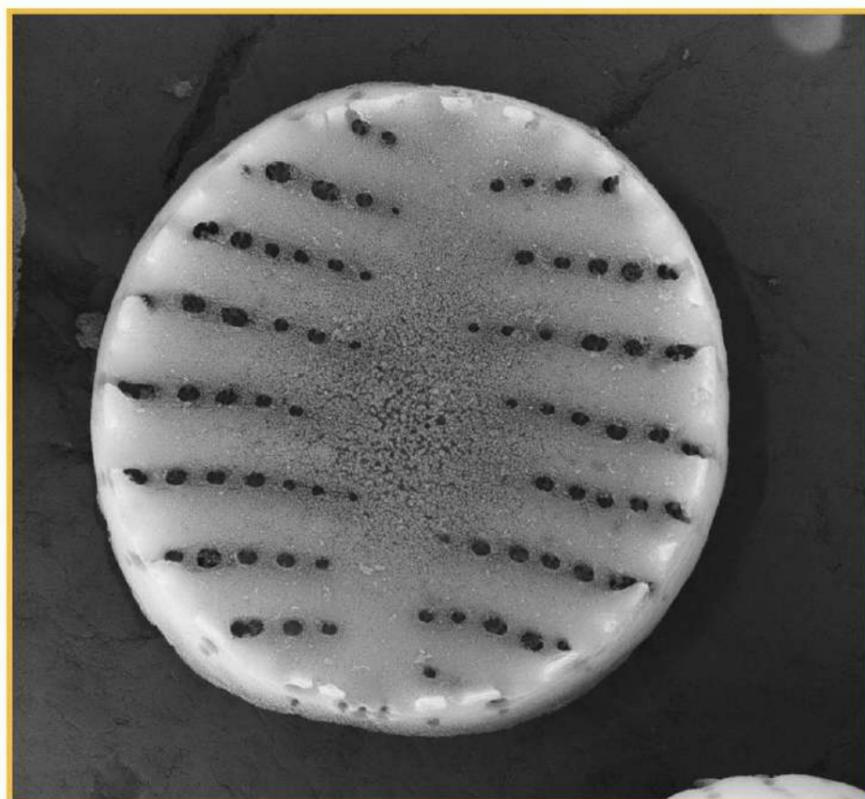


Algal biomass and nanotechnologies

ALGARES



Microalgal biomass can be grown in wastewaters and used as raw materials for the extraction of high value bio-compounds. In the framework of the "circular economy", this cultivation allows to combine two or more processes in order to enhance the production of all the intermediates along the chain and transform wastes into valuable products. AlgaRes promotes the use of this biotechnology, offering as final products clean waters and algal biomass, from which photonic devices can be also obtained.



Pure organic spirulina chips



BIOECONOMY
VILLAGE

ALGARIA

Algaria

Spirulina is a blue-green alga, nutrient-rich with important benefits for the human health.

FAO recognized its value defining it as “the food of the future” and identifying it as a potential solution to address food security and malnutrition.

AlgAria offers spirulina in an innovative form, as a functional ingredient, thanks to the wide experience of the biologists who control the process and guarantee the absence of any contaminants.



Biogas is the natural product deriving from the biological process of anaerobic digestion of organic compounds.

Its purification produces biomethane which is similar to that used for heating applications or transports.

To produce biogas, AzzeroCO2 proposes the management and valorisation of organic waste and the Organic Fraction of Urban Solid Waste also to stimulate an efficient waste management and exploit its great energy potential.

AzzeroCO2 can design systems suitable to meet specific demands from public or private institutions.

Biomethane is clean, sustainable and it is a renewable energy source for the future!

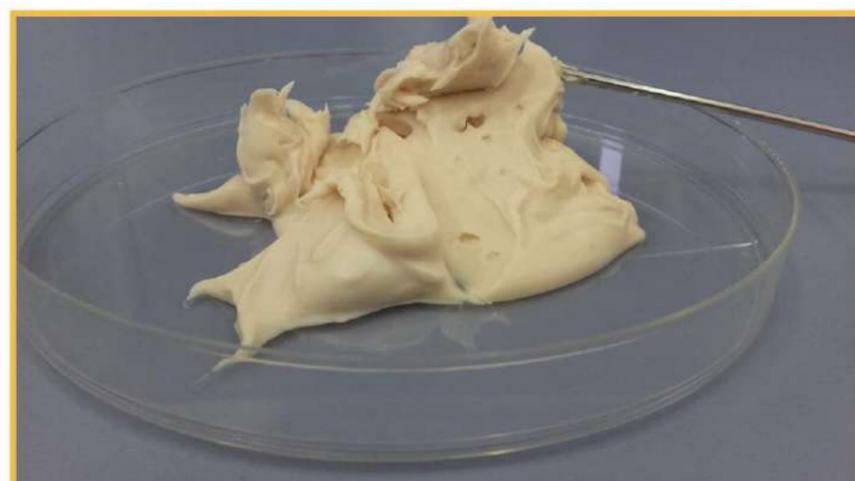
AzzeroCO₂
il clima nelle nostre mani
www.azzeroCO2.it



Yeasts for food and nutraceutical uses. Whey proteins for the food, nutraceutical and textile industries.



Through an innovative patent pending biotechnological process, BioInnoTech converts whey, a polluting by-product of the dairy industry, into high added-value products, i.e. yeasts and whey proteins. Yeasts are available in wet and dry forms for bread-making, animal feed, nutraceutical, beer and wine industries. Proteins can be used for food and nutraceutical applications, e.g. food additives or dietary supplements, and for non-food applications, e.g. fillers for the textile industry.



Particleboards from agricultural residues for interior constructions and furniture



CHIMAR

CHIMAR 

CHIMAR HELLAS SA has manufactured low-density chipboard using the inside/core of the plant stem of lignocellulosic crops like hemp, kenaf, jute, etc. These crops have no other use and currently are considered as residues.

For the particleboards manufacturing bio-based adhesives (e.g. tannin/lignin) were used, thereby achieving innovative "green" end panels that are lighter than existing ones on the market while having similar properties to them.



Particleboard panel with engineered biopolymer

CHIMAR

CHIMAR 

Conventional particleboard panels are mainly composed of chopped wood parts (particles/chips) that are glued together using petroleum based materials, including Formaldehyde, which is presumed to have carcinogenic potential for humans. CHIMAR HELLAS SA is providing a Non-Added Formaldehyde (NAF) adhesive system for particleboard application, which includes a sustainable engineered biopolymer, coming from renewable feedstock, reducing the toxicity and giving equivalent or even better performance to the final product in relation to petrochemical products.

Particleboards are used in applications such as furniture, flooring, roofing, windows and doors frames etc.



Bracelets from fish skin



BIOECONOMY
VILLAGE

BLU MARINE SERVICE



The Skin Fish project is funded by the Italian Ministry of Agriculture and Forestry as a part of the "Initiatives to support fishing activities" (MD 02/10/14).

The aim of the project was to evaluate and test the use of a fish processing industry waste, i.e. the fish skin. In particular, the project identified the fish skins present on the Italian market that can be exploited in various sectors such as clothing, footwear, supplies, accessories and design in general.

