Spanish Pilot Plant - SPP

From by-products to food ingredients and bio-fertilizers

Antonio Cruz-Bañeres - INDULLEIDA 07/01/2021

Horizon 2020 European Union Funding for Research & Innovation

BIO-BASED INDUSTRIES

Bio-based Industries Consortium

This project has received funding from the Bio Based Industries Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement No. 720719.

WHY AGROINDUSTRIAL PILOT PLANTS?

- ***One third*** of ***food is wasted*** globally: ***1.300 MT/year***.
- Europe wastes *89 MT/year:* ***180 kg/year*** per European citizen.
- ***European Union*** is the ***first global food exporter*** and the second global importer after EEUU.

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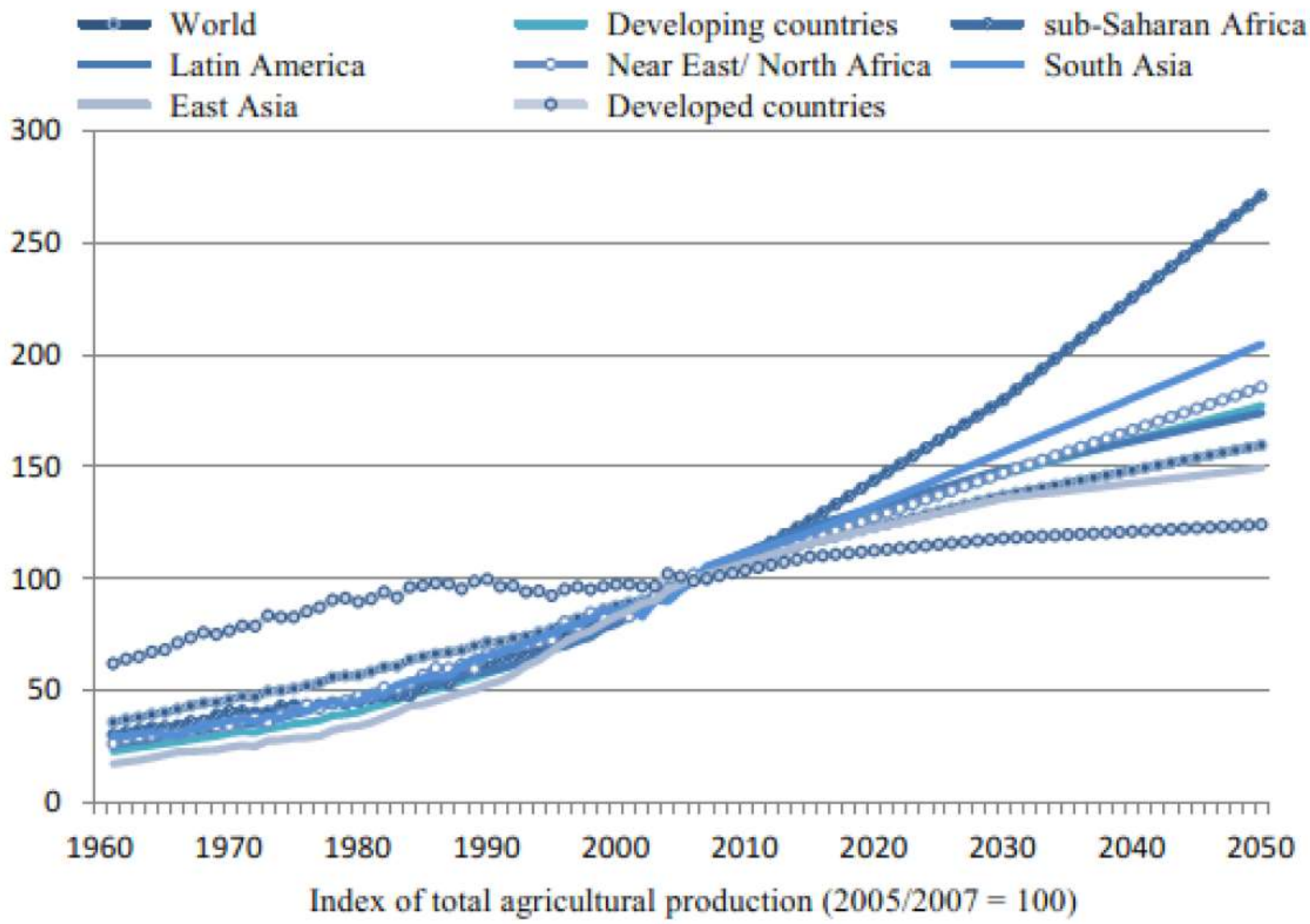
FOOD PRODUCTION (FAO)



