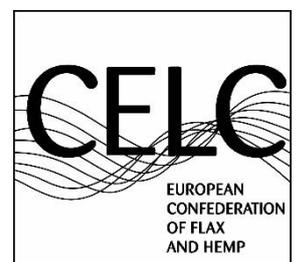


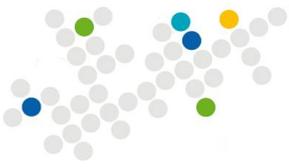
Integrate bio-based products in your composites

2019 Edition



In partnership with





Since its creation in 2005, IAR – The French Bioeconomy Cluster - works to develop and place innovative bio-based products on the market.

In this context, bio-based materials have a privileged place. They feature strong technical properties interesting for industry and consequently participate to the development of the bioeconomy.

Today, the development of bio-based composites meets the requirements of industrial markets, in applications such as “transportation”, “building”, “sports and leisure” and “furniture & design”.

The innovation of these new materials is growing strongly since the past ten years. It focuses on the use of natural fibers as reinforcement, on the development of resins with an increased bio-based share and finally on the interactions between these natural fibers and the resin matrix.

As innovation catalyst, the IAR cluster takes part in this innovation process, supporting collaborative R&D projects initiation and monitoring. It is also the ambassador of these new products through its website www.agrobiobase.com, the international showcase of bio-based products.

To carry further and faster the development of these products and their associated sectors, IAR – The French Bioeconomy Cluster and the technical section of the European Confederation of Flax and Hemp (CELC) have joined their forces and put their skills together on:

- Projects Engineering
- Promotion & Communication
- Business intelligence & Monitoring tools

IAR’s work, supported by Europe, France and the Grand Est and Hauts-de-France Regions, contributes to developing these products and associated sectors. Front runners in terms of bioeconomy, these regions bring together a number of bio-based material stakeholders.

To further boost the development of the bioeconomy and bio-based materials at national level, IAR and the CELC technical cluster have combined their skills and expertise. It eases the mutualisation of resources from agri-industrial sectors, scientific research networks and companies directly in touch with customer expectations.

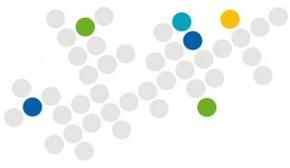
The IAR’s Bio-based materials Committee and the Agrobiobase are pleased to introduce their full range of solutions for your composite applications.



Karim BEHLOULI
President of the Commission Bio-based materials of IAR cluster

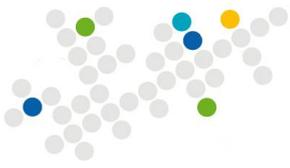


Jean BAUSSET
Innovation Manager Bio-based materials, IAR cluster



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Preface: Precepts on bio-based products

Bio-based and product origin

A bio-based product does not mean it is 100% derived from biomass. It is common to have various origins in a product (fossil, mineral, plant or animal) to take advantage of each constituent.

The choice of material is indeed based on three main motivations for industrials:

- Optimize costs and vary its supply to always be competitive if market fluctuations,
- Get new features and properties,
- Reduce environmental footprint.

Incorporation rate

The rate of incorporation of bio-based materials depends on the family of products and existing technologies. Certain classes of products are actually more advanced in terms of incorporation of bio-based materials. For this reason it is important to integrate this parameter in the analysis of bio-based content.

How bio-based content is measured?

Today there is no legal framework to define accurately a bio-based product, whether in terms of definition or in terms of bio-based content measurement.

One of the most widely used methods is based on the calculation by percentage weight (or volume) of the various components of a product to assess its bio-based content.

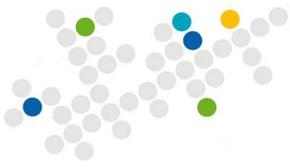
To communicate with their customers, manufacturers also use independent analyzes (via a third party), on the content of bio-based carbon and the content of other elements from biomass (oxygen, nitrogen ...) of their products.

Normative framework

At European level, several standards dedicated to bio-based products are now available. These standards were developed in the framework of the technical committee CEN / TC 411 Bio-based products.



- The standard EN 16575:2014 “Bio-based products – Vocabulary” defines general terms to be used in the field of bio-based products, including horizontal aspects relevant for bio-based product standards.
- The standard EN 16785-1:2015 “Bio-based products - Bio-based content - Part 1: Determination of the bio-based content using the radiocarbon analysis and elemental analysis” specifies a method of determining the bio-based content in products, based on the radiocarbon analysis and elemental analysis.



Preface: Precepts on bio-based products

- The standard EN 16640:2017 'Bio-based products - Bio-based carbon content - Determination of the bio-based carbon content using the radiocarbon method' specifies a method for the determination of the bio-based carbon content in products, based on the ¹⁴C content measurement.
- The standard EN 16760:2015 "Bio-based products - Life Cycle Assessment" provides specific life cycle assessment (LCA) requirements and guidance for bio-based products, excluding food, feed and energy, based on EN ISO 14040 and EN ISO 14044.
- The standard EN 16751:2016 "Bio-based products - Sustainability criteria" sets horizontal sustainability criteria applicable to the bio-based part of all bio-based products, excluding food, feed and energy, covering all three pillars of sustainability; environmental, social and economic aspects.
- The standard EN 16848:2016 "Bio-based products - Requirements for Business to Business communication of characteristics using a Data Sheet" specifies a template for the reporting and communication of characteristics, including recovery and disposal options, of bio-based products designed for business to business transactions.
- Other technical reports or specifications have also been published (CEN/TR 16721:2014 "Bio-based products - Overview of methods to determine the bio-based content" ; CEN/TS 16766:2015 "Bio-based solvents - Requirements and test methods" ; CEN/TR 16957:2016 "Bio-based products - Guidelines for Life Cycle Inventory (LCI) for the End-of-life phase").

At the international level, the standard ASTM D6866 explains how to calculate the bio-based carbon content, based on the measurement of the percentage of carbon derived from the plant in the organic portion of the product. This method of analysis is based on the carbon-14 dating (¹⁴C/¹²C ratio).

Not to be confused

It is important to note that the origin of a product does not predict anything in its environmental impact: renewability, toxicity, end of life, greenhouse gas emissions, energy consumption during the manufacturing etc..

It is also important to distinguish the manufacturing process and the origin. For example, a product cannot be considered as bio-based if it is obtained by fermentation of a fossil substrate by a microorganism.



What is a composite material?

A composite material consists of two or more immiscible materials, with properties superior to those of the constituents taken independently. This is usually referred to a matrix and reinforcements.

The properties of a composite will depend on the intrinsic properties of these 2 components, on the interface between them and the used process.

Fibers provide high mechanical performances, thus we talk about "reinforcements". The matrix or resin, more frequently used term, protects fibers and transfers mechanical requests and external stress applied to the material.

Focus on matrices

In the case of composites reinforced with natural fibers (long or short depending on the types of application), the polymeric matrix are mainly used.

The choice of polymers depends on several parameters related to technical performances (mechanical resistance, shocks, UV), the industrial processes used for the shaping of these materials (temperature, viscosity, speed of impregnation, rate of production) and of course, for the price of raw materials.

The polymers used can be divided into two large families:

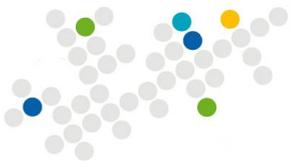
- The thermoplastics (TP), shaped by heating, then frozen by cooling, and finally crushed and shaped a number of times.
- The thermosets (TD), irreversibly solids after the polymerization of the resin.

Integration of bio-based components into composites

The remainder of this booklet presents solutions (48 in total) in terms of bio-based reinforcements and matrices:

- Bio-based resins
- Dry fabrics and nonwovens
- Pre-impregnated fabrics and nonwovens
- Comingled fabrics and nonwovens
- Short natural fibres
- Bio-based compounds
- Bio-based composites

The two diagrams on the next page detail the different cases of use of bio-based products in the development of a composite material.