Several experiences in some Northern European countries have already shown that fish is a great source not only of food, but also of the feedstock, i.e. the fish skin, to produce leather-like products. The Skin Fish project has identified the fish species most suitable for this use, and defined the technical aspects to obtain a fish skin suitable for tanning.



Liquid laundry detergent with a bio-based packaging



BIOECONOMY
VILLAGE

OFFICINA NATURAE



The new packaging of laundry detergents sold by Officina Naturae and Solara brands are made with 100% of green polyethylene. Such a packaging is produced by using bioethanol from sugar cane which is cultivated in an ecologically and ethically responsible manner in Brazil.



Compostable bread packaging



BIOECONOMY
VILLAGE

OFFICINA NATURAE



The bread packaging manufactured by Polycart is made of paper and a transparent Mater-Bi® film window, and therefore it is fully biodegradable and disposable with the organic waste. This bread packaging is a convenient and flexible solution which combines sustainability and practicality, and gained a great success at the Nuremberg Biofach, the world's largest fair for the organic sector.



Cushion for hot and cold therapy from food by-products



BIOECONOMY
VILLAGE

CHIMICA VERDE



The cushion is made of 100% felt outside, an organic cotton/linen wrap inside and a cartridge containing a dried apple by-product mixture from organic apple juice processing. According to laboratory tests, the apple by-product retains the heat longer than the other natural materials which the cushions are usually filled with. The temperature at which the cushion is heated (microwaves or conventional oven) is maintained for 20-25 minutes, then settles at body temperature causing well-being.



Objects in PLA made with 3D printer



BIOECONOMY
VILLAGE

CHIMICA VERDE



PLA (polylactic acid) is the plastic most widely used for the production of objects with the Fused Deposition Modeling technology with 3D printing.

PLA has good rheological, mechanical and biodegradable properties.



A high performance gear oil from renewable sources

FOUNDRY CHEM



This lubricant consists of a natural oil and selected additives which guarantee excellent performances for different applications. Its high viscosity index (30/50) ensures a high resistance to heavy mechanical and cutting stresses without significant changes in viscosity, while providing the proper lubrication in different uses. Therefore, this product has a high efficiency which allows energy savings and high performances. Moreover, it is stable to oxidation and corrosion, does not produce deposits and sludge, and has demulsibility properties, air release and absence of foam thanks to its specific additives. It is perfect when high levels of lubrication and efficiency are required.



Apple faux leather



BIOECONOMY
VILLAGE

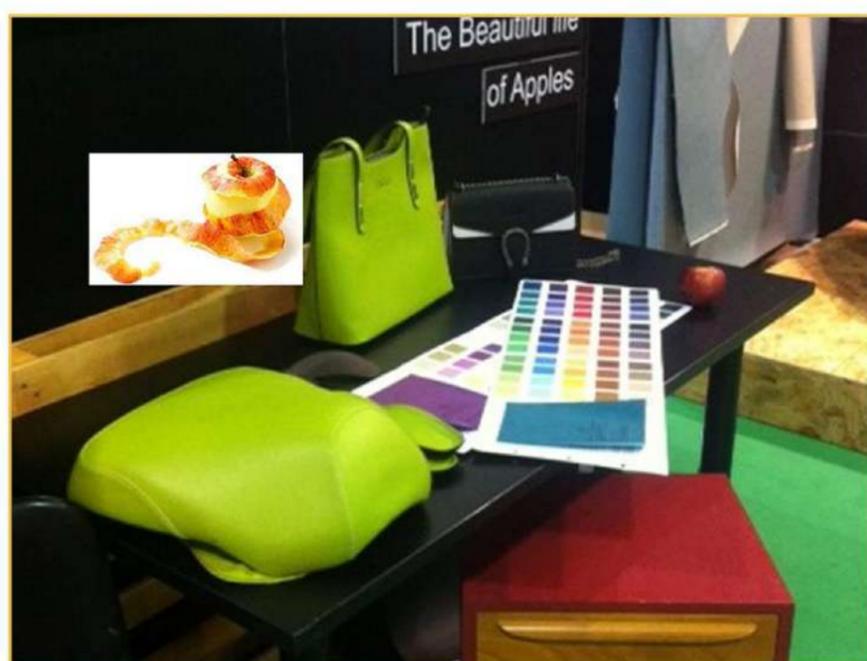
FOUNDRY CHEM



Apples' peel is generally discarded during the production of jams and juices. Nevertheless it is characterized by several properties because it is rich in sugars, cellulose and waxes. When it is mixed with some of the ingredients used for synthetic leather, such as polyurethane, it forms a material suitable to produce a 75% natural leather.

Its main advantages are its porosity, which allows transpiration, and the reduction of waste disposal costs.

Lifestyle Enterprise has exploited the technology developed in Italy to valorise the peels of apple skins to produce leather-like furniture, e.g. sofa and armchairs.



“Biricco” baby care shampoo with organic quince extract

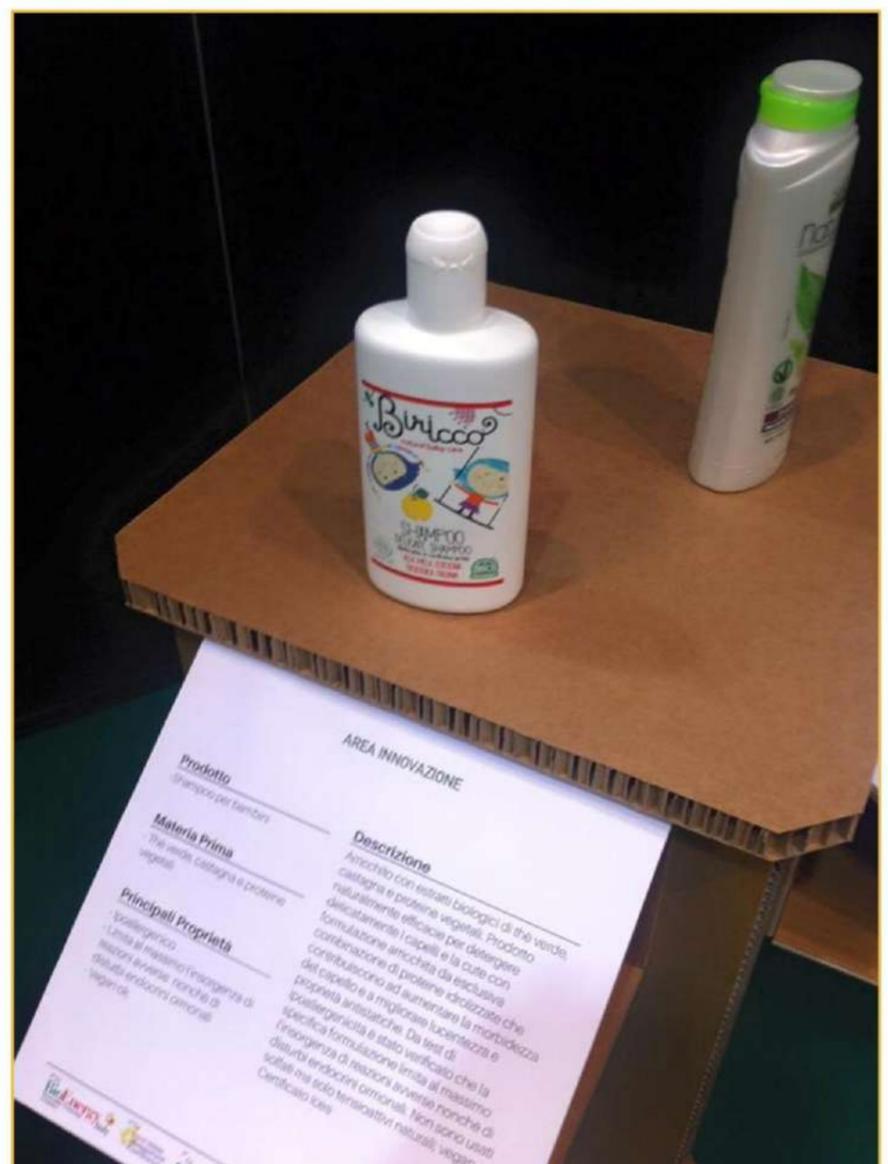
OFFICINA NATURAE



“Biricco” is a shampoo developed to gently cleanse and cuddle the hair of kids.