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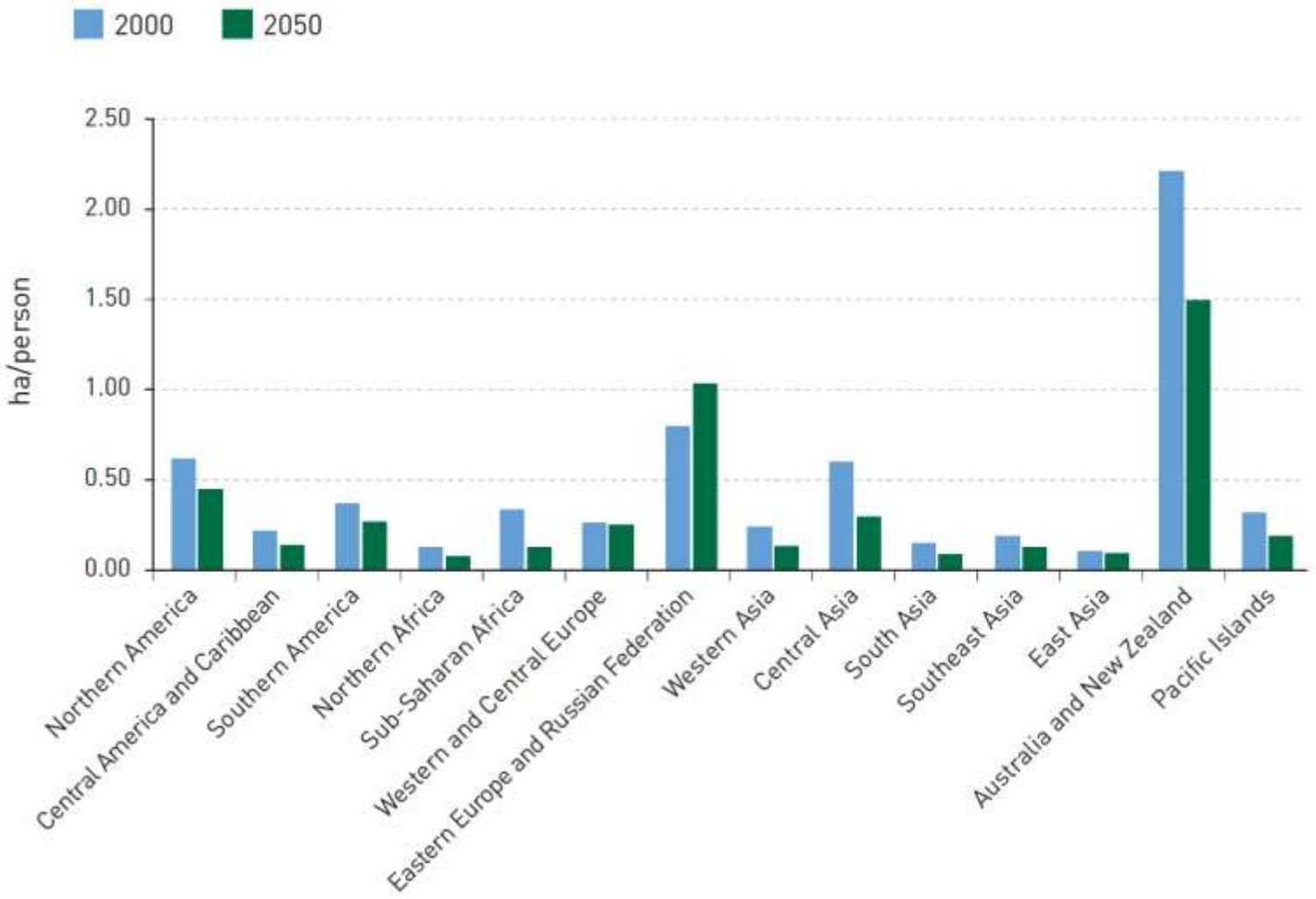
FOOD PRODUCTION VS NATURAL RESOURCES

Cultivated land per capita (FAO)



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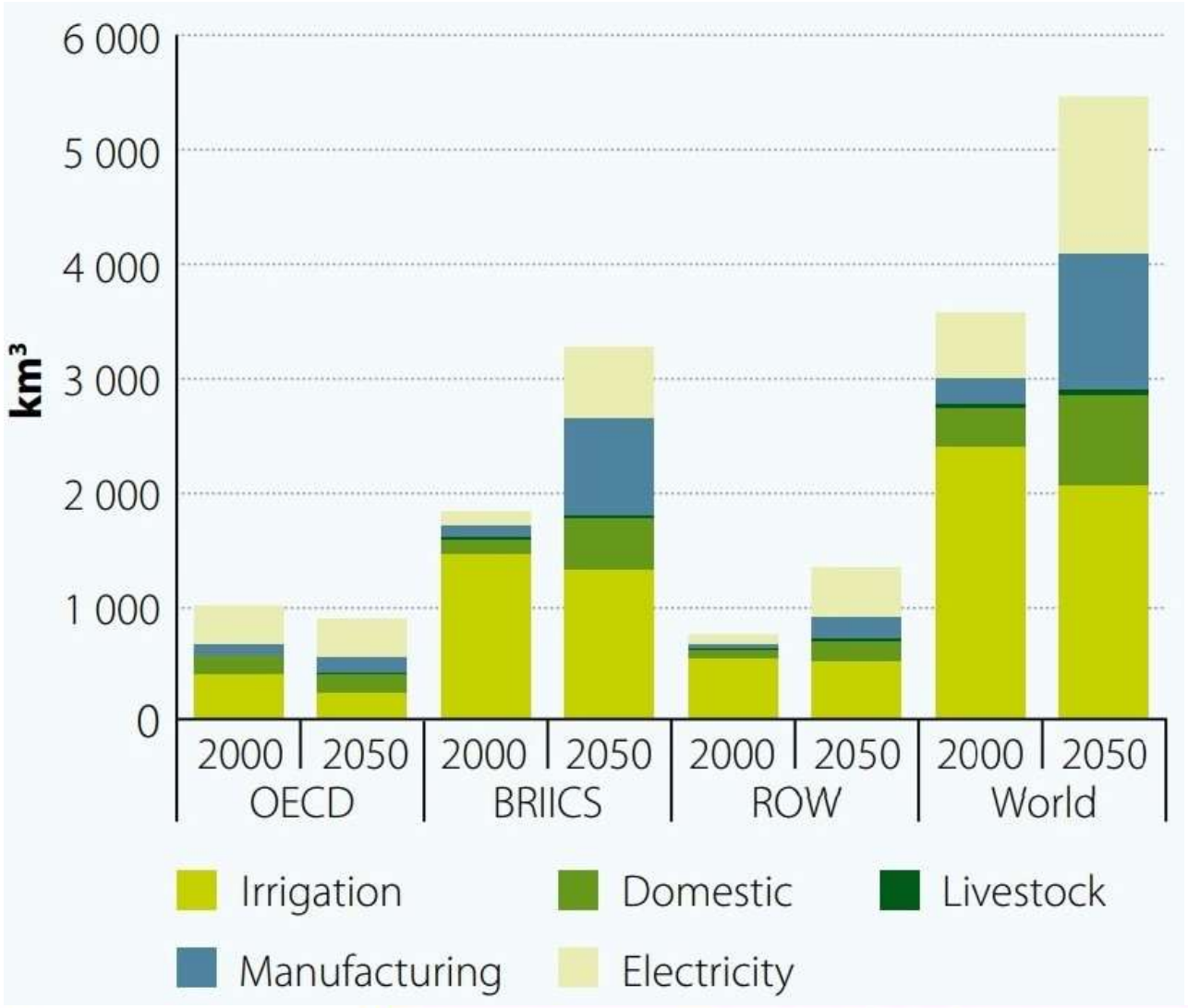
FOOD PRODUCTION VS NATURAL RESOURCES

