



## THE SUSTAINABLE CHOICE BIOPOLYMERS SOLUTIONS

biopolymers.nurel.com

## NUREL INTRODUCING INZEA®

With an eye on sustainability and anticipating market trends and future environmental regulations, **NUREL** has developed a complete range of renewable and compostable biobased biopolymers: **INZEA**<sup>®</sup>.

As part of **SAMCA Group**, **NUREL** is a polymer and fibre producer based in Zaragoza, Spain, with over five decades of polymer production expertise.

**SAMCA Group**'s corporate engagement towards sustainability is oriented to reduce the greenhouse gasses impact, minimize the dependence on fossil oil derivatives, promote the use of renewable energies and to reduce the plastic waste in the environment.

Following our core values, at **NUREL** we have optimized our production processes establishing a "zero waste" policy to **minimize our CO**, footprint impact from our activities.

We are committed to carrying out Life Cycle Assessment of all our activities and products. NUREL satisfies the applicable legal and regulatory requirements in all areas of the integrated Management System. NUREL is ISO 9001, ISO 14001, ISO 50001 and FSCC 22000 certified.

INZEA® is our response to the market demand for more sustainable materials. INZEA® is a range of biopolymers that may be processed by injection or other manufacturing methods using conventional equipments.

With optimal mechanical properties and similar processing parameters, INZEA<sup>®</sup> could be the sustainable solution to replace oil-based polymers e.g. polyolefins or styrenics with equivalent properties.

INZEA® biopolymers are compatible with standard fillers, additives and biopolymer based master-batches.

Thanks to many years of experience and our continuous investment in R&D development, NUREL Biopolymers can develop **tailor made solutions** to match our customer's production and final applications requirements.

Compostability depends on the final applications.
\*\* For further information contact with NUREL Technical Department.



## **INZEA®** Biopolymers are:

## BIODEGRADABLE COMPOSTABLE\* BIOBASED\*\* SUITABLE FOR FOOD CONTACT

## SUSTAINABLE MATERIAL

**INZEA®** offers sustainable solutions for injection, extrusion, thermoforming, blow moulding and other manufacturing processes.

Material replacement with INZEA® products:

INZEA biopolymers can replace and be processed in the **same machinery as standard polymers** with only minor process adjustments.





## INZEA® PRODUCTS

INZEA® is **obtained from renewable sources**. Using NUREL's technology, raw materials and intermediates are converted into our INZEA® biopolymers. Then, eco-designed products, such as single-use bags, disposables items, food packaging or mulch film can be produced.

INZEA<sup>®</sup> product range is **designed to return to nature** by different disposal methods such as industrial & home composting, or by biodegradation in different environments that may include soil, water or anaerobic digestion.

The action of temperature and microorganisms transform materials into CO2, H2O and biomass, nourishing the soil and preparing it for seed germination. **New plants will grow and the lifecycle will restart.** 



## LAND USE FOR **BIOPLASTICS**



## INZEA<sup>®</sup> DOES NOT compete with the food chain.

Source:

**European Bioplastics**, Institute for Bioplastics and Biocomposites, nova-Institute (2021).

\* In relation to global agricultural area. \*\* Also includes approx. 1% fallow land.

## NEW CHALLENGES OF THE **PLASTIC INDUSTRY**

The world is changing and the plastics industry has to adapt to a new situation where sustainability is a priority for governments, companies and end users.

In fact, the European Union is **restricting the use of single-use materials** and there is a European Plastics Strategy, whose objectives for 2030 are to **reduce the amount of plastics** that goes to landfills.

Conventional materials such as PE, PP or PS, have traditionally been used by the industry to produce containers and other plastic films obtained from fossil resources that, in many cases, due to mixtures of **multiple materials or to food contamination cannot be easily recycled**.

By using INZEA biopolymers, **plastic waste can be valorized as compost**, thus reducing the amount of plastic in the environment is guaranteed.



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The INZEA® range of biopolymers offers multiple options for the agricultural sector in order to evolve from the use of conventional plastics towards the use of sustainable biodegradable solutions.

## **APPLICATIONS**



Agricultural Mulch Film

Pruning and Garden Debris Bags



Clips, Guides, Seedbeds. Plant Stakes, etc.





Plant Pots



## **SOLUTIONS**



in soil



Compostable

Water Soluble



## **BAGS**

Local authorities are promoting the replacement of polyolefin-based bags. INZEA® can replace polyolefins and comply with the new sustainable regulations in force in each country. The bags manufactured with INZEA have equivalent mechanical properties compared to those manufactured from conventional plastics.