It is enriched in organic quince and rosemary extracts, and is suitable for frequent washing of delicate and sensitive children’s skin.

Biricco contains surfactants only of vegetable origin.



Trays made of BioFoam®

SYNBRA



BioFoam® is a 100% PLA (polylactic acid) plastic that has physical and mechanical properties comparable to those of the expanded polystyrene. It can be used to produce pouf and it is already used for refrigerated transport and protective packaging. It is also a highly sustainable material to be used in the construction sector as an insulation material.



Protein-based materials produced from legume by-products

CNR-IPCF

 Consiglio Nazionale delle Ricerche



LEGUVAL is focused on the valorisation of e tons of legume by-products in Europe. These by-products have a strong environmental impact and high disposal costs since they are generally discarded as wastes. The aim of LEGUVAL is to reduce both environmental pollution and fossil fuels dependence by producing new bio-plastics with improved properties, increasing the competitiveness of agricultural areas and the use of new materials. After their extraction, legume proteins are used to produce packaging coatings, plastic compounds for injection moulding and pot applications.



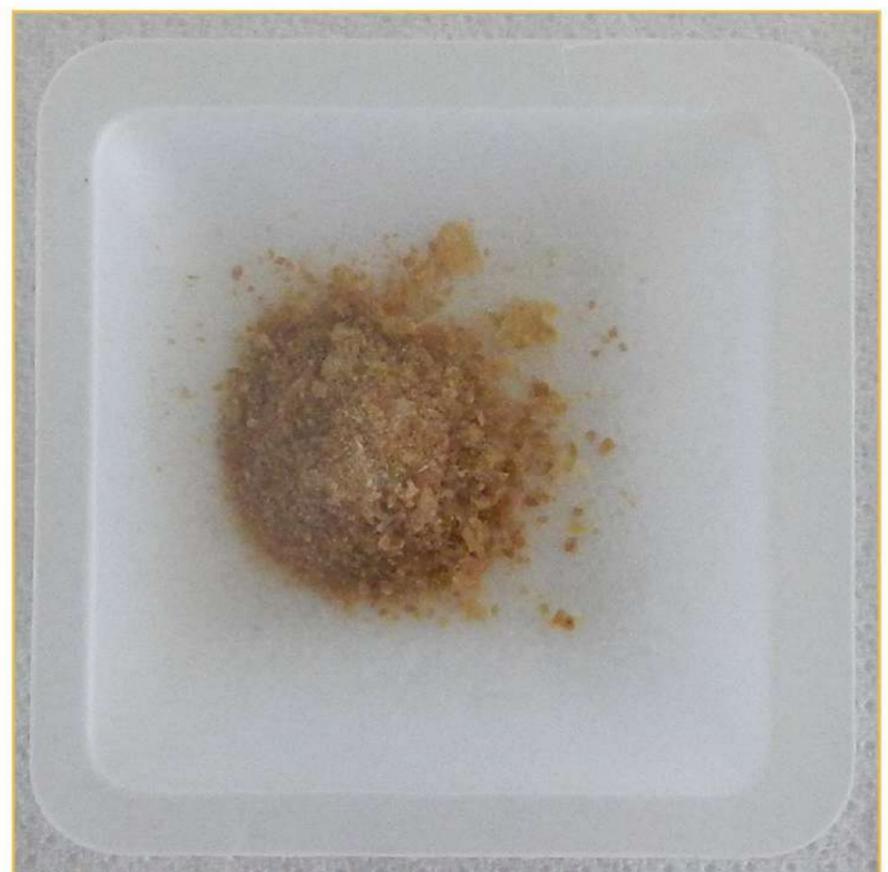
Potential use of seaweed for pharmaceuticals and health products

CNR-ISMAR



Algae are used in many countries in various fields such as cosmetics, agriculture, wastewater treatment, and also in search for new drugs.

Recent studies have shown that phycocolloids (phycos = alga, kòlla = glue) of the brown alga (*Undaria pinnatifida*) have a good activity against the protozoan *Leishmania infantum*, responsible for the Leishmaniasis disease that affects both humans and animals. This result focuses attention on the study and use of polysaccharides as natural resources to be combined with integrated strategies for the use of local algae.



Bio-based plastics from agri-food wastes



BIOECONOMY
VILLAGE

CNR-IRSA



Consiglio Nazionale delle Ricerche

New flexible and robust processes have been effectively applied to agri-food wastes such as citrus by-products, spent coffee grounds, sewage sludge, residual fractions of algae, as well as the Organic Fraction of Urban Solid Wastes to obtain hydroxymethylfurfural (HMF), which is the precursor of furandicarboxylic acid (FDCA). FDCA is a candidate to replace the terephthalic acid, constituent of PET, through the technology known as YXY technology. These thermochemical processes, which are flexible, sustainable and efficient, are a valid alternative to the current disposal of the wastes through their valorisation.



Fondi Caffè



Alghe



FORSU



Fanghi Urbani



Agro-Waste



Biodiesel from sewage sludge



BIOECONOMY
VILLAGE

CNR-IRSA



Consiglio Nazionale delle Ricerche

In 2015, more than 3 million tons of urban treated wastewater sludge were produced in Italy. In this contest, an effective wastewater treatment combined with resource recovery is a challenge towards their sustainable management.

The possibility to recover over 80% of the lipid component of sludge (20-25% of dry sludge) through a solvent-free sustainable procedure and without using chemical agents has been proved. Such a recovered lipid fraction can be then used to produce biodiesel complying the EN14214 regulation through catalytic systems in homogeneous phases. Once widely used, this technology will make available to the European community about 1.5Mt/year of biodiesel, namely the 15% of the current production, by using an exhausted feedstock.



Biodiesel

Thermosetting resins from hemp for everyday products

CNR-ISTM

 Consiglio Nazionale delle Ricerche

Hemp is a sustainable crop with high yields and a high adaptability to the European climate, with positive environmental and agronomic characteristics. While it has been traditionally cultivated for its fibres, seeds and psychoactive substances, hemp is an ideal multi-purpose crop that well fits into the circular bioeconomy. Innovative biomaterials, highly cross-linked thanks to the high content of unsaturated oils, can be produced from hemp seeds.



