

# Sustainable bio-lacquer from tomato by-products for food metal packaging



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**SSICA**, Experimental Station for the Food Preserving Industry, is a **Research Institute**, established in Parma in 1922.

SSICA activities focus on applied research regarding the production chain in the agro-food sector and food processing industry.

SSICA has about 100 employees in 2 locations, Parma and Angri (SA).



The **Packaging department** focuses its activity on the hygienic-sanitary control, as well as on the correct functioning of the containers and of the materials involved, in relation with their construction characteristics and operating conditions for use.

BIOCOPAC

BIOCOPAC *Plus*

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Each year in the EU-28 more than **200,000 tonn** of solid tomato residues (peels and seeds) are produced.

### THE KEY IDEA

Starting from tomato residues to formulate a **bio-based lacquer** to protect metallic cans and closures.

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FP7-SME-2011 GA 286446 **BIOCOPAC**: *Development of tomato bio-based coating from tomato processing waste intended for metal packaging (2011-2014)*

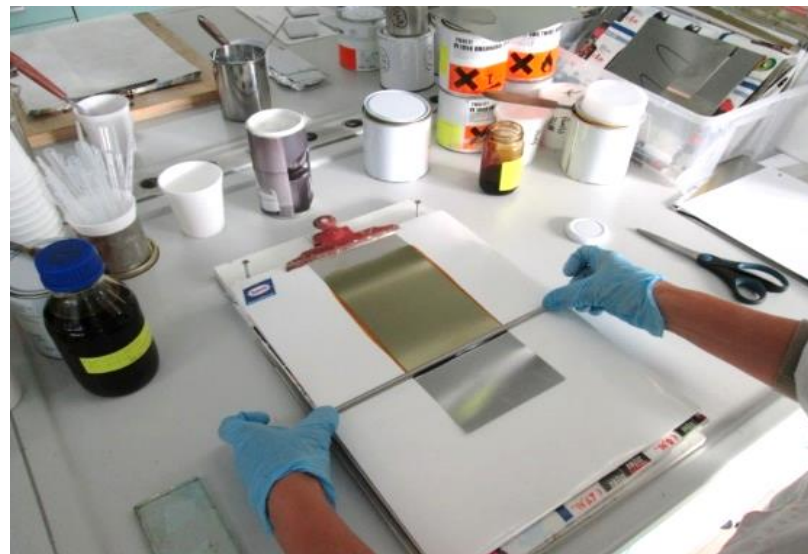
The initial substance is **cutin**, a component of the cuticle of the tomato peels

Tomato cutin is a **natural polymer of polyester type**

The main component of tomato cutin is the **10,16 dihydroxyhexadecanoic acid** (70-80%), starting substance for the polymerization

## Project Development

- ✓ Formulation of a **new bio-lacquer** at laboratory scale
- ✓ Application of the bio-lacquer on tinplate and aluminium
- ✓ Evaluation of the **chemical** and **mechanical properties**
- ✓ **Compliance** with the Italian and European legislations: the global and specific migrations are under the law limits



# BIOCOPAC<sup>Plus</sup>

LIFE + 2007-2013 Eu Funding for the Environment, LIFE13 ENV/IT/000590

***BiocopacPlus: Sustainable bio-based coating from tomato processing by-products for food metal packaging (2014-2017)***

## Objectives:

- ✓ Build up a **semi-industrial plant** for cutin extraction
- ✓ Evaluate the process efficiency in terms of yields and costs
- ✓ Demonstrate the feasibility of the extraction process and the **bio-lacquer production**



azienda agricola  
VIRGINIO CHIESA



Production site: Azienda Agricola Virginio Chiesa, **Canneto sull'Oglio** (MN)

- ✓ Pilot plant capacity: **100Kg/h**, equal to 10-20% of a future industrial line
- ✓ Extraction efficiency: sugars and fibers content in the final cutin **< 0.5%**
- ✓ Yield of extraction: **10-15%**



Test performed	Skins processed	Cutin extracted
35	5050 Kg	<b>245-250 Kg</b>



## Project Development

- ✓ Formulation of the **new bio-lacquer** at **pilot scale**
- ✓ **Industrial application** on aluminium, tin free steel and tinplate
- ✓ **Industrial production** of 2 and 3 pieces cans and open top ends
- ✓ Evaluation of the **chemical** and **mechanical properties** and **compliance** with the Italian and European legislation
- ✓ **Filling** of the cans with tomato, meat and legumes for **shelf life** evaluation





**BBI H2020 AGRIMAX** – *Agri and food waste valorisation co-ops based on flexible multi-feedstocks biorefinery processing technologies for new high added value applications (2016-2020)*

