



CONTENTO TRADE SRL
Innovazione tecnologica per l'ambiente

Recent projects & new technologies for the biomedical sector

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Contento Trade: since 1987, research and development for environmental innovation

Since 1987 Contento Trade researches, develops and produces industrial plants and processes, working for **technological innovation** and to improve the environmental compatibility of different industrial sectors.

In over 30 years of activity, we have conceived, tested and developed a multiplicity of innovative industrial processes. Our main goals are the exploitation of industrial waste, the transformation of waste and residuals and the closure of the products' life cycle.

Contento Trade operates as an **applied research laboratory**, for the development of new technologies, as an **environmental consulting company** for manufacturing companies and as a **laboratory for chemical and mechanical analysis**, to characterize and certify materials and products.



Contento Trade: sectors and technologies

Industrial sectors in which we operate:

- Environmental (waste & decontamination)
- Construction materials (aggregates)
- Steel
- Food & agriculture
- Pharmaceutical
- Biomedical
- Perfume
- Restoration

Industrial plant types that we develop:

- ARKÉ: impregnation and thermomechanical drying of wooden archaeological artefacts soaked in water
- DIC: drying, texturing and de-bacterization of plant products
- Foxy: extraction of plant products
- TERMODIC: low temperature and highly energy efficient drying
- LAW: integrated production of light aggregates and electricity from waste mixtures
- Hivalue: washing and decontamination, or inertization of industrial waste without any high temperature treatment



Contento Trade: recent research projects

LIFE COSMOS	re-use of fly ashes made inert for the production of COSMOS fillers	LIFE COSMOS-RICE:	use of colloidal silica to obtain safe inert materials from rice husks
NEW LAW	combined production of expanded ceramic aggregates and electricity from industrial waste	ALFAPRO-1:	enhancement of Alfalfa outside the livestock industry
SPARKLEEZING:	improvement of freezing and freeze drying processes, through instantaneous treatments, for new or optimized frozen products	Whey-Grain:	active packaging made from whey
LIFE Sustainable cruise:	sustainable waste management on board cruise ships	Ultra-filtrazione:	optimization of fermentation processes by ultrafiltration
EUROSTARS REOP:	removal of organic pollutants from soils by controlled instantaneous decompression	DECORUM:	development of a platform for a transparent, efficient, complete and agile management of the construction and demolition inert materials supply chain.



Recent Projects: innovative IT tools to manage demolition, design and construction processes

Basic needs:

1. Ensure compliance of works and supplies with **technical standards**
2. Promote design choices that are economically and environmentally **sustainable in the life cycle** of the works
3. Share updated information on supply and demand of recycled products for the building industry
4. Make different subjects of the construction and demolition sector speak a common technical language

Tools identified:

- **Software** to support the creation of Work Breakdown Structures (WBS) based on updated technical standards
- A geo-referenced local **database** of building products classified for technical and environmental performance
- Preliminary **decision support software** (DSS) based on **LCA** and **LCC** parametric estimates of the design assumptions
- An **IT platform** that connects and manages these tools

Phases of realization envisaged:

- A. ERDF Lazio local Project Demolition & Construction Recycling Unified Management (**DECORUM**), with Softlab and ENEA, in progress
- B. LIFE **A-REAL Integrated LCA** Project, with Fraunhofer Institut, Conexiona and Municipality of Galatsi (Greece), presented and under evaluation



Recent Projects: optimized extraction of products with high added value from Alfalfa fodder (*Medicago sativa*)



Medicago sativa plants (known as **Alfalfa**), contain proteins for 45-60% of the highest quality, as well as pectins, minerals (Ca, Fe, Mg) and vitamins (A, D, E, K).

The **AlfaPro** project intends to combine the technology of **Rapid Instant Decompression**, with mild extraction techniques to provide an integrated pilot plant, with a high biochemical efficiency.