Biodegradable energy storage material



BIOECONOMY
VILLAGE

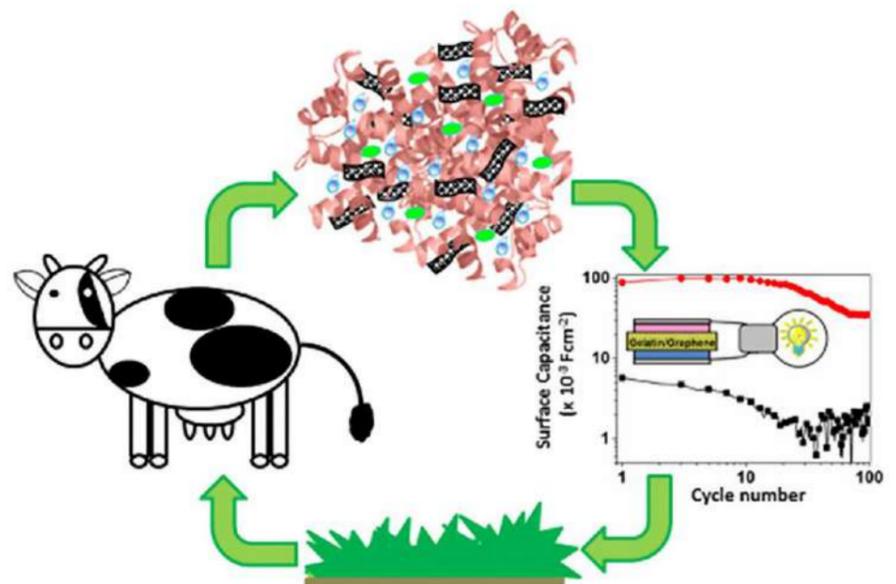
CNR-IPCB



Biodegradable/transient electronics is an emerging technology in which the device can physically disappear, entirely or in part, in a controlled way and after a period of stable operation. The current challenge is to obtain low-cost and environmentally safe products.

The biodegradable materials obtained from renewable resources such as gelatine, silk, zein and lignin are important constituents for this technology.

Possible applications include environmental sensors and temporary biomedical implants for the detection and stimulation of human body tissues.



Soil remediation and sustainable production



BIOECONOMY
VILLAGE

CNR

Istituto di Biologia
Agroambientale
e Forestale



Consiglio Nazionale delle Ricerche

Millions of hectares of Italian land cannot be used because they are contaminated, such as derelict industrial sites, illegal landfills, military brownfields and ammunition storage areas. These sites cannot be restored using traditional techniques because of the economic and environmental unsustainability of the treatments due to the extensive soil volumes to be treated. An alternative is represented by a phytoremediation system (based on crops active against pollutants) aimed at the biomass production. In this way, the contaminated lands can be converted in green productive areas and Bioeconomy is supported as well.



Energy and green fertilizers

CNR-IRSA

 Consiglio Nazionale delle Ricerche

Food processing waste such as fruit and vegetable peels, and household waste are rich in biodegradable organic matter, which can be converted in valuable resources. The natural process of anaerobic digestion consists in the degradation of the organic matter driven by bacteria in the absence of oxygen and in the production of methane (which is energy!) and fertilizers. IRSA-CNR is testing an advanced technology, with a pre-treatment system, to valorise waste before their conversion into energy. Laboratory tests have shown very promising results by obtaining up to 100 litres of methane from 1 kg of wet household waste (which is the daily amount of waste produced by an average family). Furthermore, feeding the earth with digestate can lead to a reduced use of chemical fertilizers, resulting in environmental benefits and closing the loop of the organic matter cycle in the soil and in the environment.



Bio-based mortars for restoration and paper made with *Opuntia ficus-indica* cladodes extracts - an example of circular bioeconomy



ENEA
Progetto bilaterale
MAECI Italia Messico



Agenzia nazionale per le nuove tecnologie,
l'energia e lo sviluppo economico sostenibile

In ancient Mexican tradition, extracts of *Opuntia ficus-indica* were used to preserve ancient wall paintings and other works of art. Through a patent pending process innovation, Nopa-gel is made by *Opuntia* cladodes. The multifunctional product is used as an additive for restoration mortars and preservative for structures in terra cotta, giving good plasticity, structure and durability. The paper is made with the insoluble fibres which remain from the extraction process.



Antioxidant mixtures from agro-industrial waste



Agenzia nazionale per le nuove tecnologie,
l'energia e lo sviluppo economico sostenibile

Plants employ a wide variety of bioactive molecules as part of their defence mechanisms. These compounds belong to different chemical classes and are mainly endowed with antioxidant activity.

ENE A has acquired a quite long experience in the recovery of these biomolecules from the agro-industrial waste of different processes, e.g. kernel, pine nut, buckwheat, olive leaves and prickly pears. Their bioactive components can be used in the agricultural, nutraceutical, cosmetic fields in the context of a circular economy approach.

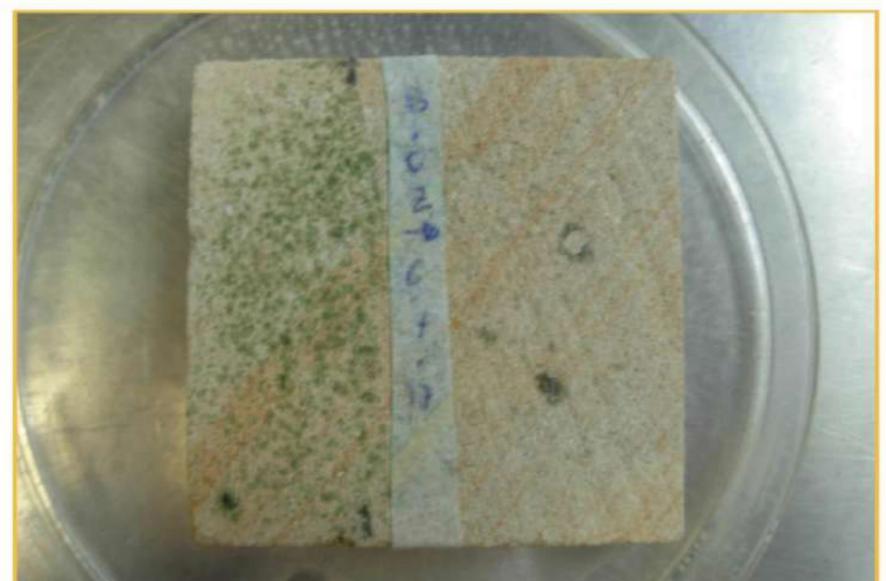
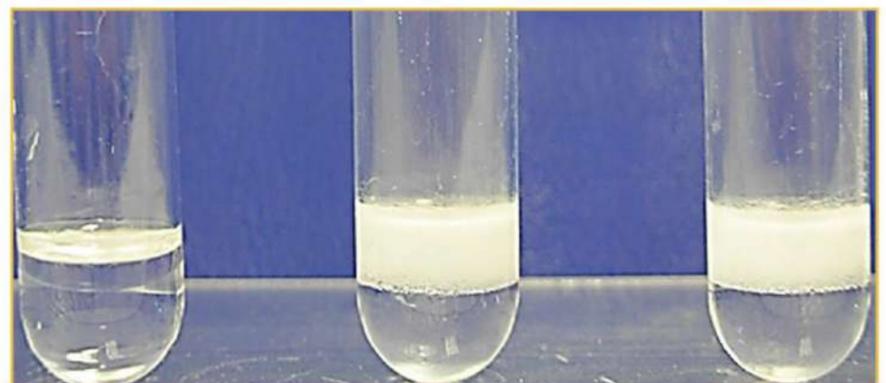