Global water demand (UNESCO)



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BIOECONOMY GOALS

- Incorporate ***new processing technologies***, ***preserving organoleptic and nutritional properties***.
- Incorporate in the ***new food ingredients*** convenience and functionality, promoting ***consumers health***.
- Promote a ***value chain problem solving approach***.
- ***Improve*** natural resources use ***efficiency*** (water, soil,…).
- ***Intensify*** production and ***sustainability***.
- ***Minimize food waste recovering*** residues and ***by-products***.

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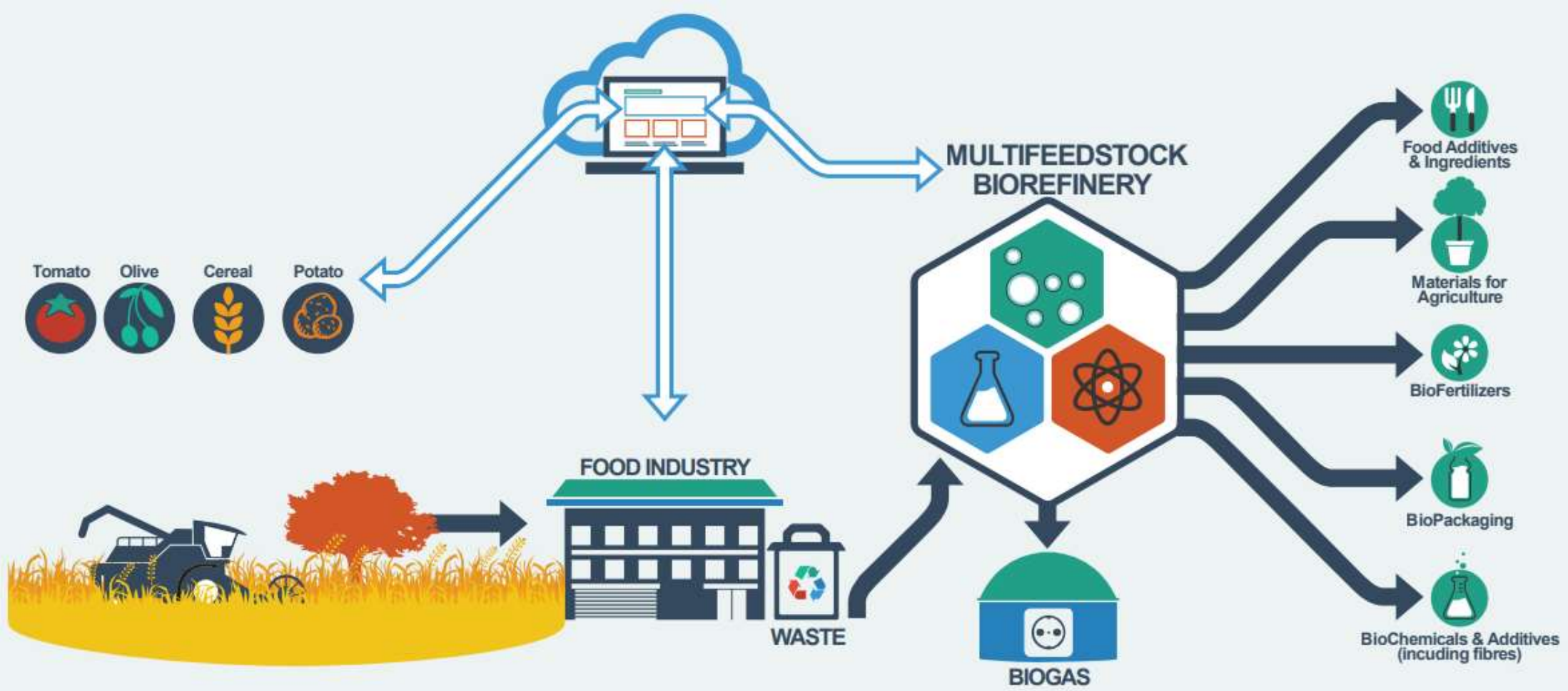
AGRIMAX OBJECTIVES: NEW PRODUCTS AND PROCESSING TECHNOLOGIES