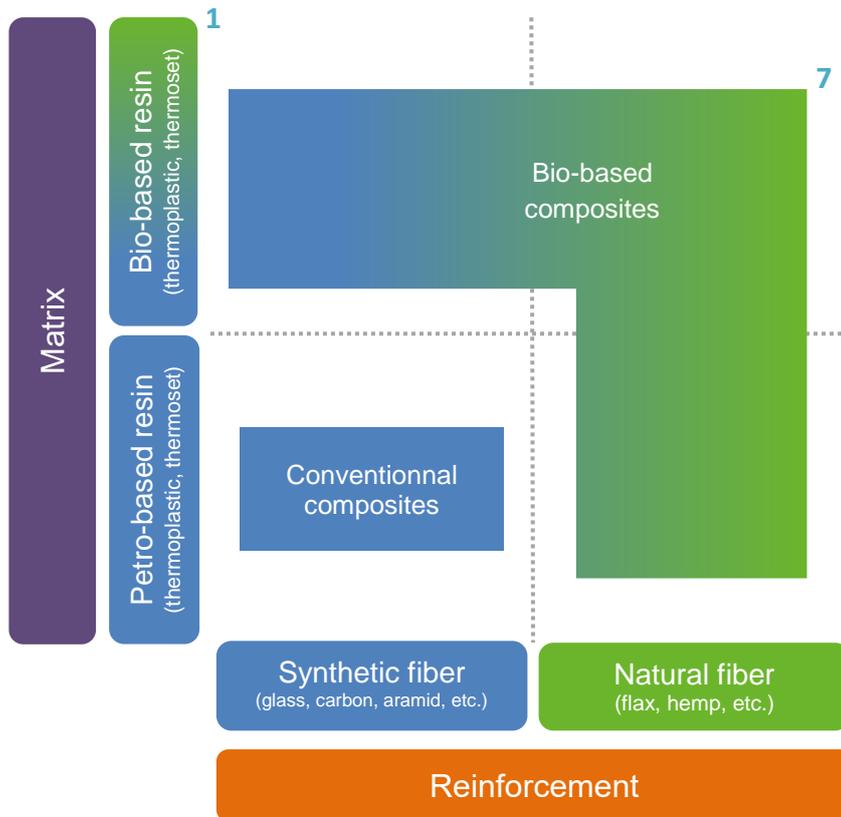


Design of bio-based composites



THE FRENCH
BIOECONOMY CLUSTER

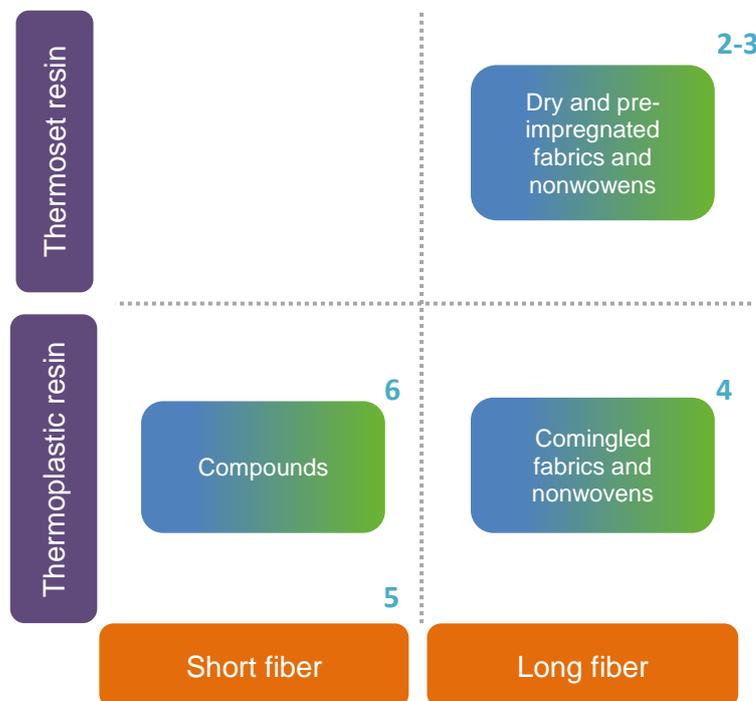
Scheme 1: Integration of bio-based components into composites



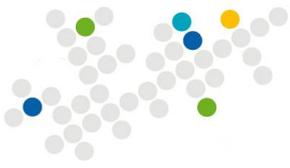
Let's discover our solution for your composite applications:

- 1 Page 9
- 2 Pages 10-21
- 3 Pages 22-25
- 4 Pages 26-28
- 5 Pages 29-33
- 6 Pages 34-36
- 7 Pages 37-40

Scheme 2: Different types of preforms (combinations matrix / reinforcement)



Note: These schemes do not represent all possibilities of combination between matrix and reinforcement.



Focus on processes

About ten different processes exist for the production of composite materials. The performance of a composite material will depend heavily on the choice and quality of the process.

A distinction is made between production processes according to the production volumes, the technical specifications required, the materials used (type of reinforcement, matrix used).

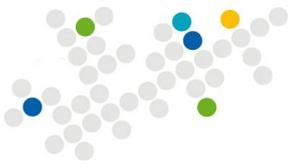
The table below shows the existing processes and the opportunities for using bio-based components for the production of a composite material.

Processes*	Volume	Use of bio-based components
Contact moulding	Small and medium series	✓
Spray-up moulding	Small and medium series	
RTM injection moulding	Small and medium series	✓
Infusion	Small and medium series	✓
Oven molding of thermoplastic semi-finished products	Small and medium series	✓
Filament winding	High performance	✓
Molding of pre-impregnated thermosets in oven	High performance	✓
SMC compression moulding	Large series	✓
Stamping - Thermocompression - Thermoforming	Large series	✓
BMC injection	Large series	
Loaded thermoplastics injection moulding	Large series	✓

* Based on the classification IPC (www.compositec.com/compositec-promotion/les-procedes)



Contact our specialists in bio-based composites who will answer your expectations and questions! Indeed, the success of a project depends on the expertise and know-how of recognized stakeholders in the field of bio-based products.



Arkema

France



Description

With operations in more than 40 countries, some 14,000 employees and 10 research centers, Arkema generates annual revenue of some €6.4 billion. Deploying a responsible, innovation-based approach, Arkema produces state-of-the-art specialty chemicals that provide customers with practical solutions to such challenges as climate change, access to drinking water, the future of energy, fossil fuel preservation and the need for lighter materials.

Business sector :

Chemistry



web

1 product proposed by this supplier

Rilsan®

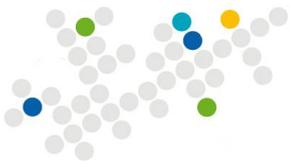


Rilsan® PA11 has been a trusted source of performance in highly demanding applications for nearly 60 years. It affords an unrivalled balance of technical and economic benefits that are valuable to our customers.

While other polymers may excel in one particular physical property, Rilsan® PA11 stands alone in delivering superior performance in several key areas:

- *high impact resistance, at room temperature and at very low temperature*
- *very good resistance to many chemical agents*
- *high abrasion resistance*

Rilsan® PA11 is also a polymer of choice to obtain partially or totally bio-based thermoplastic composites thanks to the high fluidity of selected grades. Rilsan® PA11 is available in pellets and powder form.



EcoTechnilin

France



Description

EcoTechnilin is the European leading supplier of non-woven products based on natural fibers. Our production capacity will reach 11,000 tonnes per year thanks to our two production sites in France and Poland at the end of the year. EcoTechnilin delivers the entire world from Argentina to Australia through all European countries, Russia, Turkey, India and China. Our privileged links with our raw material suppliers have allowed us to develop products adapted for many applications. A shift towards high performance products has been made in recent years to meet the requirements of the railway and aeronautics markets.

Business sector

Natural fibers provider



2 products proposed by this supplier

FibriMat LCM

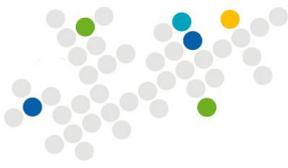


FibriMat LCM is a range of 100% biosourced reinforcement mats developed for composite applications.

FibriMat LCM HD



FibriMat LCM HD is a range of natural fibre reinforcement mats for composites for infusion and RTM (Resin Transfer Moulding) processes which allow to achieve high levels of reinforcement in composites.



Fibrés Recherche Développement - FRD

France



Description

FRD® is a private innovation company and engineering platform for industrial projects, FRD promotes the emergence and development of innovative applications for agricultural fibres. (insulation, concretes, composites...).

Business sector

Insulation, Concrete, Composites



4 products proposed by this supplier

Yarn and rovings of natural fibres



Rovings and yarns are linear assemblies of aligned fibers, linked by a torsion more or less important for the cohesion of the whole from flax or hemp fibers.

Technical fabrics and unidirectionals



Fabrics structures determine their mechanical performances in the two directions: 0° and 90°. Unidirectionals are suitable for end-uses where mechanical stresses are applied in one major direction.

Multiaxials +45°/-45° natural fibres

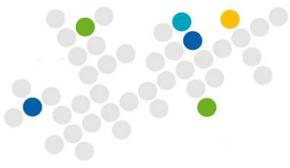


Multiaxials consist of unidirectional fibres of flax or hemp superposed in two or more directions (45°, -45°) and then linked by inter-layer stitching which can be cotton.

Nonwoven natural fibres



Nonwovens are made of a fleece or a mat of fibers arranged randomly linked by mechanical, chemical or pneumatic action. This arrangement of fibres provides isotropic mechanical performance to materials incorporating nonwovens.



GEOCHANVRE F

France

MEMBER



Description

GEOCHANVRE F manufactures and sells non-woven geotextiles and geofilaments from long fibers mechanically bonded by hydro-logy, for various applications in the fields of ecological engineering, soil erosion control and crop protection. Our new 100% natural products also meet the needs of the construction and composite fiber industries.

Business sector

Environment, Agriculture, Construction, Composites



1 product proposed by this supplier

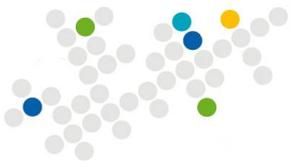
Geochanvre



GEOCHANVRE is a range of nonwoven geotextiles and geofilaments produced from long fibers mechanically linked by spunlace technology.

Applications are possible in the fields of ecological engineering, soil erosion control, crop protection, weed control and exotic plants.

Our new 100% natural products also help to meet the needs of construction and composite materials.



TDL technique / Terre de Lin

France

Description

TDL TECHNIQUE is a subsidiary of TERRE DE LIN, 1st european flax fibres producer. TDL TECHNIQUE has its own production units which a capacity of 150 000m²/year.

Its range BIORENFORTS is composed by flax fibers reinforcements, unidirectional or bi-axial, in 100 % flax or in blend with other composites fibers.