Grazie ai processi così individuati si otterranno simultaneamente:

- Proteine per consumo umano
- Ingredienti alimentari funzionali

- Nutraceutici
- Pectina
- Biocarburanti
- Materiali fibrosi per l'edilizia verde, l'isolamento e l'industria cartifera





Bio-plastics from food waste: research projects for the exploitation of whey



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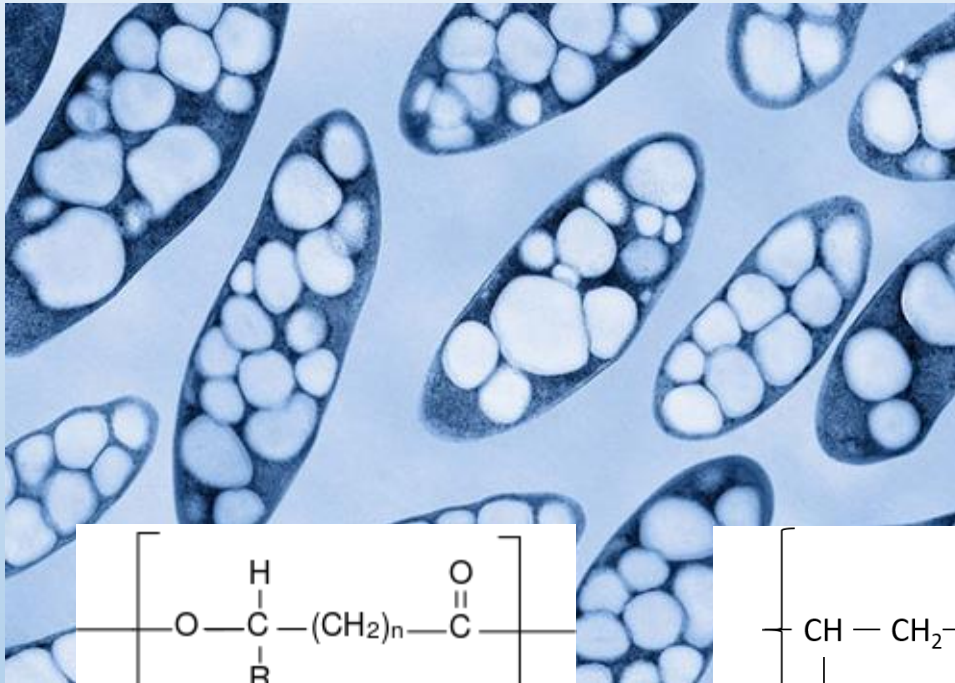


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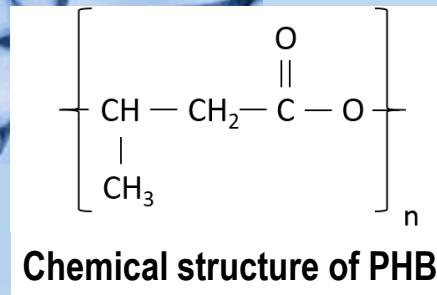
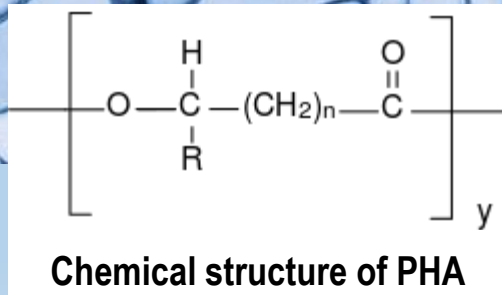
Why bio-plastics: PHA and PHB as a bacterial fermentation product



Thanks to the **fermentation** of different types of bacteria, they can give rise to **polyhydroxyalkanoate** molecules (**PHA**)

These can be treated at low temperature to become bio-degradable plastic objects.

Due to their physical-mechanical characteristics, **poly-β-hydroxybutyrates** (**PHB**) are among the most used PHAs in the industrial field.