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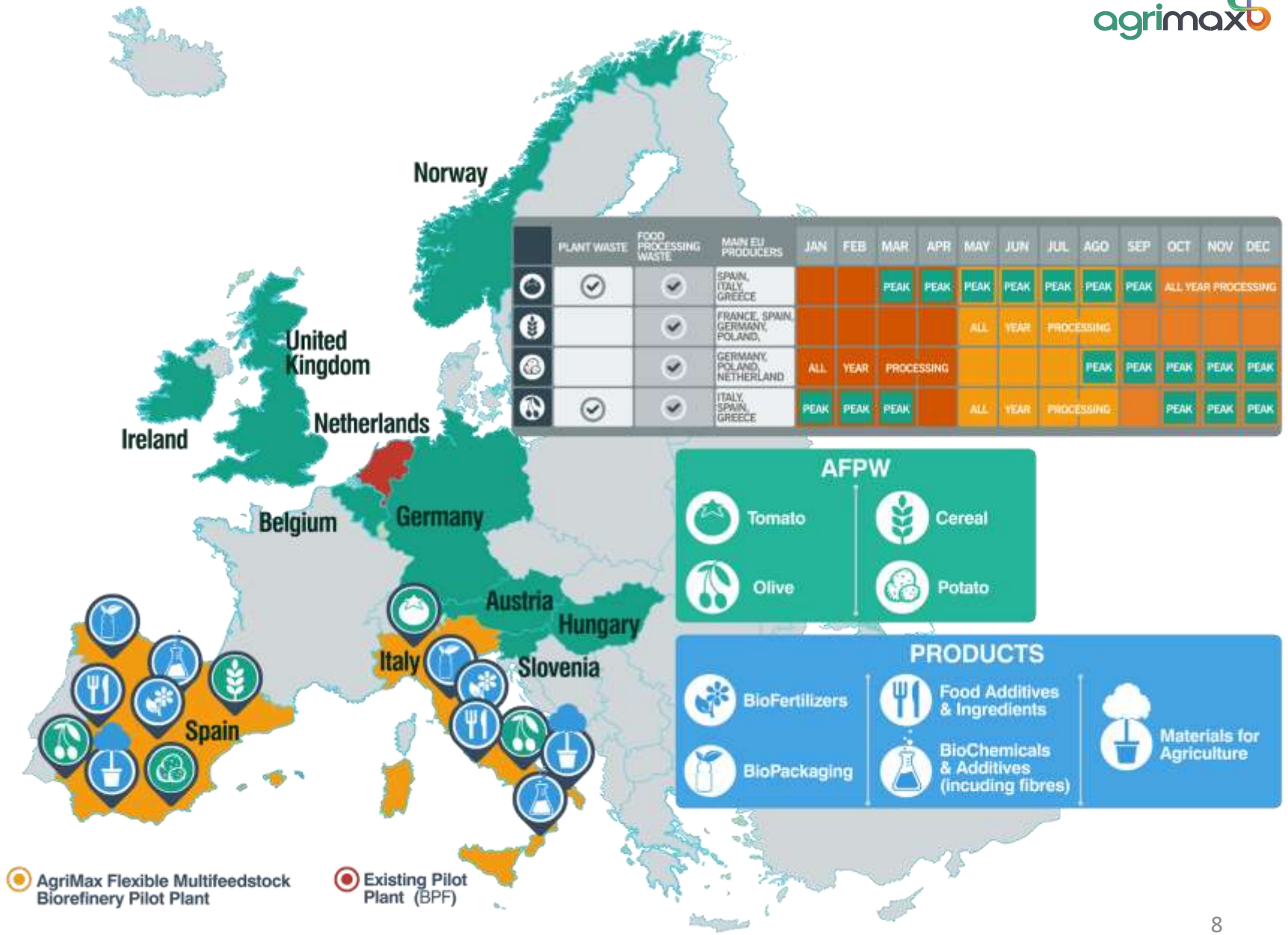
Demonstration project

Two pilot plants to prove the viability of the proposed approach.



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Collaborative working

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SPP BIOECONOMIC KEY RESULTS AND ACHIEVEMENTS

- ✓ Multi-feedstock and multi-product pilot plant: demonstrated feasible in an operative environment.
- ✓ Scale-up plant modeled.
- ✓ 8 High added value food ingredients in cascade: natural polyphenols, carotenoids and aromas from different by-products.
- ✓ 2 enhanced raw materials for: bio-fertilizers and bio-stimulants.
- ✓ Zero waste: just water 'emissions' after processing by-products.

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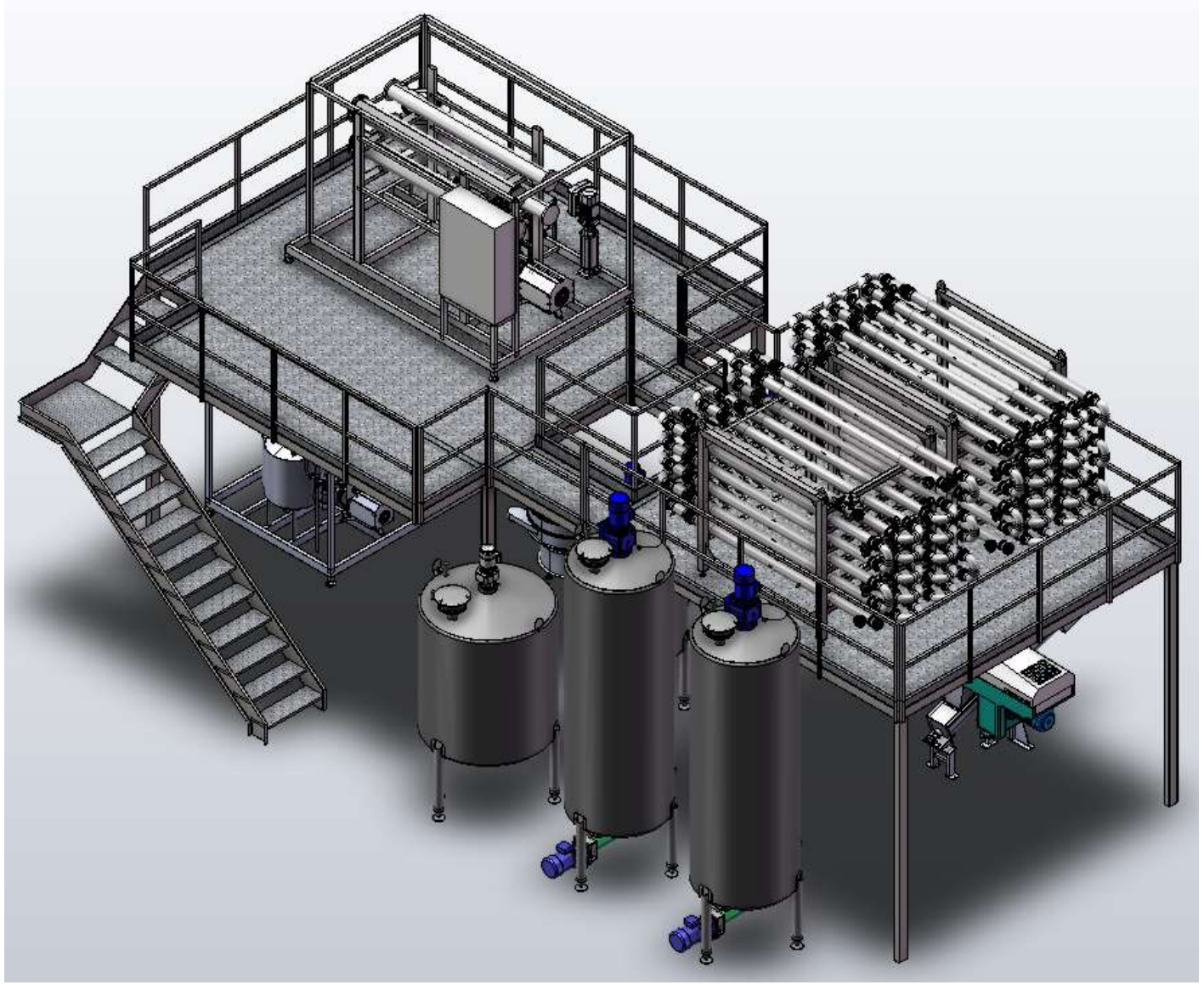
SPP ENGINEERING