BIO-Z: a bacterial derived product with emulsifying and antimicrobial properties to clean historical and art surfaces



Agenzia nazionale per le nuove tecnologie,
l'energia e lo sviluppo economico sostenibile

BIO-Z is a non-toxic and environmentally safe product obtained from a non-pathogenic bacterial strain. BIO-Z is a raw extract, without living bacterial cells, which contains a biopolymer with good surfactant characteristics. It reduces surface tension, has a good stability over time, it is resistant to changes in pH, temperature and salinity. Moreover, it has emulsifying and antimicrobial properties, especially towards some bacteria able to colonize walls and art works. When used inside a suitable support, BIO-Z is easy to spread and does not leave undesired residues on the work. It is active both as antimicrobial against mixed microbial communities (biofilms) that cause structural and aesthetic damages, and as a cleaner to remove some hydrocarbons from sediments on wall paintings, such as fumes of fuel oil, fats and kerosene. Thanks to these activities, the original plaster colours are restored.



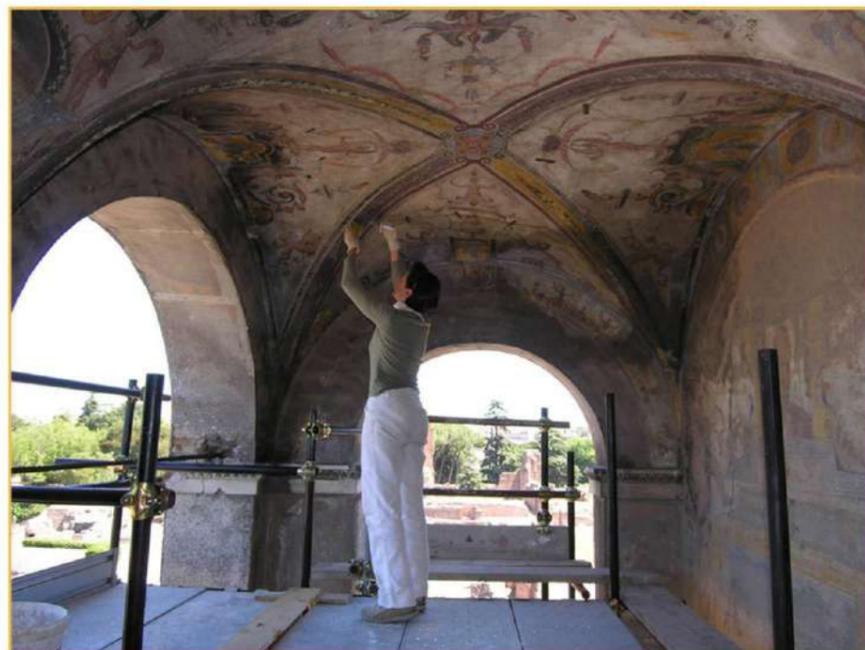
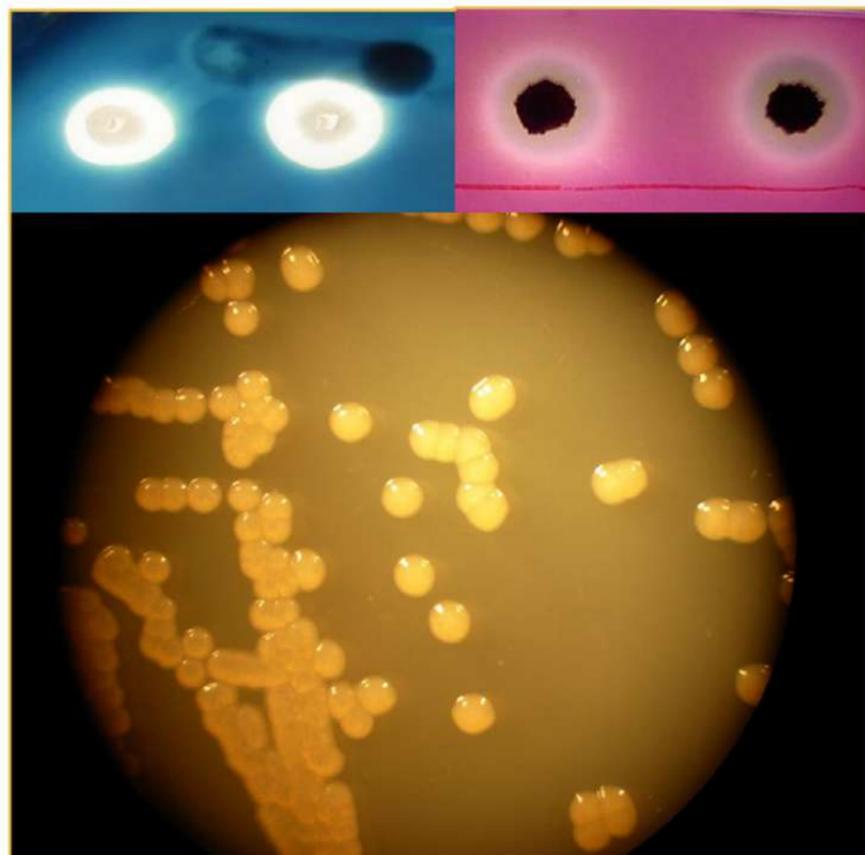
MICRO-PACK: Microbial formulas for art works

ENE A

ENE A

Agenzia nazionale per le nuove tecnologie,
l'energia e lo sviluppo economico sostenibile

The idea relates to a non-toxic and selective process for the removal of several types of deposits on art works and/or wall paints using non-toxic and safe bacterial strains, immobilized within a gel. The microorganisms are used, either single or in co-culture, as "micro-packs" of living cells selected according to the specific application. They can be easily put onto the surfaces to be treated, even if vertical ones or ceilings, and easily removed without leaving any residues or affecting the painting. The contact time is modulated according to the substrate to be removed, the state of conservation and type of surface to be treated, and their use does not require any stringent conditions. The main advantages are the selectivity of the treatments, safety for the art works, non-toxicity for restorers, low costs and the limited environmental impact.



Microbes and plants for environmental bioremediation



Agenzia nazionale per le nuove tecnologie,
l'energia e lo sviluppo economico sostenibile

Innovative microbial formulas have been designed within ENEA and successfully tested for bioremediation of tannery wastewater (to remove chromium and some organic compounds) and soils contaminated with metals and organic compounds (e.g. zinc, lead and hydrocarbons). For the recovery of mine soils in Europe, phytoremediation “toolboxes” have been designed to deliver a microbially assisted phytoremediation process in which endemic pioneer plants and native bacteria have been associated. Bacteria can promote plant growth and nitrogen fixation, while plants, in association with bacteria, can stop the release of toxic metals in soil and waters.