Business sector

Producer of flax reinforcements for composites uses



2 products proposed by this supplier

Unidirectionnel flax fiber reinforcements

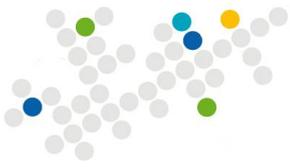


Unidirectional flax fibers reinforcement made by parallelized flax slivers, maintained by sewing between 2 polyester fabrics
Weight: 120 g/m² of flax+ 2 polyester fabrics (20g/m²), 200 g/m² of flax+ 2 polyester fabrics (35g/m²), 400 g/m² of flax+ 2 polyester fabrics (35g/m²)
Packaging: rolls of 120 m², width of 1220 mm

Bi-axial 45°x45° flax fibers reinforcement



Bi-axial 45°x45° flax fibers reinforcement, made with parallelized hackled flax sliver. 100 % flax;
Weight: 300,400,500,600,750g/m². Specific weight on request.
Packaging: rolls of 60 m², width of 2530 mm



Bcomp Ltd.

Switzerland

MEMBER



Description

We develop and patent technologies allowing the fabrication of eco superior products from natural fibres.

Business sector

Sport and leisure, Mobility & marine, Electronics & acoustics, Design & interior



web

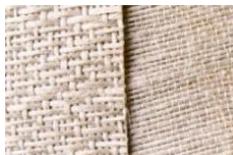
5 products proposed by this supplier

ampliTex® flax braids



This product can be combined with other composites and is the easiest way to absorb shocks in different applications, such as tubes, poles, rods, hockey sticks, rackets or x-country skis.

ampliTex® light fabrics



The strong need of the water sport- and bike industry inspired us to develop this lightweight reinforcement range. The ampliTex light products are made with a new low-twist yarn for a maximum performance.

ampliTex® non crimp fabrics



Our non crimp fabrics are the preforms leading to the strongest and stiffest natural fibre composites currently on the market.

ampliTex® powerRibs

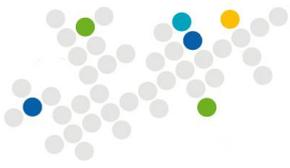


The powerRibs can be easily combined with flax, glass or carbon fibre fabrics. During production, the flax yarn placement is carefully controlled in order to obtain an application-specific mesh structure.

bCores



This patented ski core material can be processed like wood, is the lightest on the market and provides this "woody" feeling we all love. Today we offer a range of three product groups for the use in Winter- and Watersport applications as well as other industries.



DEHONDT COMPOSITES

France

MEMBER



Description

DEHONDT COMPOSITES, a spin-off of Groupe Dehondt, designs, manufactures and markets a new generation of bio-sourced composite materials: from continuous roving in technical flax fibre to thermoplastic sandwich panels. Innovative “cleantech” solutions are bio-sourced reinforcements made from flax fibre that can be combined with thermoplastic resins.

Business sector :

Natural fibres reinforcement and semi-finished products for composite material



web

2 products proposed by this supplier

NATTEX®

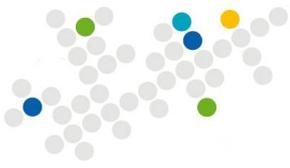


NATTEX® represents a range of natural flax fibres reinforcement issued from a specific culture, different from flax fibres for the textile industry.

TWINFLAX®



TWINFLAX® is a technical fabric in natural flax fibre designed from non-coated twisted strands.



Groupe DEPESTELE

France

Description

Its expertise in the preparation of flax fibres allowed the Depestele Group to develop a technical fiber specially adapted to the manufacture of flax fibre reinforcements dedicated to the composite industry.

Business sector

Composites, Equestrian sector

MEMBER



4 products proposed by this supplier

LINCORE® CF



LINCORE® CF is a technical flax fabric made of untwisted comingled rovings, composed of long flax fibers comingled with thermoplastic filaments (PLA, PP, PA...) .

LINCORE® FF



LINCORE® FF is a 100% flax fabric made of untwisted rovings. The moulding is realized by infusion, resin transfer molding, lay up, pultrusion...

LINCORE® ML

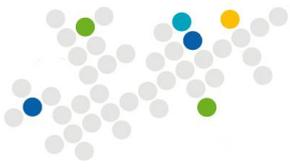


LINCORE® ML is a flexible multilayer structure that consists in a stack of flax technical fabrics arranged on one side or both sides of a core, being a nonwoven material containing natural fibres.

LINCORE® R



LINCORE® R is an untwisted roving composed of long technical flax fibers, that can be comingled or pre-impregnated with a thermoplastic matrix such as PLA, PP, PA or PVC...



MEMBER



FLAXCO [®]

Belgique

Description

Flaxco is a new division of Flipts & dobbels NV, which has specialised for over a century in the production of traditional flax fabrics.

We develop and manufacture sustainable lightweight bio-based materials for the composite industry, such as 100% woven flax fibre and thermoplastic pre impregnated flax fabrics.

Business sector

Natural fibres for thermoplastic composite materials



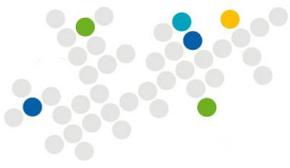
1 product proposed by this supplier

FLAXCO [®] FABRIC



FLAXCO [®] fabrics are manufactured from 100% flax fibre, in different weave styles with a surface weight ranging from 200gr/m² up to 1.000 gr/m².

The mechanical properties of these lightweight bio-based materials are high stiffness, strength, vibration and noise absorbing.



LINEO SAS

France

Description

Development, manufacturing and marketing of flax reinforcements (fabrics & fibers) for composite applications

A particular attention to customer's needs allows us to provide innovative, bio-based & high performance solutions to the composite industry

MEMBER



Business sector

Sport & Leisure, Transportation, Marine, Aeronautics, Furniture, Design, Musical



web

2 products proposed by this supplier

FLAXPLY



*FlaxPLY: a comprehensive range of sized flax fabrics
Available in UD150, UD180, BL150, BL200, BL300 & BL550gsm
Ready-to-use flax reinforcements for the manufacturing of composites parts*

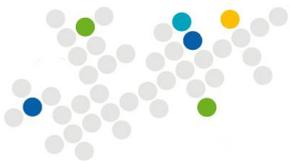
Unique and patented product range that allows to improve the mechanical properties, the vibrations absorption and the aesthetic of composites parts

FLAXTAPE©



*FlaxTape©: a laminate of unidirectional raw flax fibers
Available in UD50,70,110 & 200 gsm*

*The bio-based and innovative reinforcement for your composites parts
Also available as a prepreg epoxy version*



Norafin Industries GmbH

Germany

MEMBER



Description

Norafin is a solution provider for engineered fabrics, specialty and technical nonwovens as well as composites. We target industrial market segments such as filtration, performance apparel and specialty applications.

Norafin provides tailor-made solutions which respond to the markets needs by

- translating customer needs into product functions,
- turning innovative ideas into valid products,
- targeting the entire product development process - from the product idea to the launch.

Business sector

Producer of nonwovens/technical textiles

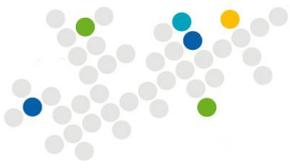


1 product proposed by this supplier

Flax nonwoven



Spunlaced product development based on flax nonwovens. This technology allows a huge variety of fiber blends, multilayered structures as well as various functionalities.



Procotex Corporation SA

Belgium

MEMBER



Description

Procotex is specialised in processing natural fibers like flax, kenaf, coconut, sisal, jute....

Furthermore we are also developing unidirectional flax based prepreg material to be used in the composite world.

Business sector

Natural fibers / Natural composites



web

1 product proposed by this supplier

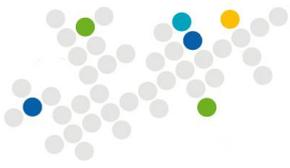
Hackled, Combed, Cottonized Flax



Hackling sliver: for finer spinning numbers (from 32 nm to 100 nm).

Carded and combed tops: for spinning, composite, insulation, paper industry

Cottonized flax: for spinning, insulation, paper



Safilin

France

Description

SAFILIN is the european flax spinner leader, with 3000 tons of yarns produced per year.

Since 1778, SAFILIN selects and blends from each crop the very best flax fibers, naturally ensuring the high level of its yarns and rovings, for reinforcements in bio-based composites.

Business sector

Bio-based materials, natural fiber reinforced composite

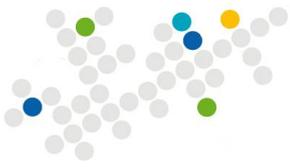


1 product proposed by this supplier

100% low twist flax yarns & rovings



100% low twist linen/flax rovings and yarns adapted for natural fiber reinforced composites processes such as pultrusion, filament winding, weaving...



EcoTechnilin

France



Description

EcoTechnilin is the European leading supplier of non-woven products based on natural fibers. Our production capacity will reach 11,000 tonnes per year thanks to our two production sites in France and Poland at the end of the year. EcoTechnilin delivers the entire world from Argentina to Australia through all European countries, Russia, Turkey, India and China. Our privileged links with our raw material suppliers have allowed us to develop products adapted for many applications. A shift towards high performance products has been made in recent years to meet the requirements of the railway and aeronautics markets.

Business sector

Natural fibers provider

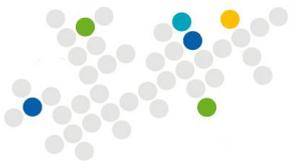


1 product proposed by this supplier

FibriPreg



FibriPreg is a pre impregnated reinforcement made of flax fibres in association with bio-based resin dedicated to hot compression moulding.



DEHONDT COMPOSITES

France

MEMBER



Description

DEHONDT COMPOSITES, a spin-off of Groupe Dehondt, designs, manufactures and markets a new generation of bio-sourced composite materials: from continuous roving in technical flax fibre to thermoplastic sandwich panels. Innovative “cleantech” solutions are bio-sourced reinforcements made from flax fibre that can be combined with thermoplastic resins.