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SPP BUILDING

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SPP START-UP TRIALS

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CEREALS AND POTATOES BY-PRODUCTS TRIALS

- *Cereals by-products* processed at *ITENE's pilot plant* to obtain *compounds for bio-materials.*
- *Potato peels* require *further research* to obtain *high value compounds*.
- *Potato juice by-product protein* obtained at lab scale requires *further research* to be supplied as a *food grade raw material* to the SPP.

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OLIVE POMACE *INITIAL* TRIALS

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SPP OLIVE POMACE *INITIAL NEW* INGREDIENTS & BY-PRODUCTS

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SPP ACHIEVING *BIOECONOMIC* PROCESSING TRIALS

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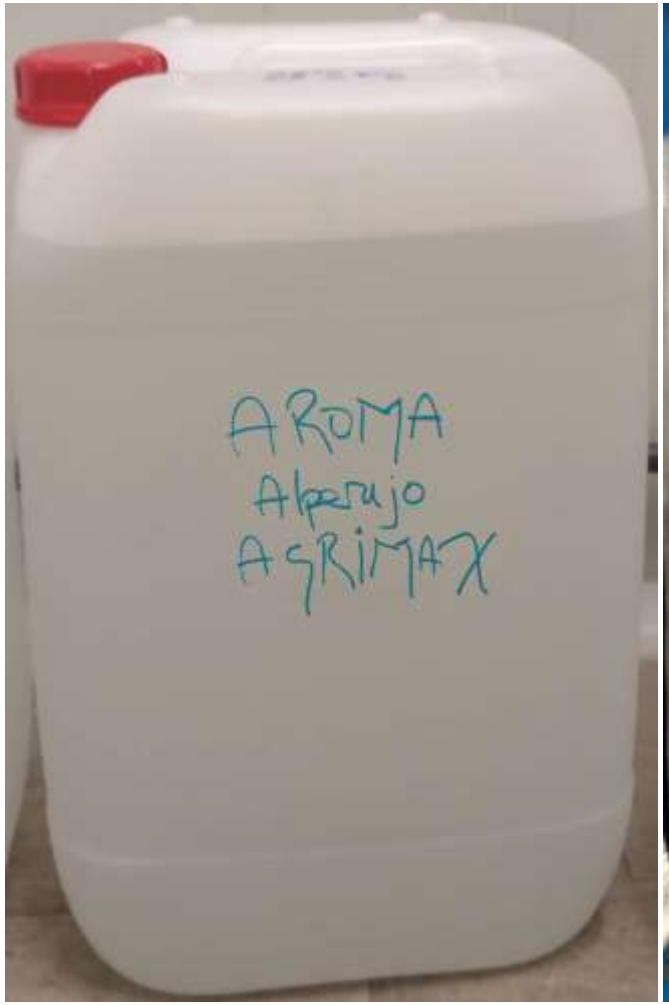
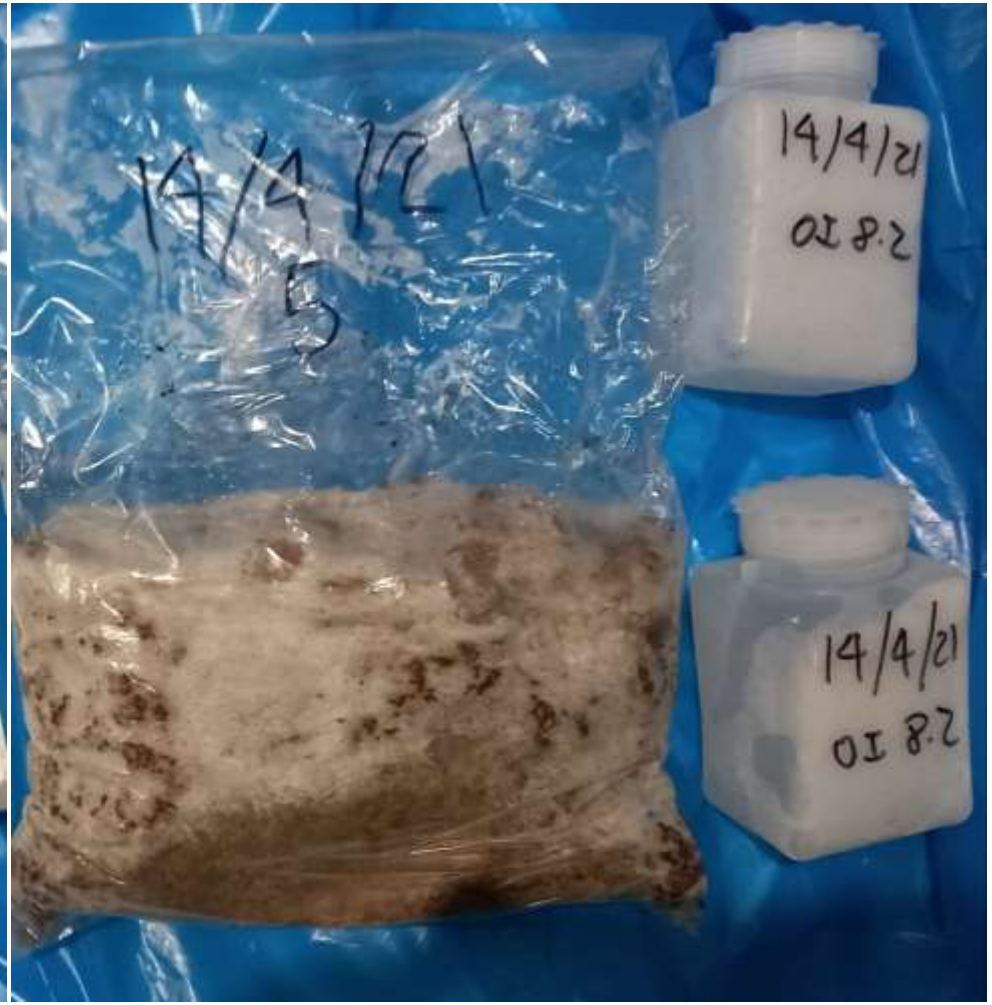
SPP OLIVE POMACE *NEW BIOECONOMIC* INGREDIENTS & BY-PRODUCTS