## **APPLICATIONS**



T-Shirt Bags (single use)



& Globes

Patch and Loop Handle Bags



Fruits & Vegetables Bags



Pruning and Garden Debris Bags



Bags



Dog Waste Bags

Caddy Liners





## **SOLUTIONS**



HOME & OK Compost

Up to 60% **Biobased Content** 



Food

Contact

Transparency



## **FOOD PACKAGING**

Sustainable packaging made with INZEA Biopolymers protects food, preserves its freshness and is highly attractive to the consumer. INZEA offers a wide range of biopolymers in contact with food.

After use, INZEA based packaging can be valorized as compost even containing organic remains so that everything can be composted.

#### **APPLICATIONS**





Fresh Vegetable Bags

Laminated and Barrier Thermoformed Packaging Trays



Paper Coating



Paper Laminating



Films

Sealability





Lids





HOME & OK Compost



Heat Resistance Barrier Solutions



Transparency



Lamination

Food







## **BARRIER PACKAGING**

INZEA® can now offer a solution to achieve 100% biodegradable, compostable and high oxygen barrier packaging for the correct preservation of foodstuffs. INZEA barrier grades can be tailored to customer requirements for an efficient and sustainable food preservation packaging.

One of the main problems of conventional multilayer packaging is its waste management. Avoiding multi-layers is not always possible, as technical requirements must be met to ensure the preservation of the food. Therefore, our proposal is a 100% compostable alternative that can be managed together with the food remains.

INZEA offers grades of blown film and thermoformed cast film, which in a co-extrusion process, they provide a biodegradable alternative that minimizes food waste, guaranteeing its conservation and minimizing plastic waste, since together they can be composted.





## **APPLICATIONS**







Flow Pack

Sachets

Coffee Capsules

Stand-up Poaches

## SOLUTIONS



Transparency

3 layers



5 layers coextrusion



## **O**THER PACKAGING SOLUTIONS

INZEA offers a biodegradable and compostable solution that serves as an alternative to current materials used in extrusion and injection blow moulding for the manufacture of different packaging applications.

INZEA's biopolymers offer properties equivalent to those of conventional plastics, being biodegradable and compostable at the end of their life cycle, and can be disposed of in the organic waste bin. In addition, INZEA is Food Contact approved.

#### **APPLICATIONS**





Fruits and Vegetable Neets

Delivery Bags



Protective Cushioning



Single use Crockery, Cutlery and Straws









Compostable Bowls and Plates



## SOLUTIONS



HOME & OK Compost

Water Solubility



Food

Contact

Transparency

## **SINGLE USE ITEMS**

We use plastic cutlery and plates, masks or other single-use items on a daily basis, in order to avoid cleaning after use, to minimize the risk of disease transmission or simply for convenience. Therefore, its consumption has increased. However, this increase generates a negative environmental impact due to the incorrect management of its waste once its useful life has ended.

INZEA offers compostable biopolymers to replace conventional plastics and thus solve the problem generated by waste from single-use products.

#### **APPLICATIONS**



Coffee Capsules



Single use Crockery, Cutlery and Straws



Compostable Blowls and Plates



Detergency and Phytosanitary Pods







## SOLUTIONS

Non Wovens



HOME & OK Compost



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Heat Resistance



# INZEA® Special Grades

## INZEA® BIOPOLYMERS MATERIAL SUBSTITUTION

INZEA is a range of biopolymers which can replace traditional plastics in different applications such as bags, mono-use items and packaging, with the advantage of biodegradation or being able to be converted into compost.

Our sustainable polymers have the **same functionality as conventional polymers** and are specially recommended for applications such as single use packaging, disposable single-use or items with complex collection processes e.g. mulch films, catering materials and certain packaging types. The main advantage is that at the end of their useful life, INZEA products can be valorized even when containing organic remains. It does not matter if the product is stained with food, everything will be composted.

INZEA's portfolio offers a wide range of **flexible and rigid grades**.

INZEA product range offers a variety of grades, with different flexibility, transparency and other technical properties such as **sealability and thermal shrinkage** that can be processed on standard blown film, cast film, blow moulding, injection moulding, filament and thermoforming extrusion lines.

**INZEA flexible grades** are suitable for applications such as, flexible and transparent packaging, paper laminating, paper-like, paper coating, mulch film, shrink film and thermoforming.