Business sector

Natural fibres reinforcement and semi-finished products for composite material



web

1 product proposed by this supplier

TWINFLAX P-PREG



TWINFLAX P-PREG is a semi-finished products design from technical fabrics impregnated with a high performance bio-based thermoplastic resin.

**** Winner of Agrobiobase Award 2013 ****



LINEO SAS

France

Description

Development, manufacturing and marketing of flax reinforcements (fabrics & fibers) for composite applications

A particular attention to customer's needs allows us to provide innovative, bio-based & high performance solutions to the composite industry

Business sector

Sport & Leisure, Transportation, Marine, Aeronautics, Furniture, Design, Musical

MEMBER



web

1 product proposed by this supplier

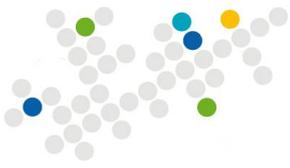
FLAXPREG



FlaxPREG: a full range of prepreg epoxy flax fabrics

Available in UD150, UD180, BL150, BL200, BL300 & BL550 gsm

Impregnating processes: Hotmelt Coating & Solution Coating



MEMBER



FLAXCO [®]

Belgique

Description

Flaxco is a new division of Flipts & dobbels NV, which has specialised for over a century in the production of traditional flax fabrics.

We develop and manufacture sustainable lightweight bio-based materials for the composite industry, such as 100% woven flax fibre and thermoplastic pre impregnated flax fabrics.

Business sector

Natural fibres for thermoplastic composite materials



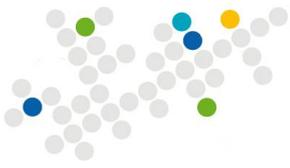
1 product proposed by this supplier

FLAXCO [®] PREPREG



FLAXCO [®] prepregs are manufactured from woven flax fibre, pre impregnated and consolidated with thermoplastic (PP-PA-PLA) resins. These semi-finished products can be delivered in rigid sheets or on rolls as single ply sheet.

The mechanical properties of these lightweight bio-based materials are high stiffness, strength, vibration and noise absorbing.



Culture iN

France



Description

Culture iN is an industrial company that innovates in the field of materials with its dry textile impregnation technology. We develop and manufacture bio-based thermoplastic composite, safe and renewable. Our semi-products are ready to use for technical and aesthetic applications

Business sector

Housing and transports



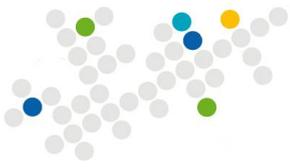
1 product proposed by this supplier

VARIAN®



Innovative technology and new material: VARIAN®

The Varian® is a new bio-based thermoplastic composite made by an unique fabric and plant resin combination. Between texture and structure, Varian® is a rigid impregnated fabric available in sheets or rolls ready to use, and simple to use as a real "textile sheet". Lightweight, durable and customizable by the choice of weaving, finishes and colors, Varian® combines technology and aesthetics for eco-design, layout and decoration of healthy living spaces in the housing and transports



EcoTechnilin

France



Description

EcoTechnilin is the European leading supplier of non-woven products based on natural fibers. Our production capacity will reach 11,000 tonnes per year thanks to our two production sites in France and Poland at the end of the year. EcoTechnilin delivers the entire world from Argentina to Australia through all European countries, Russia, Turkey, India and China. Our privileged links with our raw material suppliers have allowed us to develop products adapted for many applications. A shift towards high performance products has been made in recent years to meet the requirements of the railway and aeronautics markets.

Business sector

Natural fibers provider

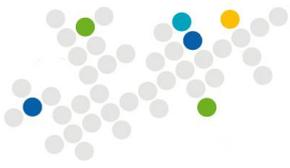


1 product proposed by this supplier

FibriPlast



FibriPlast is a range of nonwoven felts especially dedicated to thermocompression moulding. FibriPlast products are composed of a natural reinforcement fibre in association with a thermoplastic matrix (PP).



TDL technique / Terre de Lin

France

Description

TDL TECHNIQUE is a subsidiary of TERRE DE LIN, 1st european flax fibres producer. TDL TECHNIQUE has its own production units which a capacity of 150 000m²/year.

Its range BIORENFORTS is composed by flax fibers reinforcements, unidirectional or bi-axial, in 100 % flax or in blend with other composites fibers.

Business sector

Producer of flax reinforcements for composites uses



2 products proposed by this supplier

Bi-axial Flax/PLA reinforcement

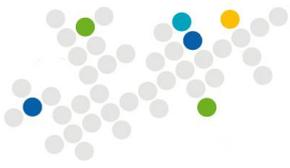


Bi-axial 2x45° reinforcement made by an intimate blend of flax fibers and polylactic acid fibers. The blend is composed by 60 % of PLA fibers and 40 % of flax fibers in volume. Several weights are available.

Bi-axial Flax/PP reinforcement



Bi-axial 2x45° reinforcement made by an intimate blend of flax fibers and polypropylene fibers. The blend is composed by 60 % of PP fibers and 40 % of flax fibers in volume. Several weights are available.



Cavac Biomatériaux

France

MEMBER



Description

Founded in 2009, Cavac Biomatériaux is a subsidiary of French agroindustrial cooperative group called Cavac, whose activities are based on cereals processing, feeding and animals growing in the west part of France (in Vendée one hour south from Nantes). We go on to develop uses for straw and plant fibres to open up new markets for agro-materials.

Business sector

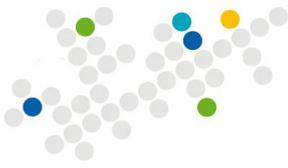
Processing of vegetable fibers: defibering and burling and micronization

1 product proposed by this supplier

AGROFIB



Agrofib, a brand of Cavac Biomatériaux, specializes in the transformation of plant material into micronized powder with customized granulometry. Agrofib is able to meet the most demanding customer specifications thanks to its innovative and efficient industrial process.



Fibres Recherche Développement - FRD

France



Description

FRD® is a private innovation company and engineering platform for industrial projects, FRD promotes the emergence and development of innovative applications for agricultural fibres. (insulation, concretes, composites...).

Business sector

Insulation, Concrete, Composites



4 products proposed by this supplier

FTECH



FTECH is a range of hemp or flax fibres available with length between 20 and 150 mm, and available with different fineness. Other species are available upon request (sisal, jute...).

FIBRA



FIBRA is a range of fibers between 2 and 20 mm, flax or hemp, for the reinforced thermoset and thermoplastic composites.

μFIBRA & μGREEN

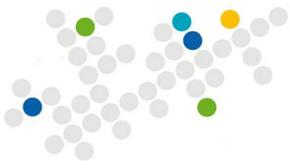


μFIBRA and μGREEN are ranges of micronized flours made from plant-based fibres and aggregates intended for the plastics industry as a filler or reinforcement.

GREEN, plant fractions



GREEN is a range of plant fractions, for the load or the reinforcement of thermoplastic composites. This range is suitable for injection and extrusion processes.



MEMBER



J. RETTENMAIER & SÖHNE France (JRS)

France

Description

Rettenmaier produces organic fibres that could be used in different current applications classified in business units:

Pharma, Food, Feed & Petfood, Roadconstruction, Filtration, Industry, Chemistry, Technical Applications, Pet Care, Innovations, Contract Manufacturing.

Business sector

Organic fibres producer



2 products proposed by this supplier

ARBOCEL – Cellulose fibers



ARBOCEL®

These functional additives (short fibers) are used in bio-based composites.

We have products with consistent quality and high production capacity. In addition, we have a custom manufacturing unit dedicated to the transformation of powders (grinding, micronisation, mixing, pelletisation, granulation ...)

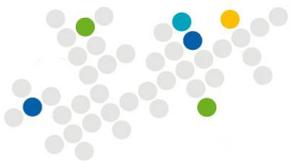
LIGNOCEL – Wood fibers



LIGNOCEL®

These functional additives (short fibers) are used in bio-based composites.

We have products with consistent quality and high production capacity. In addition, we have a custom manufacturing unit dedicated to the transformation of powders (grinding, micronisation, mixing, pelletisation, granulation ...)



DEHONDT COMPOSITES

France

MEMBER



Description

DEHONDT COMPOSITES, a spin-off of Groupe Dehondt, designs, manufactures and markets a new generation of bio-sourced composite materials: from continuous roving in technical flax fibre to thermoplastic sandwich panels. Innovative “cleantech” solutions are bio-sourced reinforcements made from flax fibre that can be combined with thermoplastic resins.

Business sector

Natural fibres reinforcement and semi-finished products for composite material



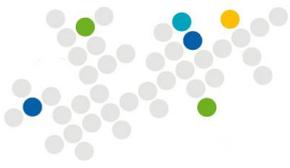
web

1 product proposed by this supplier

LINTEX®



LINTEX® is a semi-finished natural flax fibre product in the form of calibrated fibre lengths for plasturgy, composites or building.



Procotex Corporation SA

Belgium

MEMBER



Description

Procotex is specialised in processing natural fibers like flax, kenaf, coconut, sisal, jute....

Furthermore we are also developing unidirectional flax based prepreg material to be used in the composite world.

Business sector

Natural fibers / Natural composites



web

2 products proposed by this supplier

Natural cut fibers



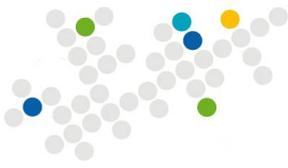
We are specialised in processing natural fibers. The fibers we can offer are flax, kenaf, coconut, sisal, jute,...

All these fibers can be cut up to very short lengths which makes it useable for the plastic industry.