The microbial collection of "Lilith" contains about 600 strains with a strong biotechnological potential, which can be exploited to obtain new products and “tailor-made” microbial associations for bioremediation.



Green Diesel

ENI
Centro ricerche Eni
Upstream e Downstream



Biorefineries are a response to the European challenge of industrial transformation and a direct action towards the development of new generations of biofuels with no environmental impacts.

Thanks to innovations related to the raw materials and processes, the refineries in Venice and Gela have been converted into more environmentally sustainable production facilities.

Used food and vegetable oils are transformed into Green Diesel, a renewable component which composes 15% of a new Eni biofuel, i.e. "Eni Diesel +".

Gas emissions are reduced, and the circular economy is boosted.



Agri-food waste to produce microbial oils, a feedstock for advanced green diesel



ENI
Centro Ricerche ENI
per le Energie Rinnovabili
e l'Ambiente

Biofuels currently on the market largely derives from vegetable oils, a raw material usually devoted to the agri-food market.

In order to avoid this competition, Eni has developed a process in which waste biomasses, such as wheat straw and corn stalks, are used as raw materials. Through a fermentation process with special oleaginous yeasts, Eni transforms these wastes into microbial oils, with a chemical composition similar to those obtained from plant crops such as palm and rape.

The process consists of two steps: an initial saccharification, which transforms the cellulosic component of the raw materials into simple sugars (glucose), and a subsequent fermentation in which yeasts metabolize the sugars and accumulate up to 70% of microbial oils into the cells. Such oils are then extracted and sent to biorefineries for the production of advanced biofuels such as “Greendiesel”.



Sticks containing green flame retardants

DAREN LABS

Every year more than 3.1 million tonnes of chicken feather waste are produced within the food industry in Europe. In the framework of the KaRMA2020 project, 16 partners from 10 different countries are studying a strategy to convert this waste into added value materials to be used for bio-based products for various applications, such as flame retardants, fertilizers and bio-plastics for food packaging. The sticks, containing keratin extracted from the chicken feather waste, show the same flame retardant properties as the raw materials obtained within the KaRMA2020 project.



Wastewater bioremediation with bio-based substances derived from organic waste

MAT4TREAT



A strategy to reduce water contamination by different pollutants can be based on the use and recycle of waste! In fact, after their composting and chemical treatments, several Bio-Based Substances (BBS) active against pollutants can be extracted. The BBS can remove harmful substances by their adsorption or breaking them down when activated by a proper irradiation (photocatalysis) treatment.

The environment benefits twice from this strategy since waste are valorised and water purified!



Biodegradable and compostable tableware



BIOECONOMY
VILLAGE

MINIMO IMPATTO



minimo impatto®

Several everyday products such as disposable tableware can be made from bio-based materials. These materials are different from the traditional plastic ones in that they are entirely or partially obtained from renewable vegetal biomasses without fossil components.

The aim of Minimo Impatto is to introduce and explain the characteristics of these innovative materials with a low environmental impact such as Mater-Bi®, a biodegradable and compostable plastic produced by Novamont, which is used by Ecozema® for its flatware.



Tiles and panels made of fungal mycelium-based composites

MOGU

mogu

MOGU products are made with agricultural vegetable by-products colonized by fungi. Fungi use cellulose as a nutrient for their growth thus colonizing empty spaces and binding the organic matter with their “root structure” – the mycelium. The resulting material is a strong functional biocomposite, fully natural, 100% compostable and suitable for many diverse applications and markets, e.g. green building and eco-friendly design.



Azelaic acid from renewable resources

NOVAMONT



NOVAMONT

Oilseed cultures such as thistle seeds can be used to extract vegetable oils to be converted into bio-monomers, including azelaic acid.

Azelaic acid is a compound of great interest because it is the main constituent of the third-generation of Mater-Bi®, the innovative family of fully biodegradable and compostable bioplastics produced by Novamont.

Moreover, azelaic acid has important applications in the formulation of biolubricants and cosmetics, and in the pharmaceutical and personal care fields.



Bio-butanediol

NOVAMONT



NOVAMONT

MATER-BIOTECH, which has been created by Novamont, is the world's first industrial plant for the production of bio-butanediol (1,4-butanediol – 1,4 BDO) directly from sugars through a fermentation process.

Bio-butanediol is used as a renewable building-block for the production of the fourth generation of Mater-Bi®, the innovative family of fully bioplastics produced by Novamont. The main characteristics of the fourth generation of Mater-Bi® are the significant content of renewable raw materials and the decreased greenhouse gas emissions.



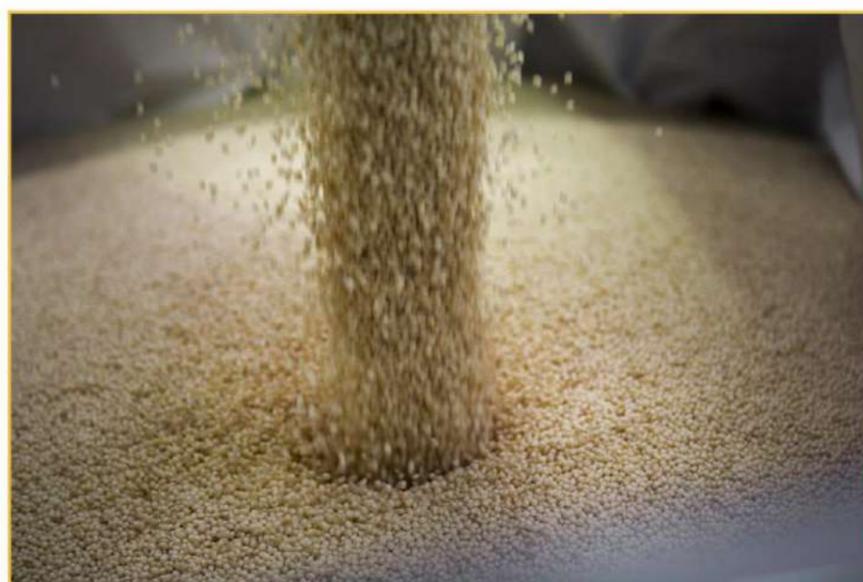
Biodegradable and compostable coffee capsules

NOVAMONT



The coffee capsules made of Mater-Bi® 3G (from Novamont's third generation materials) can be disposed along with the other organic waste and industrially processed to become compost, thus contributing to the reduction of unsorted waste.

Mater-Bi® is the innovative family of bioplastics produced by Novamont using renewable resources as raw materials. In the circular economy perspective, Mater-Bi® provides solutions for different applications in which biodegradability and compostability are added value characteristics both during the use and at the end of life of the bio-products.