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OLIVE POMACE SPP BIOECONOMIC BY-PRODUCTS FOR BIO-FERTILIZERS

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REJECTED FRESH TOMATOES TRIALS

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REJECTED FRESH TOMATO TRIALS

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REJECTED FRESH TOMATO TRIALS

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REJECTED FRESH TOMATOES BIOECONOMIC FOOD INGREDIENTS

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SPP BIOECONOMIC INGREDIENTS & BY-PRODUCTS APPLICATIONS

OLIVE POMACE

REJECTED TOMATOES

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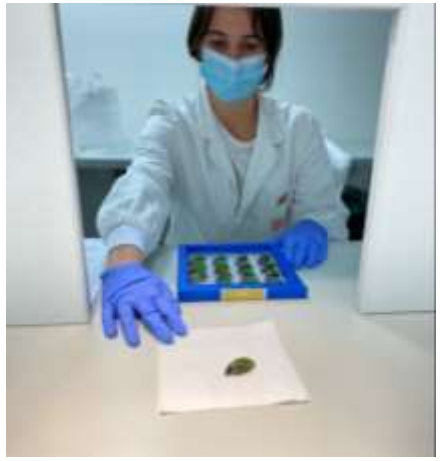
SPP OLIVE & TOMATO BIOECONOMIC INGREDIENTS APPLICATIONS TASTES



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SPP SCALE UP MODELING TRIALS: *parameters*