Recycled Fibre



Natural fibers for insulation and non-woven industry



Automotive Performance materials

France



Description

APM is specialized in compounding of natural fibers in thermoplastics (hemp / wood / sisal / kenaf / linen).

Since our inception, we are working on composite materials of 100% plant origin. Our materials are used in the construction sector, automotive and appliance industries.

Our production capacity amounts to 20,000 t / yr of compounds.

Business sector

Compounding



3 products proposed by this supplier

NAFILEan



NAFILEan is 20% hemp fibres reinforced polypropylene compound and is designed for automotive structural parts by injection process.

In regard to environmental issues and the progressive exhaustion of fossil resources, NAFILEan is a clear answer to the trend in the automotive industry towards lightweight concepts and bio-materials.

REFINE® PF3434A

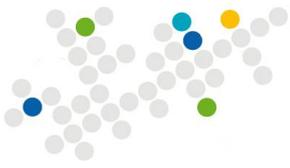


Part of the range REFINE®, this compound, composed of 30% industrial hemp fiber reinforced polypropylene, is intended for the production of automotive parts.

REFINE® range



REFINE materials are composite materials of vegetable fiber (hemp / wood / sisal / kenaf / linen) + thermoplastic (PVC / PP / PE / ABS / PS / ...). These materials can replace conventional materials loaded with glass vibrated to the mechanical properties provided by the plant fibers and by their lightness.



Fibres Recherche Développement - FRD

France



Description

FRD® is a private innovation company and engineering platform for industrial projects, FRD promotes the emergence and development of innovative applications for agricultural fibres. (insulation, concretes, composites...).

Business sector

Insulation, Concrete, Composites

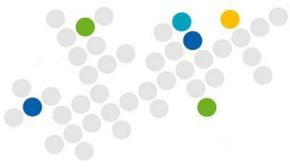


1 product proposed by this supplier

Natural fibres based compounds



Formulated from polymers of wide diffusion such as PE, PP and PVC, the compounds are reinforced with 20% to 50% fiber or powder from flax, hemp, miscanthus and wood.



FuturaMat

France



Description

FuturaMat's activity is compounding plant materials (wheat, wood) associated with conventional polymers or with biopolymers. The compounds produced are compatible with the current technologies of industrial processing of plastics mainly for horticultural and packaging sectors.

Business sector

Compounds



4 products proposed by this supplier

Biocérés range



A true alloy of wheat flour and a biodegradable polymer, BioCeres products are biobased and compostable. One reference carries the OK Compost label and the OK Biobased label.

With the possibility of creating products from renewable resources, BioCeres products are ideal for using calendaring, extrusion and injection-molding.

BioFibra range



The products range BioFibra[®] is a real alloy composite wood fiber / biodegradable polymer. BioFibre[®] products are compostable, bio-equivalent and offer degrees tailored to the different techniques of plastics processing (injection, thermoforming, calendaring ...).

BioMine range



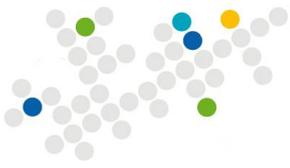
BioMine[®] products are ideal for technical transformations with using techniques such as injection molding, and are recommended for applications in agriculture, horticulture, construction, catering, pieces of equipment...

These materials are made from biopolymers of vegetable origin alloyed with mineral charges.

Polyfibra range



Polyfibra[®] product line features the lignocellulosic fiber composites (beech, spruce ...) / thermoplastic (PP, PE, PS, ABS ...). The wood fiber is an expense: petrochemical substitution of carbon, but also because of its mechanical properties, reinforcement.



CoDEM – Le BATLAB

France



Description

Developer, manufacturer of Biobased materials and products for construction, renovation and fitting

MEMBER



Business sector

Construction, renovation and fitting

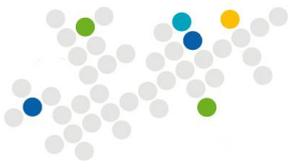


1 product proposed by this supplier

PANOLIB'



*PANOLIB' - The first Biobased Customizable Panel
Low-density sandwich panels for layout and renovation.
Our panels exist in different forms. Depending on the characteristics of use, we adapt our processes to your needs: Mechanical resistance, fireproofing, water repellency, durability, biodegradability ...*



DEDIENNE MULTIPLASTURGY®

France

Description

DEDIENNE MULTIPLASTURGY® is a European specialist in the manufacture of technical and composite plastic parts.

DEDIENNE MULTIPLASTURGY® is focused on specialised markets as a multi-technology processor.

DEDIENNE MULTIPLASTURGY® offers a range of FLAXCOMP CP products, panels made from 100% linen fabric or blended with other fibers, from thermoplastic resins and various core materials.

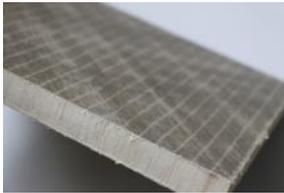
Business sector

Plastic and composite materials



2 products proposed by this supplier

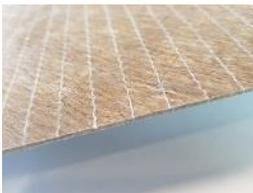
FLAXCOMP CP



Calendered or compressed panels of linen Multiaxial fabrics with thermoplastic resin.

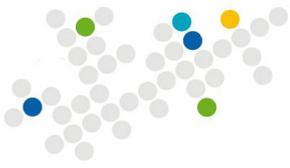
Several available weights of fabrics, several available core materials, available TP resins (PP, PLA, PA11)

FLAXCOMP SP



Calendered or compressed sheets of linen Multiaxial fabrics with thermoplastic resin.

Several available weights of fabrics, available TP resins (PP, PLA, PA11), possible thicknesses from 0.5mm to 6mm



EcoTechnilin

France



Description

EcoTechnilin is the European leading supplier of non-woven products based on natural fibers. Our production capacity will reach 11,000 tonnes per year thanks to our two production sites in France and Poland at the end of the year. EcoTechnilin delivers the entire world from Argentina to Australia through all European countries, Russia, Turkey, India and China. Our privileged links with our raw material suppliers have allowed us to develop products adapted for many applications. A shift towards high performance products has been made in recent years to meet the requirements of the railway and aeronautics markets.

Business sector

Natural fibers provider



1 product proposed by this supplier

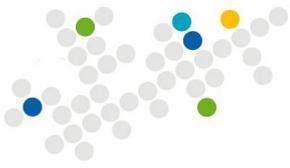
Fibrirock



EcoTechnilin have developed the bio-sourced FibriRock composite that is used in the lightweight SmartCart galley cart that will be launched in the second quarter of 2015.

FibriRock comprises flax/basalt skins bonded by a sugar-based bioresin to a regular Nomex core and allows the Smartcart to be the first sub-12kg galley cart to be rated for a 50kg load tested to the new 21J specification (which includes a 9g pull test).

The flax/basalt matrix is produced by EcoTechnilin in Normandy. The SmartCart combines light weight with industry leading security technology and will allow airlines to save weight and cost whilst using sustainable, bio-sourced technology.



MEMBER



Soprema

France

Description

Independent group since its inception over 100 years ago, Soprema itself as one of the top global companies in the field of sealing, green roofs, photovoltaic sealing complexes, roofing, sub thin-layer acoustic and thermal insulation.

Business sector

Sealing



1 product proposed by this supplier

Mammoth® Neo



Mammoth ® Neo is the culmination of 10 years of research and development by SOPREMA with the filing of a patent embodying the basics of the first bituminous membrane based on thermoplastic polyurethane (TPU).

It consists in placing a self-protecting and semi-independent sealing bilayer coating by self-adhesiveness of the first layer on the support.



Projects and actions supported by the IAR cluster



The assistance and the setting up of R&I projects in order to overcome several technological barriers:

Developing bio-based composites involve to better understand several mechanisms and to pass beyond technological obstacles, in particular:

1. *How to manage variability, quality, supply of raw materials and shapping of natural fibers for composites applications?*
2. *How to develop new bio-based resins for high technical specifications?*
3. *How to improve the interactions between natural fibers and resins?*
4. *How to propose new material structures to answer to requirements specification?*
5. *How to manage end of life and recycling of the bio-based materials?*

The Bio-based materials Commission

The bio-based materials commission helps to promote the emergence of projects and highlight the skills of IAR members in the field of bio-based materials, in order to consolidate their network.

Working groups and dedicated technical days to respond to priority issues identified by its members are also organized.

The Technology Intelligence Tremplin®



To give targeted information to the Bio-based materials commission and for the setting up R&I projects

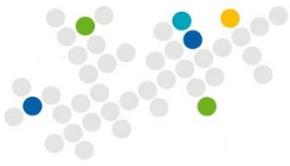
The International IAR Service

To support the members development on the international market (*for example : Delegation in Canada in October 2016 focused on natural fibres (flax and hemp) and its applications in materials*)

The website Agrobiobase



To promote bio-based products and materials
www.agrobiobase.com



FLOWER project



Flax composites, LOW weight, End of life and Recycling

Project leader

Université de Bretagne Sud / IRDL

Funding agency

Interreg VA France (Manche) Angleterre

Period

2018-2022

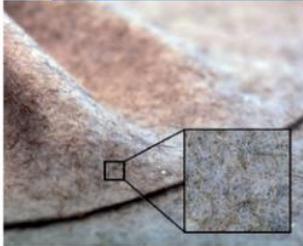
Project description

The main objective of FLOWER is to develop flax fibre reinforcements produced locally and with optimised architectures for the composite sector. These innovative preforms will allow the emergence of new products for the automotive, sailing and point-of-sale advertising industries. The partnership relies and builds on complementary cross-border competences: it spans the entire value-chain, from the agricultural production of flax fibres to the R&D and commercialisation of endproducts. This will ensure the development of highperformance, light-weight, biodegradable or recyclable products with reduced environmental impacts.