Biodegradable pheromone dispenser for sexual disorientation

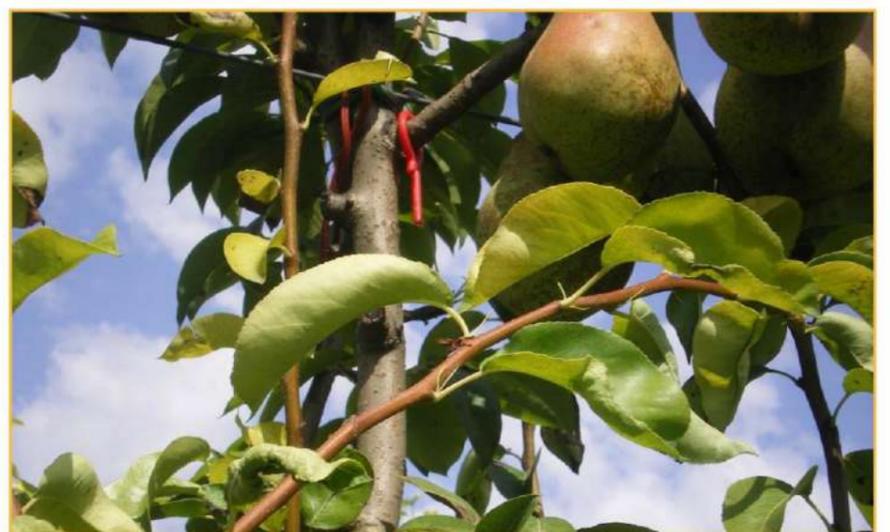
NOVAMONT



NOVAMONT

Pheromone dispensers made of Mater-Bi® are an effective and sustainable solution against the main orchard phytophages. The dispensers do not need to be disposed because they are fully biodegradable in the soil.

Mater-Bi® is the innovative family of bioplastics from Novamont produced from renewable resources. In the circular economy perspective, Mater-Bi® provides solutions for different applications in which biodegradability and compostability are added value characteristics both during the use and at the end of life of the bio-products.



Biodegradable and compostable tableware



BIOECONOMY
VILLAGE

NOVAMONT



NOVAMONT

The use of Mater-Bi® compostable tableware simplifies waste management since the bio-products can be disposed of as organic waste after their use, thus reducing the environmental impact and waste management costs.

Mater-Bi® is the innovative family of bioplastics manufactured by Novamont using renewable resources. In the circular economy perspective, Mater-Bi® provides solutions for different applications for which biodegradability and compostability are added value characteristics both during the use and at the end of life of the bio-products.



Biodegradable and compostable fruit and vegetable bags

NOVAMONT



NOVAMONT

The use of fruit and vegetable bags made of Mater-Bi® contributes both to the reduction of not easily recyclable plastics and to the increase of the separate organic waste collection.

Mater-Bi® is the innovative family of bioplastics from Novamont, which uses raw materials from renewable resources. In the circular economy perspective, Mater-Bi® provides solutions for different applications for which biodegradability and compostability are added value characteristics both during the use and at the end of life of the bio-products.



Biodegradable and compostable bags for separate organic waste collection



NOVAMONT



NOVAMONT

Due to their characteristics and functionality, bags made of Mater-Bi® are a key tool and solution to support separate collection of organic waste.

Mater-Bi® is the innovative family of bioplastics from Novamont, which uses raw materials from renewable resources. In the circular economy perspective, Mater-Bi® provides solutions for different applications for which biodegradability and compostability are added value characteristics both during the use and at the end of life of the bio-products.



Biodegradable and compostable shoppers

NOVAMONT



NOVAMONT

The shoppers made of Mater-Bi® contribute to promote a proper and efficient separate organic waste collection thanks to their double use as bags for goods transport and later as organic waste containers.

Mater-Bi® is the innovative family of bioplastics of Novamont, which uses raw materials from renewable resources. In the circular economy perspective, Mater-Bi® provides solutions for different applications for which biodegradability and compostability are added value characteristics both during the use and at the end of life of the bio-products.



Biodegradable mulching films

NOVAMONT



NOVAMONT

The Mater-Bi® mulching film is an agronomically and environmentally efficient application. It is completely biodegradable in the soil, and therefore it does not have to be collected and disposed of at the end of the crop cycle.

Mater-Bi® is the innovative family of bioplastics of Novamont, which uses raw materials from renewable resources. In the circular economy perspective, Mater-Bi® provides solutions for different applications for which biodegradability and compostability are added value characteristics both during the use and at the end of life of the bio-products.



Okka's panels made of pine needles

OKKA

The silence and peace in Estonian pine forests is extraordinary. It's the thick layer of pine needles, which softens your steps and absorbs the noise. How to take this peace of nature along with you to your home or office?

Okka has found a way to make it possible! Pine needles, considered as useless side product of the forestry industry, have become an element of interior design and soul of the acoustics inspired by nature in Okka's decorative wall, ceiling and furniture panels.

okka



A new sustainable cosmetic horizon: Celus-Bi® emollient esters



ROELMI HPC

ROELMI·HPC
Health & Personal Care 

Esters are functional ingredients widely used in cosmetics due to their emollient properties.

Given their importance, ROELMI HPC invested in eco-sustainable processes. Thanks to its commitment to sustainable development and eco-sustainability, ROELMI HPC has developed a low-impact philosophy, and the Celus-Bi® line of cosmetic ingredients is based on ethical processes which aims at zero impact on the environment. Celus-Bi® is the innovative family of esters to be used as ingredients for cosmetics, having unique performances and being made from renewable raw materials with an innovative technology.



New functional foods from agro-industrial by-products



SAPIENZA
Università di Roma

Dipartimento di Ingegneria Chimica,
Materiali Ambiente



SAPIENZA
UNIVERSITÀ DI ROMA

Functional foods are enriched with compounds with beneficial and healthy properties, such as polyphenols and carotenoids which can be found in high percentages in several agri-food by-products. It is well known that these compounds display beneficial effects on human health also by preventing diseases. Our research group has investigated the possibility of enriching some common food products with functional compounds derived from by-products, such as oil enriched in lycopene (from tomato seeds) and polyphenol-rich drinking yogurts.



For more information:
antonio.zuorro@uniroma1.it

Functional cosmetics enriched with polyphenols deriving from agro-industrial wastes



SAPIENZA

Università di Roma

Dipartimento di Ingegneria Chimica,
Materiali Ambiente



SAPIENZA
UNIVERSITÀ DI ROMA

Agro-industrial processes, such as the production of olive oil and fruit juices, result in large volumes of wastes. However, these by-products contain large amounts of antioxidant compounds, such as polyphenols.

These compounds can be recovered from the industrial wastes and used as ingredients to produce natural cosmetics for skin aging prevention.

*For more information:
antonio.zuorro@uniroma1.it*



Production of PLA composites reinforced with nanocellulose



SAPIENZA
Università di Roma

Dipartimento di Ingegneria Chimica,
Materiali Ambiente



SAPIENZA
UNIVERSITÀ DI ROMA

Cellulose is the main component of plant cells walls. It is arranged in nanometer-sized beams of parallel chains arranged in a helix, joined together through other components, such as hemicellulose and pectin. The cellulose nanofibers can be extracted by removing the other components with chemical agents and/or enzymes.

Our research group used the extracted nanocellulose to reinforce a bio-polymer suitable for food packaging, i.e. PLA (polylactic acid), improving its mechanical and thermal resistance properties.

For more information:
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Lycopene extraction from tomato peels



BIOECONOMY
VILLAGE

SAPIENZA

Università di Roma

Dipartimento di Ingegneria Chimica,
Materiali Ambiente



SAPIENZA
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Tomatoes peels contain a wide variety of antioxidant compounds. Among these compounds, lycopene, which is the main one responsible for the red colour of ripe tomatoes, can play a significant role of preventing some diseases.