OLIVE POMACE

REJECTED TOMATOES

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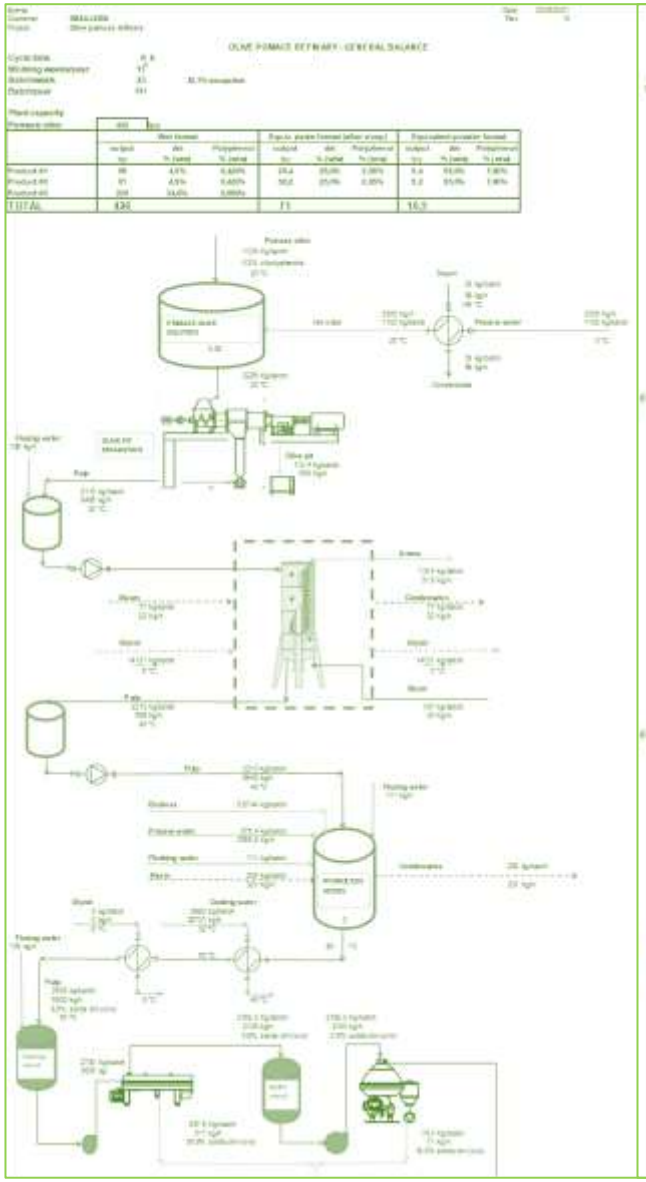
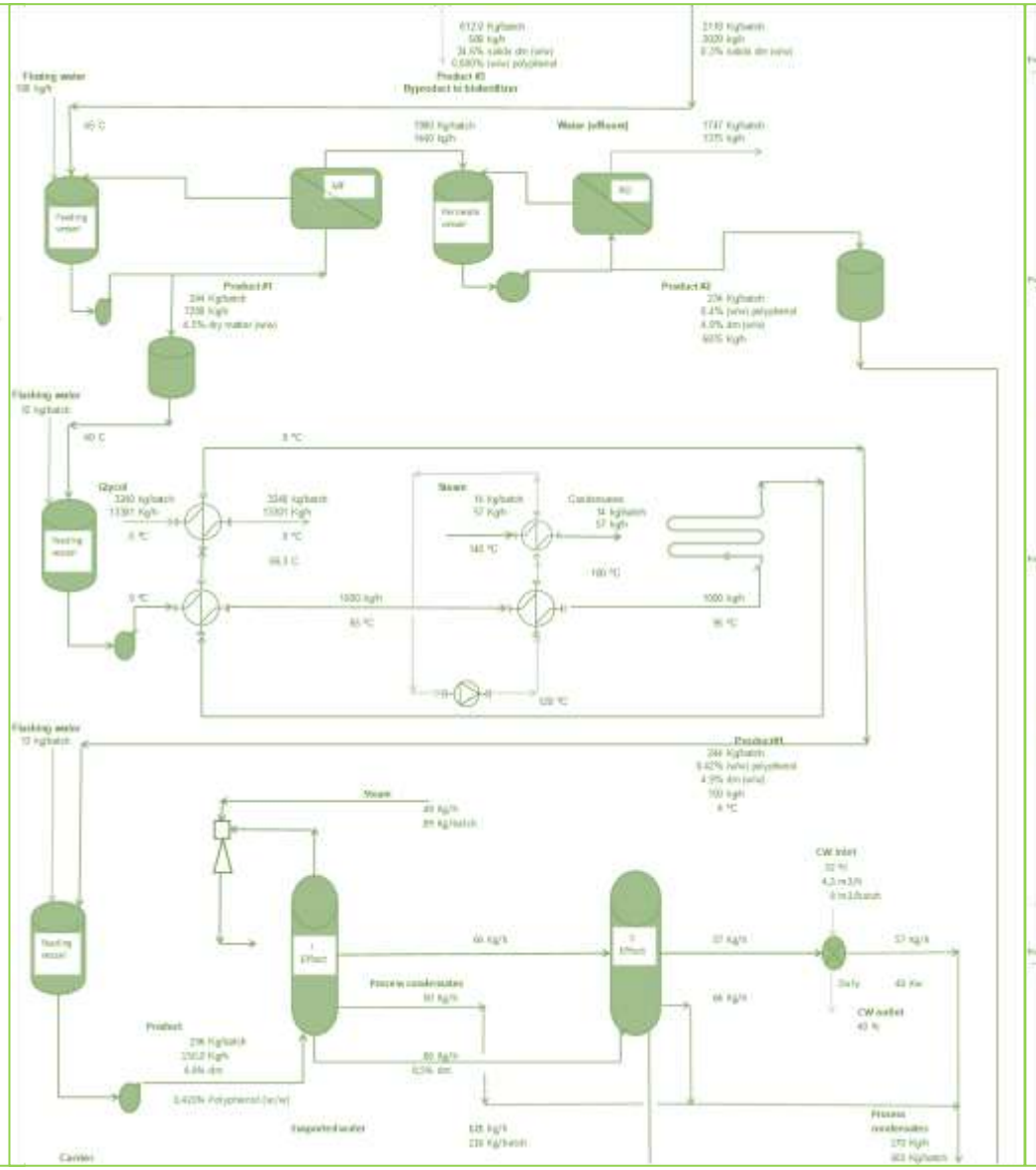
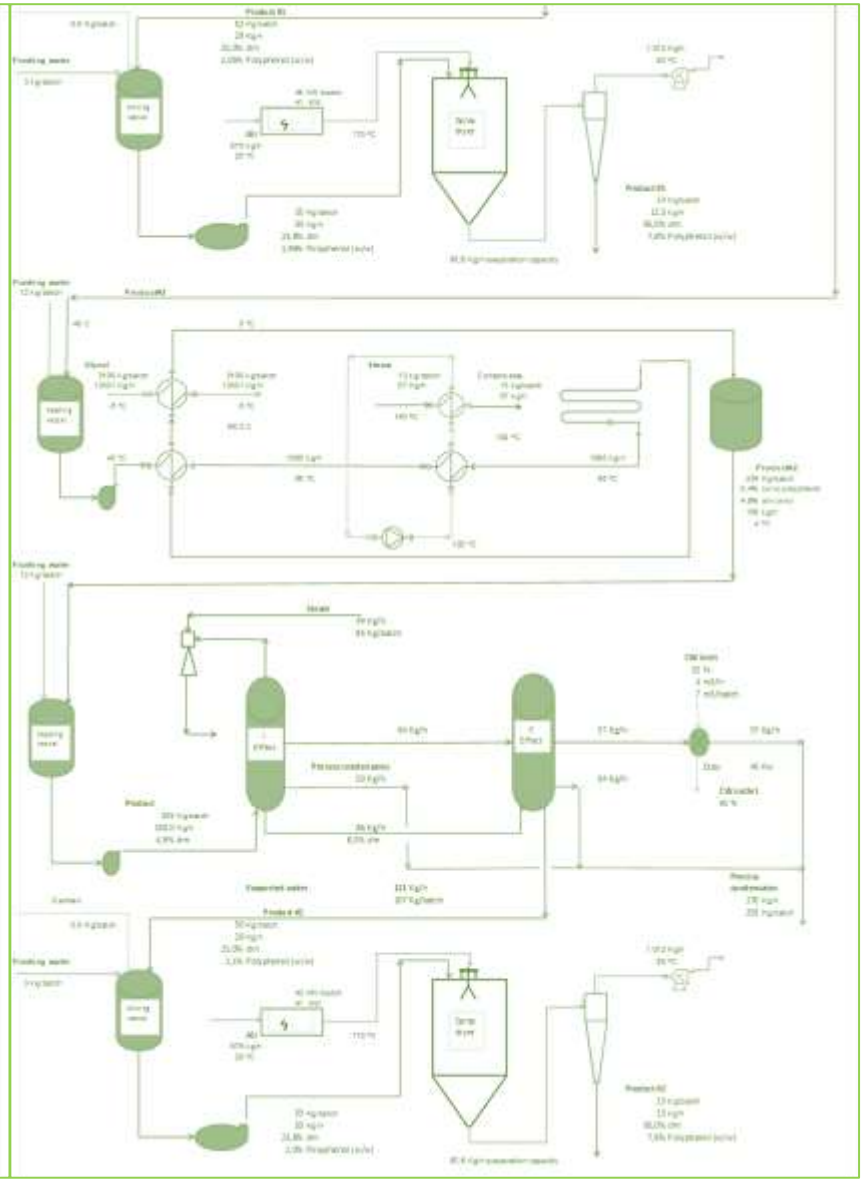
SPP SCALED UP BIOECONOMIC MODEL