Partners

Université de Bretagne Sud / IRDL / INRA – NANTES / Université de Portsmouth / Université de Cambridge / Teillage Vandecandelaere – Depestele / EcoTechnilin / Kairos / Howa-Tramico

Development of 2 types of semi-products
Développement de 2 types de renforts



EcoTechnilin

Non-wovens
100% flax
50% Biopolymer - 50% flax

Non-tissés
100% lin
50% biopolymère / 50% lin

For 3 industrial sectors
Pour 3 secteurs industriels



Howa TRAMICO

Automotive
Automobile



Sailing
Nautisme



KAÏROS

Point-of-sale advertising
Publicité sur lieu de vente

Depestele
Teillage Vandecandelaere

Long fibres reinforcements
Biaxial 100% flax (NCF)
Grid

Renforts à fibres longues
Biaxial 100% lin (NCF)
Grille



With the support of laboratories' expertise
Grâce au soutien et à l'expertise des laboratoires



Université
Bretagne Sud



INRA
SCIENCE & IMPACT

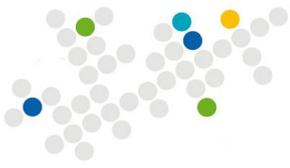


UNIVERSITY OF
PORTSMOUTH



UNIVERSITY OF
CAMBRIDGE

[More info on : flower-project.eu](http://flower-project.eu)



SSUCHY project



From lignocellulosic feedstock to bio-based composites with advanced functionalities for transportation and high value market niches

Project leader

Université de Franche-Comté

Funding agency

H2020 – BBI JU

Period

2017 -2021

Project description

The objective is the development of multifunctional recyclable and/or biodegradable bio-based composites with advanced functionalities for applications in transportation (ground transportation and aerospace) and a high value market niche (acoustic and electronics). The project is dedicated to the development of specific concepts, technologies and materials along the complete value chain. It will also test their feasibility at demonstration scale.

The expected impact is double : firstly, set the basis and validate new bio-based constituents for composites. In a second step, the ambition is to propose new composite structures and products based on these bio-based constituents and demonstrate their advanced functionalities at demonstration scale.

Partners

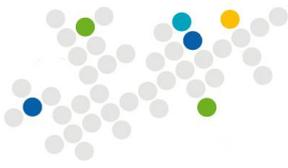
Université de Franche-Comté / CNRS / EADCO / ENSAIT / IAR / INP - ENIT / KU LEUVEN / LINIFICIO E CANAFIFICIO NAZIONALE SRL / NOURYON / NPSP / STOCKHOLM UNIVERSITY / TREVES / UNIVERSITÉ DE BOURGOGNE / UNIVERSITY OF BRISTOL / UNIVERSITÀ CATTOLICA DEL SACRO CUORE / UNIVERSITY OF DERBY / WILSON BENESCH



A strongly applied and industrial research



[More info on : http://www.ssuchy.eu](http://www.ssuchy.eu)



ACTINAT project



ACTivation of NATURAL FIBERS by gaseous fluorine

Project leader

Teintures et Apprêts Danjoux (TAD)

Funding agency

FUI 19

Period

2015 -2018

Project description

Oxyfluorination surface treatment is an innovative technology already used in the plastics industry. It allows to activate and prepare the surfaces before the application of a paint, an impression, a resin or the realization of a lamination.

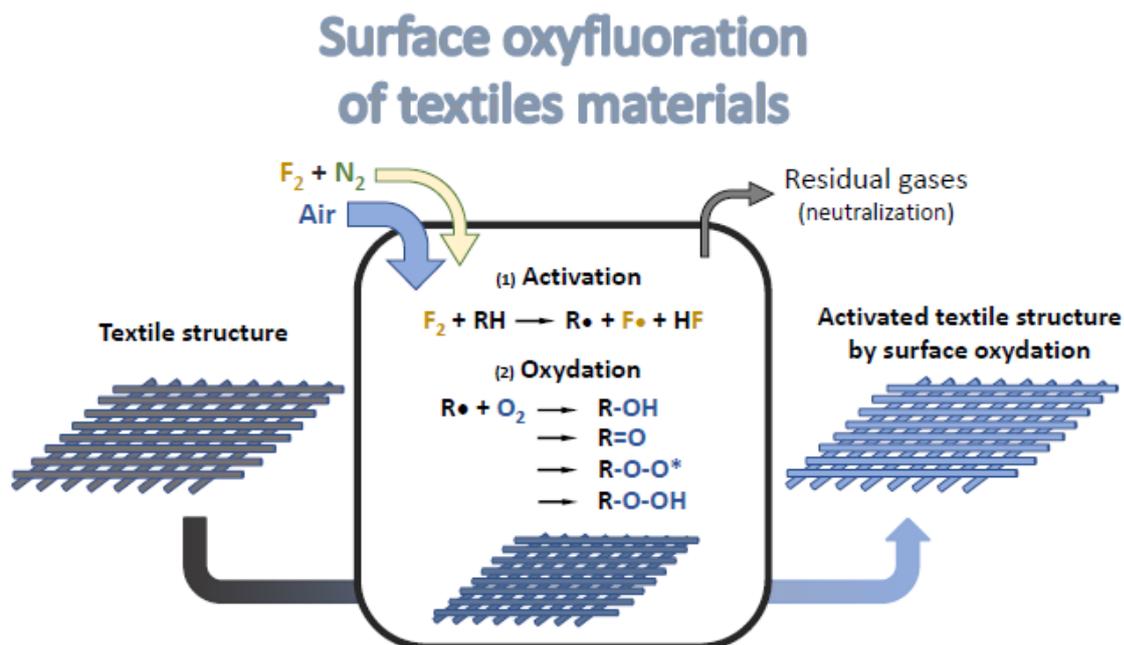
To our knowledge, in the textile sector, this technology is mainly used to improve the mechanical interface performance of the composites between a polymer matrix and the reinforcement, and also to improve the wettability and absorption properties of polyolefins-based nonwovens. Exploratory work has shown the interest of this technology for the textile sector. The following applications can notably be considered: improved wettability, improved adhesion, surface preparation, and sizing removal. On the environmental level, it is an eco-responsible technology since the treatments are performed without energy input, in a gaseous environment without water, and therefore, without drying.

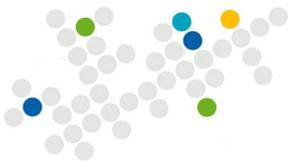
The partners of the ACTINAT project wish to develop new high-performance and eco-responsible treatments for natural fibers from oxyfluorination treatments. Current treatments are very energy, water and chemical consumers. The project is organized around 7 partners: TAD, SATAB, Hugotag Ennoblement, Science et Surface, ISA-UCBL and IFTH, FRD. The treatments developed will be compared to current industrial processes to demonstrate their advantages in terms of performance and durability of end products, environments respect and resource savings. ACTINAT has been labeled by the TECHTERA division and co-labeled by the IAR cluster.

Partners

TAD / SATAB / Hugotag Ennoblement / FRD / Science et Surface / IFTH / UCBL

Oxyfluorination process





GREEN EPOXY project



Green Epoxy – A non-toxic, plant-based alternative to rigid epoxy resins

Project description

The Green Epoxy project aims to find a non-toxic, biomass-based alternative to rigid epoxy resins. These resins from forestry-related products will be developed for already identified applications as part of the project: flooring, food, industrial paints, etc. A special focus will be put on the toxicology and eco-toxicology of these new molecules, the use of competitive processes and the analysis of environmental impacts generated by these new materials.

The Green Epoxy project is run by Proteus PCAS. Proteus PCAS works to stabilise monomers through enzyme action and has established partnerships with: Alliance Forêt Bois (biomass supplier), Lefrant Rubco (upscaling and industrialisation of extraction and purification processes), PCAS (upscaling and industrialisation of functionalisation processes) and end users with Diam Bouchage (food-grade packaging), Resipoly ChrySOR (floorings) and Prospa (industrial paints). UMR IATE (biomass fracturation), SPO (tannin depolymerisation) and Charles Gerhardt Institute (tannin functionalisation) complete this consortium. The partners therefore represent the key skills required for the project covering the entire value chain.

The main deliverables for the Green Epoxy project are a range of bio-based epoxy resins and a pilot process for extracting and functionalising polyphenols from wood.

In terms of results, the consortium aims to:

- Create a local sector for producing epoxy resins from biomass: from supplying biomass to marketing corks, flooring and industrial paints made from bio-based epoxy resins.
- Achieve economic benefits in terms of sales for end users, whose strategy will be to substitute their current products with bio-based products, and employment benefits with an estimated 24 jobs created within 5 years of the project starting.

Partners

Leader:

PROTÉUS - Audrey ROBIC - Scientific officer



Partners:

LEFRANT RUBCO / PCAS / DIAM BOUCHAGE / RESIPOLY CHRYSOR / PROSPA / UMR IATE – Montpellier / UMR Sciences pour l'Oenologie SPO / Institut Charles Gerhardt /INRA





RECYTAL project



Study of recovery routes for production falls of bio-based thermoset composites in the automotive industry

Project leader
Ecotechnilin karim@eco-technilin.com

Funding agency
BIP Ademe 2014

Period
2015-2018

Project description

Thermo-compressed part moulding generates 25% wastage. The offcuts should be collected and reprocessed as they represent a major source of waste for automotive manufacturers.

The Recytral project aims to study and develop two paths for reusing these offcuts.