The research group has developed an extraction process using a mixture of solvents, one of them with an affinity for lycopene and the other ones with effects on the properties of the vegetal matrix.

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Green synthesis of silver nanoparticles using agro-industrial wastes



SAPIENZA

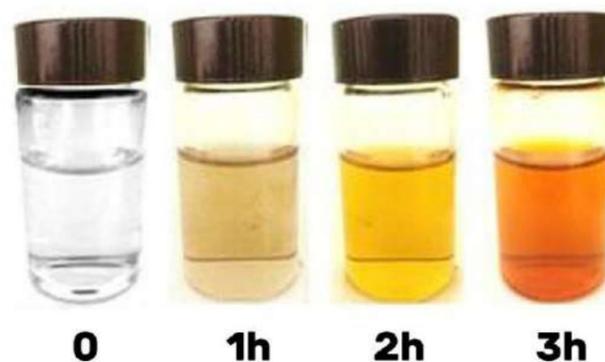
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During the last decades, silver nanoparticles have found applications in optics, electronics, wastewater treatment and as antibacterial and antimycotic agents in biotechnology. Generally, their production takes place by using toxic chemicals. Our research is focused on the feasibility of using agro-industrial wastes, such as blueberry peels and spent coffee grounds, as sources of non-toxic reducing and stabilizing agents for the production of nanoparticles.



For more information:
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Yarns and fabrics from spent coffee grounds: S. Café®, SINGTEX®



SINGTEX



The S. Café® technology reuses spent coffee grounds and convert them into fabrics through the extraction of fluids. S. Café® yarns have drying times up to 200% faster, odour-control properties and can reflect UV rays.



Protein idrogels for therapies of repair and regeneration of the tissues with stem cells



UNIVERSITA' DI ROMA
TOR VERGATA

Today it is possible to take adult stem cells from various organs and tissues of the patient, grow them in vitro, and produce complex three-dimensional systems consisting of stem cells and supports (hydrogel) made of biomaterial, biocompatible and biodegradable, with optimal biochemical and mechano-physical factors for cell growth and differentiation and vascularisation after implantation in the patient.

It will be possible to obtain an optimal and correct use of stem cells in the shelter and regeneration of tissues and organs, avoiding rejection and high socio-economic impact.



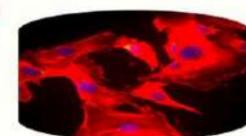
Proteine della seta



Cellule staminali



**Cerotti
cellulari**



Turbliss natural cosmetics made of peat



BIOECONOMY
VILLAGE

TURBLISS LLC



TURBLISS

Estonia, a land of forests and bogs, holds a treasure – peat. Here geology, biology, and weather have collaborated to create a layer of balneological peat so rich in humic substances that it can be used to produce high quality natural cosmetics. Turbliss combines the knowledge of our grandmothers with modern science to turn peat into an easy to use functional cosmetic products for face, body and hair for a modern human being.



Bioethanol as a food additive, solvent or biofuel produced from an oil industry by-product: olive pomace



CIRI

Agroalimentare ed Università di Bologna



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

Approximately 3,000,000 tons of olive pomace, the solid by-product of olive oil industry, are yearly produced in Italy. Typically, olive pomace has been used to extract the residual oil, but the consumers' preference for this product has decreased over the last years due to its low quality compared to the extra virgin olive oil. Therefore, it is necessary to look for alternatives to its disposal to get a better exploitation, such as the production of feed, compost and energy.

Within the CIRI Agrifood of the University of Bologna a yeast strain able to grow by using olive pomace and produce bioethanol has been selected. The deriving bioethanol can be exploited in various sectors such as the agri-food, chemical and fuel ones.



Cheese making in red...

Cheeses added with powdered tomato by-products



CIRI
Agroalimentare ed Università di Bologna



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

A tomato powder can be prepared from by-products of tomato processing, i.e. peels and seeds, following their dehydration. The powder, characterized by the presence of natural compounds with proven antioxidant properties such as lycopene and β -carotene, can be used as an ingredient to be added during the preparation of fresh cheeses such as “primosale”. The resulting product is therefore red-coloured and enriched in natural antioxidant compounds.



Bioplastics from insects and organic wastes

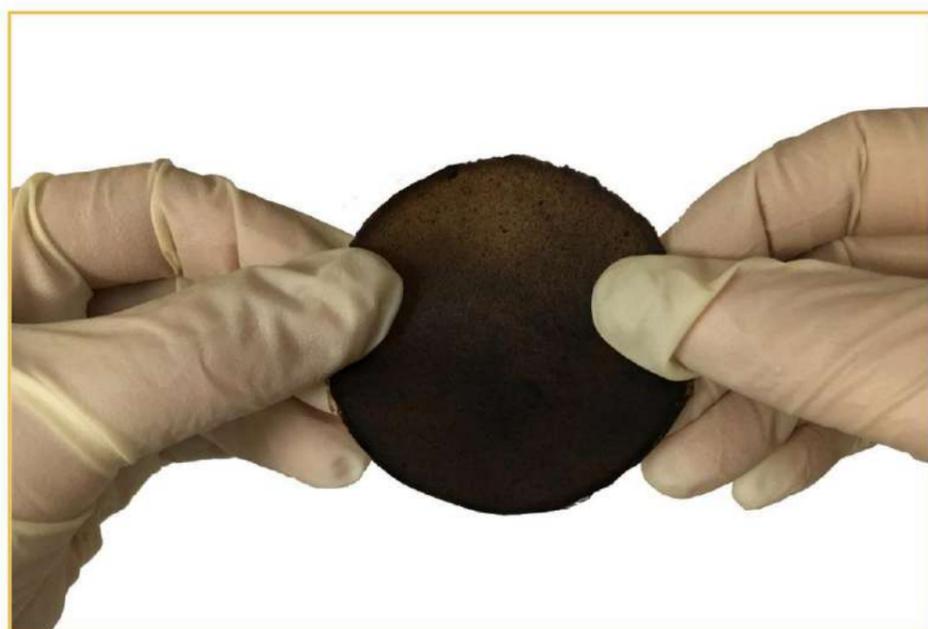
UNIMORE
BIOGEST-SITEIA



UNIMORE Centro di Ricerca Interdipartimentale
UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA BIOGEST-SITEIA

Household organic waste is a valuable resource which can be reused and exploited. An incredibly efficient means to convert organic waste into proteins and fats useful to produce bioplastics already exists in nature, i.e. insects!

VALORIBIO project aims at an alternative use and sustainable exploitation of zootechnical and other organic waste through the "soldier flies" for the production of biodegradable bioplastics which can be used in agriculture.





BIOECONOMY
VILLAGE

Wile's Alpaka yarn and handicraft

WILE FARM



Alpakas are domesticated species of South American camelid resembling a small llama in an appearance. Alpakas are mainly grown for their soft, durable and luxurious fiber which is warmer and not prickly compared to sheep's wool and hypoallergenic, because it doesn't contain lanolin.

Wile Farm is breeding Alpacas, producing Alpaca yarn and handicraft, offering training of old skills of wool spinning. Its possible to buy Alpaca-yarn and Alpaca garments from e-shop at www.wile.ee/en/ and visit the Alpakas in Järvamaa, Estonia.