Whey bio-plastics: the Whey-Grain project for active packaging

The project (under construction) includes the design and the construction of a **prototype plant** for the production of thermoformed trays for foods based on bio-polymers.

The starting point of the project is the realization of a **zero impact bio-refinery** for the production of the raw material.

The plant will use whey as the basis for the production of polyhydroxyalkanoates (PHA).

Through various physical-mechanical treatments, the project aims to produce **functionalized food trays**.

This means that they will have to allow a progressive **release of preservatives** in order to fight bacterial growth.





Whey-grain: planned contents and phases of the project

The phases of the Whey-grain project are structured in seven points:

1. **Market analysis** to identify the characteristics of potentially more profitable obtainable products
2. Design and development of an Evolutive Instant Decompression Implant (DIE), to **reduce bacterial load** of the whey
3. Implementation of a whey pre-treatment plant to **separate fats and proteins** (for food use or as supplements)
4. Implementation of the plant for the **production of biomass** from which the PHA granules will be extracted
5. Experimental selection of the different **bacterial strains** and subsequent **production of PHA** in optimal chemical-physical conditions identified in the laboratory
6. Identification of the most effective and efficient treatments for **biopolymer extraction** from the biomass.
7. Tests of thermoforming of the tubs obtained from PHA and experimental researches on its **ability to release preservatives** in order to fight bacterial growth.



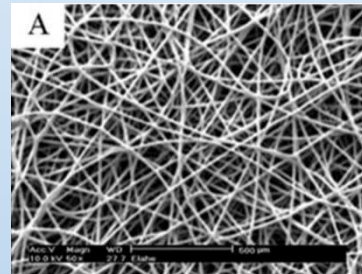
Why bio-plastics: use of PHA in medicine

PHA and PHB are highly **biodegradable** and **biocompatible** polymers. For this reason they are suitable and are already widely used for **medical-surgical devices**. In particular, the development of bio-degradable support structures such as:

Suture threads



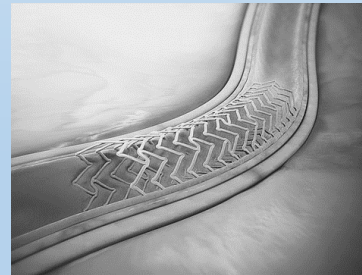
Scaffolds



Surgical meshes



Stents





Why bio-plastics: the «PHA for surgical materials» project

Biodegradable polymers such as PHA and PHB have **high production costs** and **limited resistance** to structural stresses. These are the main obstacles to the development of their industrial production.

The new project «PHA for surgical materials» aims to research experimental solutions with the aim of **improving the thermomechanical properties** of these interwoven polymers.

For this purpose we will try to combine in the laboratory the use of PHA with other bio-compatible and biodegradable materials such as:

- Starches
- Cellulose derivatives
- Lignin
- Poly (lactic acid)
- Polycaprolactone (PCL)
- Other types of PHA-PVA

Contento Trade is currently looking for new highly qualified scientific and industrial partnerships for the development of this project.



Why bio-plastics: a new European project proposal on surgical meshes in PHA

Contento Trade is developing, together with a team of Universities and companies from 4 different European countries (Italy, Slovenia, Spain and Portugal), a research project for the development of biodegradable post-operative **support structures** (surgical meshes) **for the regeneration of cellular tissues**.

The project aims to combine the use of these **bio-polymer** materials with other innovative therapies for **regenerative medicine** with **antiseptic effects**.

For this purpose, Contento Trade intends to find new experimental solutions for the creation of "**tailor-made**" **support structures**, based on the needs of different kind of patients and on the characteristics of the cellular tissues that need to be regenerated.

In this project, Contento Trade and its partners will also develop new **3D printing** techniques for bio-polymer structures. Thanks to these new methods, the speed and the accuracy of the production processes can be increased and the **costs reduced**.



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Thank you!

Contento Trade s.r.l.

Technological innovation for the environment

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