The first involves grinding them into new non-woven materials for automotive parts.

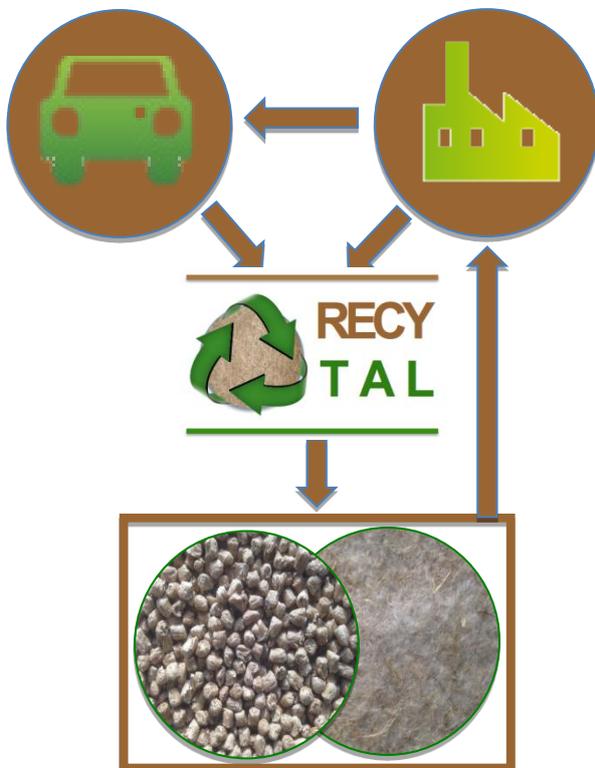
The second involves grinding them and making injection granules that can be reused in manufacturing automotive parts.

Project partners

- Ecotechnilin
- AFT Plasturgie
- LIMATB (University of South Brittany)

Project summary

Featured products



Recycling biocomposites

Description

The Recytral project aims to optimise the environmental performance of natural fibre-based biocomposites used in the automotive industry.

By recycling manufacturing offcuts, new non-woven materials can be created and an innovative range of injectable compounds made from these offcuts developed.

Scope

Flax-based non-woven materials and injectable compounds.



SINFONI project



Structuring of the flax & hemp technical fibers sectors for materials use

Project leader
FRD pierre.bono@f-r-d.fr

Funding agency
PSPC - BpiFrance

Period
2012-2017

Project description

SINFONI structures the national supply chain "natural flax and hemp technical fibers to material uses", gathering industrialists, academics on the whole value scale.

Project Objectives:

- Ensure applicative industrialists the availability in volume and price of a range of aggregates, fibers and reinforcements (compounds, non-woven, UD, weaves) for building and composites markets
- Provide natural materials with optimized performance
- Certify that the upstream supply chain respects quality standards, with the implementation of a tracking system
- Supply materials providing demonstrated environmental benefits

Partners

Fibers



Backing and other solutions



Materials



Academics



Initial benefits

12 spec sheets drawn up, covering the entire grain/flour/fibre/semi-finished material supply value chain and validated in interlaboratory tests.

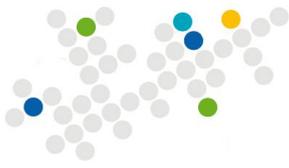
A range of fibres and reinforcements created under a collective label, which may lead to applied joint developments outside the project's chosen fields.

Initiatives carried out with the aim of setting up an innovation pool for optimising the range's performance by improving its mechanical performance and adding new features (interface, fire-proofing, water-proofing, reproducibility, etc.). New technology paths set up for producing fibres and grains, and optimising semi-finished material production processes (non-woven, unidirectional, compounds, etc.).

Sinfoni special interest club launched on 9 March 2015: an association communicating project results and news on removing technological barriers in relation to flax and hemp technical plant fibre materials. Creation of a bio-based material market intelligence observatory. Working group set up with a focus on best practices in the supply of fibre and semi-finished materials by target market.

Development of a train cabin in composite materials reinforced with plant fibers.





Featured Product



Tools/Methods/Procedures

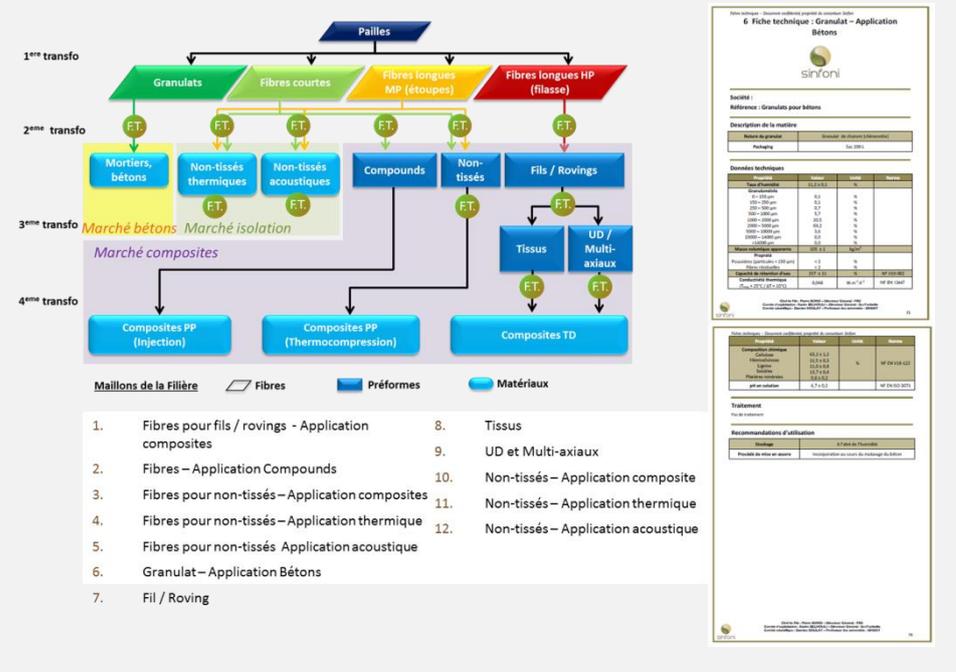
Managing quality in the supply chain of flax and hemp technical fibre for material.

Company
Sinfoni Consortium

Marketing year
2015

Description

Managing quality standards by creating shared, proven tools:
12 quality assurance spec sheets reiterating all key performances to be achieved by major parties in the value chain: fibre producers/semi-finished product processors/level 1 subcontractors/purchasers.
Measurement methods of key properties sought by the materials industry.



6 Fiche technique : Granulat – Application Bétons

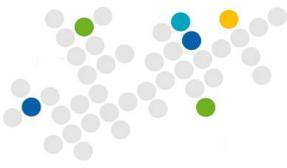
Service
Sinfoni

Adresse
Sinfoni Consortium

Description de la matière
Mortier de béton
Pochette
NF 2015

Données techniques

Propriété	Unité	Norme	Requis
Granulométrie			
0-150 µm	%		
150-250 µm	%		
250-300 µm	%		
300-425 µm	%		
425-600 µm	%		
600-800 µm	%		
800-1000 µm	%		
1000-1250 µm	%		
1250-1500 µm	%		
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BIONICOMP project



Composites with natural fibers treated by ionization

Project leader
IONISOS

Funding agency
FUI 14

Period
2012-2016

Project description

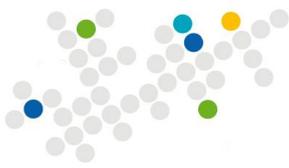
The adhesion between fibers and resins remains a major challenge for using the natural fiber reinforcements in the polymer composites.

The mass reduction led by a wider use of composites with natural fibers is an economical and environmental challenge for every mode of transportation. The weight reduction of glass fiber composites used in planes, trains and vehicles represents an important gain of competitiveness mattering for the French constructors on the worldwide market.

BIONICOMP aims at improving the global performances of bio-based composites to compete and replace fiberglass composites for a significantly lower weight.

The innovations concern the strengthening of the adhesion between fiber & matrix in the case of natural fibers and elastomer & thermoset matrix, by means of ionization intended to multiply the covalent interactions between components.

The consortium joins together 5 companies and 2 academic partners. The applied research part of this 38 months project concerns the interfaces chemistry, resulting in the development and demonstrators' qualification (interior systems for planes, vehicle, sport & leisure equipments, and technical textiles).



DEFIBREX project



Optimized DEcohesion of natural FIBeRs during EXtrusion process

Project leader
UMR FARE

Funding agency
ANR Mat&Pro

Period
2013-2016

Project description

DEFIBREX has for main objectives to propose a predictive model of the decohesion of natural fibers under mechanical stress during the twin screw extrusion process. The originality of the project is to analyse a wide variety of typologies of fibers in order to propose a generic classification (chemical, morphological) of the defibrization's behaviors.

The waited results also concern: design an optimisation scheme for processing natural fibers in a TSE, a transfer model in the Ludovic® TSE simulation software to insure industrial accessibility, the conception of specific feeder for natural fibers.

Partners

UMR FARE (Fractionnement des Agro Ressources et Environnement) ; Cemef (Centre de Mises en forme des Matériaux) ; FRD (Fibres Recherche Développement) ; Coperion K-Tron ; SCC (Sciences Computers Consultants) ; Faurecia Intérieur Système ; UMR I2M (Institut de Mécanique et d'Ingénierie)

Benefits

Creation of a laboratory-scale measurer, optimised for natural fibres on the extrusion line.