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SPP MAXIMUM CAPACITY AND BIOECONOMIC SCALE-UP SIZE

- Scalable pilot plant ***demonstrated*** operative. Maximum capacity:
  440 T/year olive pomace + ***2.350 T/year*** fresh rejected tomatoes.

- Scaled up plant ***modeled***. Maximum capacity:
  9.000 T/year olive pomace + ***47.000 T/year*** fresh rejected tomatoes.

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ZERO WASTE BIOECONOMIC PROCESSING
SPP MAIN FOOD INGREDIENT: *WATER at end-of-pipe*

OLIVE POMACE

REJECTED TOMATOES

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BIOECONOMY ←→ PROJECTS (TRL 8&9) ←→ NEW SOLUTIONS

- By-products and residues stabilization processes?
- New techs to increase yields?
- Final products formats and doses?
- Pharma? Food? Fertilizers?
- Nutritional and organoleptic enhancement?
- Scaling up and commercialization trials?
- Economical and environmental ***sustainability?***

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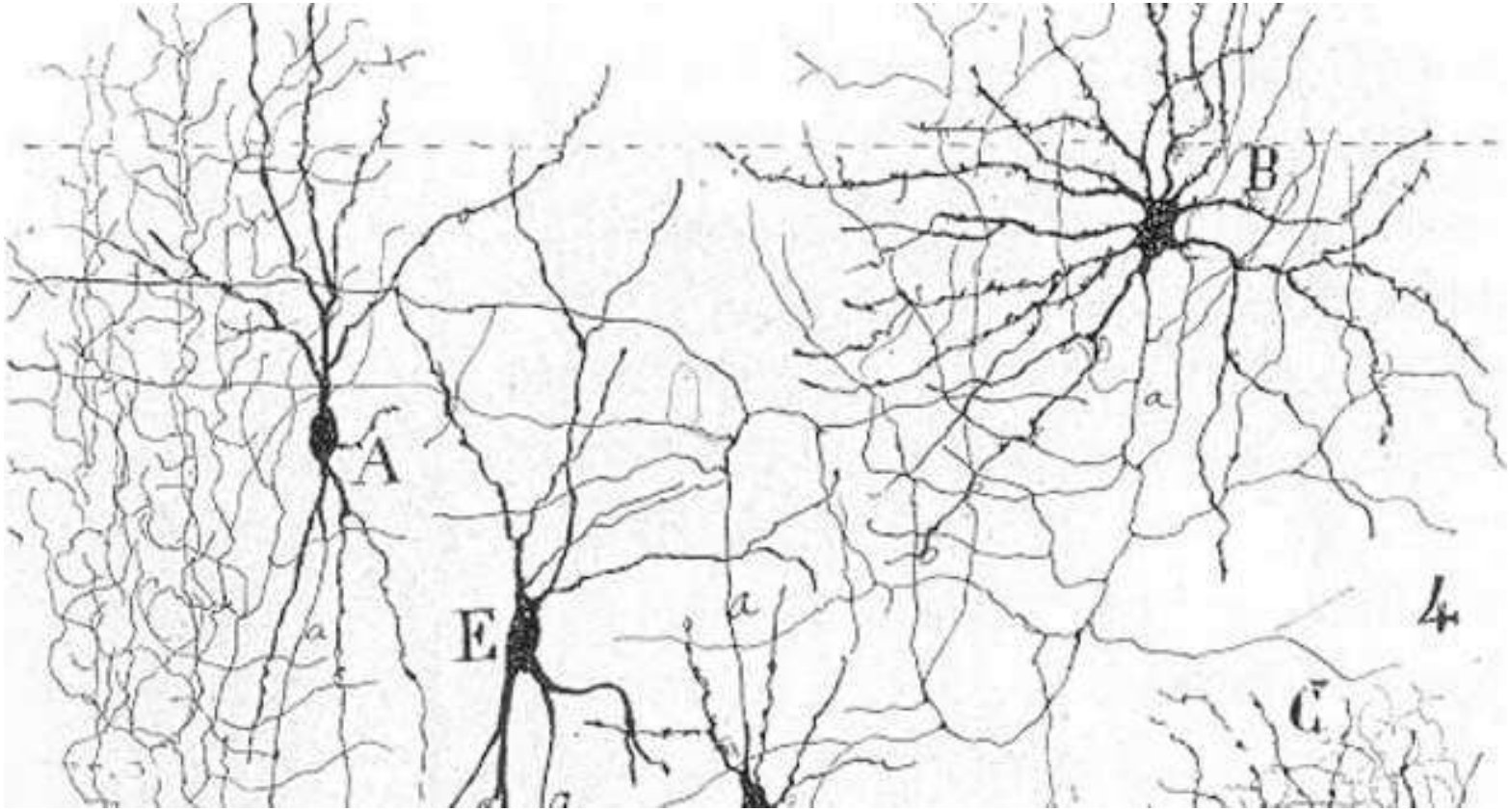

Thanks for paying attention

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