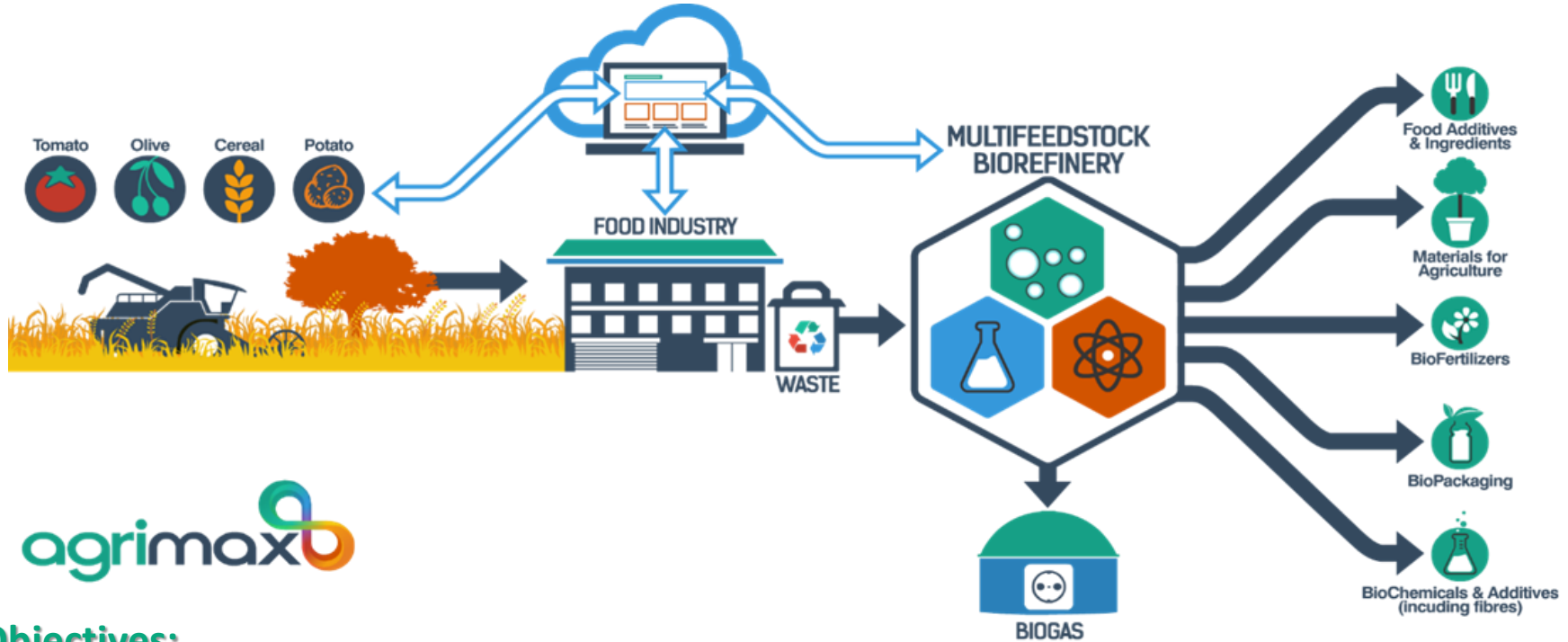


The whole supply and value chain is covered thanks to:

- ✓ **11 RTDs**
- ✓ **18 industrial partners**  
(12 SMEs and 6 large enterprises) of which 5 are multipliers



3 partners are **BIC members** and 8 **associated BIC members** to maximise the alignment with the BBI programme



## Objectives:

- ✓ demonstrate **the technical and economic feasibility of combined flexible biorefinery processes** for valorising crops & food processing wastes
- ✓ maximise the economic and environmental sustainability of the EU **agricultural and food sectors** while providing new **products to the food, packaging and agriculture sectors**

## Italian Biorefinery: wastes employed and products obtained



- ✓ Cutin
- ✓ Lycopene
- ✓ Compost and hydrocompost
- ✓ Biogas

Agro-industrial tomato wastes  
(peels, green and discarded tomatoes, plant  
residues)



- ✓ Fibers
- ✓ Ferulic acid

Industrial cereal wastes (wheat bran)

## Conclusions

- ✓ Formulation of the new bio-lacquer based on cutin extracted from tomato peels at **laboratory scale**
- ✓ Evaluation of bio-lacquer properties



**BIOCOPAC**

- ✓ Formulation of the bio-lacquer based on cutin at **pilot scale**
- ✓ **Industrial application** of the bio-lacquer and production of 2 pieces and 3 pieces cans
- ✓ **Shelf life** evaluation



**BIOCOPAC** *Plus*

- ✓ **Improvement** of the bio-lacquer formulation
- ✓ **Industrial application** of the bio-lacquer and production of 2 pieces and 3 pieces cans
- ✓ **Shelf life** evaluation



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# Thanks for your attention

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