Design of a method to measure fibre morphology by MicroTomography

10 scientific papers at national / international congresses and 5 scientific publications in leading international journals

Integration of a lignocellulosic fiber case prediction model into a commercial twin-screw extrusion simulation software (Ludovic © V6)

Featured Process

By

Twin screw extrusion of lignocellulosic (plant) fibres



Description

Developing a natural fibre optimisation process using a twin screw extruder and evaluating the potential reinforcement effect on automotive parts' functional properties.

Scope

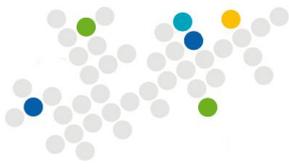
Technological barrier: mastering compounds
Great, under-exploited potential for mechanical reinforcement

Position on the value chain

Defibrex is positioned as a contributor to developing natural fibre-reinforced injection-moulded automotive parts.

Technological benefits

Functional contribution of natural fibre-reinforced compounds



FLAXPREG project



Realization and modeling of lightweight and resistant sandwich materials for automotive structural floors

Project leader

Faurecia

Funding agency

AAP Champagne Ardenne Region

Period

2011-2015

Project description

The Flaxpreg project aims to create and model light, durable sandwich materials for automotive flooring using a base of long flax fibres, to keep up with automotive manufacturers' output.

Partners

Faurecia/PSA/LINEO/URCA – GRESPI Laboratory of Materials, Processes and Packaging Systems

Initial benefits

Development of a fabric manufacturing process using long, manipulable line-impregnated flax fibres. 3 patents have been lodged: the first for manufacturing decametric flax fibre fabric, the others for sandwich processes and products using honeycomb cardboard spacers. Participation in international conferences (JEC Composites and Plant Based Summit), scientific publications (JEC Magazine and Materials & Design) and JEC Awards 2015.

Featured Process



Bio-based sandwich-type flooring

Uniform alignment of long flax fibre strings and line-impregnation of the resulting light fabric.

Description

Creating bio-based sandwich-type flooring:

- long flax fibre fabric: 50 to 250g/m²
- thermoset or thermoplastic resin (eventually Bio-based)
- spacer (honeycomb cardboard, PET foam, etc.)

Move from woven to non-woven technology with no shrinkage in manufacturing manipulable flax fibre fabric with a rapid cure resin binder in order to reduce costs and meet the needs of the automotive industry's high output.

Scope

Drastic weight reduction of false loading floor-type sandwich panels with good mechanical properties thanks to flax's low density combined with carefully oriented long fibre UD fabric.

Position on the value chain

Lineo is an expert in prepreg light UD fabric manufacture.

Faurecia is positioned as a processor and manufacturer of covered sandwich panels. PSA Peugeot Citroën is positioned as a specification-setter and integrator of the solution in automotive vehicles.



Technological benefits

The panels weigh 35% to 45% less than petroleum-based sandwich panel solutions such as Baypreg (PU/fibreglass) thanks to their superior mechanical properties (including temperature warping). Their damping properties are over 2%, a factor of 10 better than glass/epoxy and carbon/epoxy compounds.



Development of bio-based thermoset/fibres composites

Project leader
FRD

Funding agency
FUI

Period
2011-2015

Project description

FINATHER aims at **developing innovation thermoset composites with a low environmental impact for the automotive and railroad transport sectors**. The innovation consists in replacing widely the petro-resources or organic components by bio-based, renewable components. This way of innovation also allows the vehicle lightening. Therefore, for the studied materials, standard petro-sourced resins are replaced with resins derived from flaxseed oil, and glass fibers with hemp or flax fibers.

Partners

- FRD
- Alstom Transport
- Corima
- Peugeot Citroën Automobiles
- Institut Charles Gerhardt de Montpellier
- Institut Français du Textile et de l'Habillement
- CREIDD (Université de Technologie de Troyes)
- ARD
- ATMC
- Plastic Omnium, au travers de MCR
- Renfortech
- LIMATB (Université de Bretagne Sud)

Initial benefits

2 patents lodged for bio-based epoxy resins.

Development of innovative parts for the transport and furniture sectors, currently undergoing certification tests.

Creation of a database of reinforcing performance/resins/composite processes and a related expert system.

6 papers published in the fields of fibre interfaces/matrices for thermoset composites, mechanical properties of fibres and environmental reports.

Featured Products

from



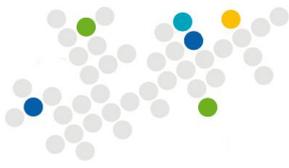
Bio-based thermoset composites

Description

The Finather Project aims to develop thermoset composites suitable for each manufacturer's processes. Product development takes into account the technical requirements of each manufacturing partner in order to develop composite materials that match their own markets and the specifications of each manufacturer.

Scope

Thermoset composites



ACOSITE project



Bio-based resins for polyester composite

Project leader
CCP Composites

Funding agency
FUI

Period
2009 - 2014

Project description

Bio-based resins for polyester composites

Partners

CCP Composites ; Roquette ; MCR ; IMP INSA Lyon

Initial benefits

The Acosite project showed the feasibility of 90%+ bio-based SMC/BMC styrene-free formulations for use in a wide range of applications: automotive parts, building materials and household appliances.

Featured Product



by



ENVIROGUARD®

Company
CCP Composites

Commercialised since
2011

Description

The Range EnviroGuard® launched by CCP COMPOSITES in 2010 is a family of unsaturated polyester resins (UPR), accessible to customers, with 20 to 50% of bio-sourced content. These resins have same physical properties, UV & chemical resistance compared to conventional UPR resins.

The Enviroguard® family can be drop-in for existing composite processes.: RTM, pultrusion, SMC/BMC, etc. They can be used in most conventional methods of processing composites for construction, transportation, recreation, marine, sanitary, automobile or railway sectors.

Product family :

Intermediate products > Resins, Polymers

Sectors/Markets



Plant origin & Bio-based content

Vary according to the references (vegetable oil by-products or sugar)
20-53%



BIOMAT project



Development of a new 100% bio-based material for the injection of structural parts of the automotive interior

Project leader
Faurecia

Funding agency
FUI - DGCIS

Period
2008-2010

Project description

Developing a new 100% bio-based material for injection-moulding automotive interior parts.

Partners

Development partners: Faurecia, AFT Plasturgie, ARD and INRA Reims

Final development and production partners: Faurecia, Mitsubishi Chemical Corporation (MCC) and Automotive Performance Materials (APM)

Initial benefits

4 patents granted, 1 thesis

R&D contract with Mitsubishi Chemical Corporation

Product: Material fully approved for fitted vehicle interior applications

Featured Product



BioMat - NBF2 112

Company
APM

Marketing year
2014

Description

Biomat is a composite that can be 100% (currently 65% bio-based). It is reinforced with natural fibres and meets the stringent specifications for automotive interior parts.

The Biomat project represents a major step forward for the automotive industry, as it reduces environmental impact and dependence on (fluctuating) petrol prices.

Product family

Bio-based compounds

Sectors/Markets

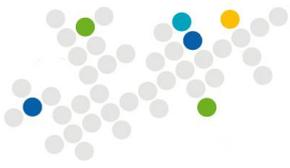
Automotive



Plant origin & bio-based content

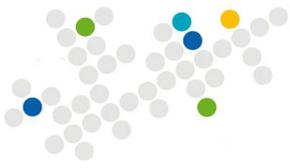
Bio-based matrix and natural fibres

100% bio-based



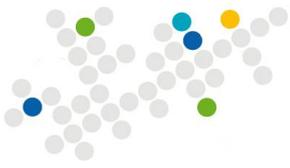
Our referents in bio-based composites





Our referents in bio-based composites





Our referents in bio-based composites



Troyes Champagne
Métropole



DISCOVER THE WORLD OF BIOPRODUCTS

Website dedicated to bio-based products and their markets



FIND A BIO-BASED PRODUCT

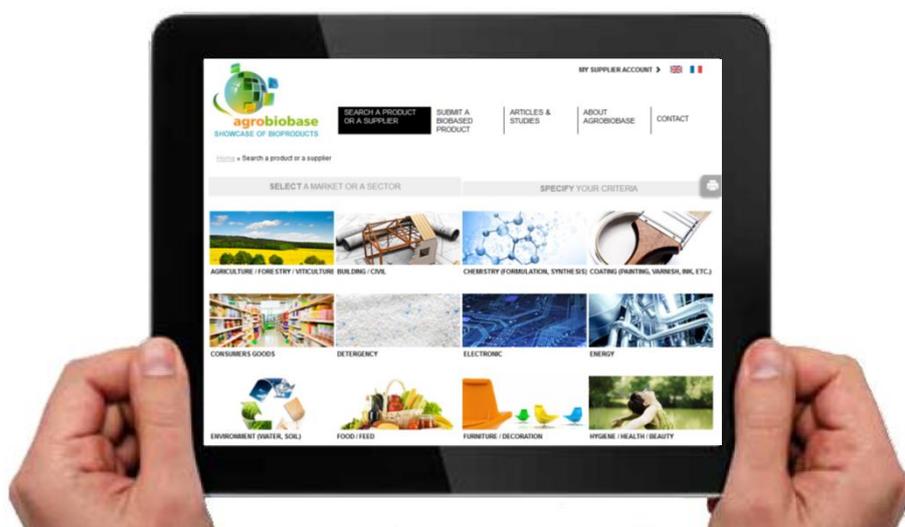
... that meets your expectations

EVALUATE ITS CHARACTERISTICS

... by studying its key data.

DISCOVER SUPPLIERS

... and make contact with the right person.



CHECK OUT
www.agrobiobase.com

A service of IAR, the French Bioeconomy cluster



THE FRENCH
BIOECONOMY CLUSTER



web

Access to the website is free of charge. / Listed companies pay a subscription.