that of the conventional ones. The yields of spelt were the last two years at a level of 10 % higher than before the use of BACTÉRIOLIT. In addition, our entrepreneur keeps telling us that **it is obvious that our crops are very healthy, which is**

particularly remarkable for organic farming ! Part of our digestate is exported, our employee, Andreas Isele, puts for each spreader BACTÉRIOLIT Concentré in the liquid phase. « Andreas Isele explains : « We spread 25 m³ of digestate with 30 kg of BACTÉRIOLIT Concentré per hectare. I prepare the buckets in advance with the quantities of BACTÉRIOLIT Concentré so that I can have them at hand when the time comes. It certainly takes a little longer, but you have to work a little more to get a reward at the end. When pulling weeds, temporary workers recognize, without knowing it in advance, that pulling from SOBAC plots is much easier ! »

CONTINUOUS IMPROVEMENT OF THE SOIL
« We can clearly see that the soil structure has become more flexible with SOBAC and also that we have fewer problems of water standing after heavy rain. The porosity has increased and erosion is very rare because of the improved structure of our soils, we can reduce our fuel costs.

Our soils have a lot of stones, so we only work our soils on the first 15 cm and the deeper work is done by plants and earthworms. These have clearly increased in the last few years since working with SOBAC. Even during the dry spring period, we find surprisingly many earthworms on the surface.

We pay particular attention to our soils to bequeath them in good health to our children for the next ten generations; this is why we have been using BACTÉRIOLIT Concentré for 3 years. Since then, we use BACTÉRIOLIT Concentré on the whole Haslachhof farm to produce sustainably and profitably for the future. »



« VERY GOOD RESULTS AGAINST NEMATODES ! »

The company was founded in Zilkerbinnenweg by Mr. Jaap van Berkel in Holland. Later, his sons, Sjaak and John, took on the activity and brought the company to what it is today. It is an impressive company with diverse cultures.



SINCE 2012

J.M. Van Berkel B.V.
Leon Van Der Zon
Crop manager in flower production
Holland

« We mainly grow Allium on which we use BACTÉRIOSOL as well, which gives very good results. The company has a double activity, on one hand we grow the flowers and on the other hand we make sure that we can re-use the bulb. Whether it is for continuous cultivation over the following year or for the immediate sale of the bulb. The company came into contact with BACTÉRIOSOL through a colleague, a producer. He is having very good results.

The problem of nematodes has been considerably reduced. The crops were in better shape. The bulb yield was much better. The crop is much more resistant. Even against nematodes, which gives a very good result. BACTÉRIOSOL is applied before ploughing. During the preparation of the soil to anticipate planting. After ploughing, we also apply some BACTÉRIOSOL Booster 10 on the surface, to quickly stimulate the soil.

We see that BACTÉRIOSOL makes the plant more resistant to all kinds of pests. Thanks to this, we have better growth and we hope to use less chemical inputs. That is our objective. And if we can do that.

We will produce in a more sustainable way. It is also better for us in terms of costs. It is always a question of costs and, of course, of income. And if we can produce in a respectful and natural way, it will be better for everyone.»