INZEA rigid grades are bio-based polymers with a renewable content 40 from 85% and they can be processed in conventional equipments for polyolefins or styrenics. Its use is recommended in applications with a short lifespan or in applications difficult to collect once they are used. Disposable items for the hospitality industry such as trays, bowls, plates, cups and cutlery, coffee capsules or various products used in agriculture, such as clips or garden pots, are safe bets for a change.

INZEA also offers grades with **thermal** resistance up to 156°C; microwave food containers, **coffee capsules** or hot food containers are the perfect applications for the INZEA High Temperature grades.



## INZEA® BIOPOLYMERS MADE TO MEASURE SOLUTIONS

The requirements of the vast INZEA applications are just as diverse as the industries from which they come. **INZEA offers customized solutions for your applications**. Each application is unique. We work together with our customers to adapt existing product grades and to develop tailor-made products.

Thanks to many years of experience and our continuous investment in R&D development, NUREL Biopolymers can develop the most adequate INZEA solution to **match all production conditions, product requirements and biodegradability legislations**.

A **new product development** starts from a **customer request**, our technical team will analyse the end-use of the product, the processing method and its end-use requirements. We start working on the product definition, and propose a new formulations thanks to our polymer chemistry know-how.

We design the process from lab scale to industrial scale always taking in consideration the biodegradability and the bio-based content requirements. Once we confirm that the material is approved at the customer, we run an industrial production.

For any special requirement, either for injection moulding or extrusion applications, please contact us.

We work together with our customers to adapt existing product grades and to develop tailormade products

## **INZEA® BIOPOLYMERS** CERTIFICATIONS

#### **TÜV Biobased content** ASTM D6866

According to the American Society for Testing and Materials (ASTM), a biobased material is an organic material in which carbon is derived from a renewable resource via biological processes.

ASTM has set a standard method to calculate the level of biobased carbon included in a resin. INZEA® product range is partially biobased and complies with USDA Certified Biobased Product Certification based on ASTM D6866 Standard.

#### TÜV OK compost EN 13432: 2000 & ASTM D6400-12

This label guarantees compliance with EN 13432 and ASTM D6400-12, international standards for compostability in industrial composting facilities. The product has to comply with the following requirements:

- 90% of biodegradation max 6 months at 50±2°C with a 50-55% RH.
- Material with a size greater than 2mm must be <10% after 3 months.</li>
- Chemical analysis of final compost and tests of eco-toxicological effects.

#### **TÜV HOME compost**

To guarantee complete biodegradability in a garden compost heap. It refers to products that compost at lower temperatures. The product has to comply with the following requirements:

- 90% of biodegradation max 12 months at 20-30°C.
- Material with a size greater than 2mm must be <10% after 6 months.</li>
- Study and tests of eco-toxicological effects in higher plants.

#### Mulch Film Biodegradability in Soil EN 17033

EN 17033 is the first European standard on the characteristics that biodegradable mulch films must have to comply with the requirements of soil biodegradability, ecotoxicity and mechanical and optical properties.

#### Life Cycle Assessments

NUREL currently undertakes life cycle analysis of all our products under SimaPro methodology, according to the most reconized international standards.











AUSTRIA









## INZEA® BIOPOLYMERS TESTS

The European Norm on packaging compostability (EN 13432) requires that biodegradable/compostable products completely decompose in a composting setting in a specific time frame, leaving no harmful residues behind. In order to ensure this, the norm requires the following tests:

#### Test on biodegradation.

Chemical breakdown of materials into  $CO_2$ , water and minerals. Pursuant to the standard at least 90% of the material has to be broken down by biological action within 6 months.

#### Test on heavy metals content.

Volatile matter >50%, heavy metals (Cu, Zn, Ni, Cd, Pb, Hg, Cr, Mo, Se, As) and fluorine below limit.

#### Test on disintegration.

Physical falling apart of the product in small fragments.

#### Test on ecotoxicity.

Measures if the composted product does not exert any negative effect on plants.

#### FOOD CONTACT

All our INZEA<sup>®</sup> product range complies with regulation 10/2011, so it is **suitable for Food Contact** taking under consideration some restrictions on use conditions and type of food.

NUREL is **FSCC 22000 certified**, a food safety system which assures the compliance with Good manufacturing Practices.

#### Test on disintegration of INZEA®



#### Test on ecotoxicity of INZEA®



#### **GMO FREE**

Genetically Modified free self declaration grades are **available upon request.** 

Please contact our Technical Department for further information.

INZEA® products conform with the international standards for composting and biobased content



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