



Procesos asociados a la biorefineria, según material prima y planta piloto

Processes associated with the biorefinery and pilot plants

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Webinar sobre valorización de subproductos agrarios a través de biorefinerías

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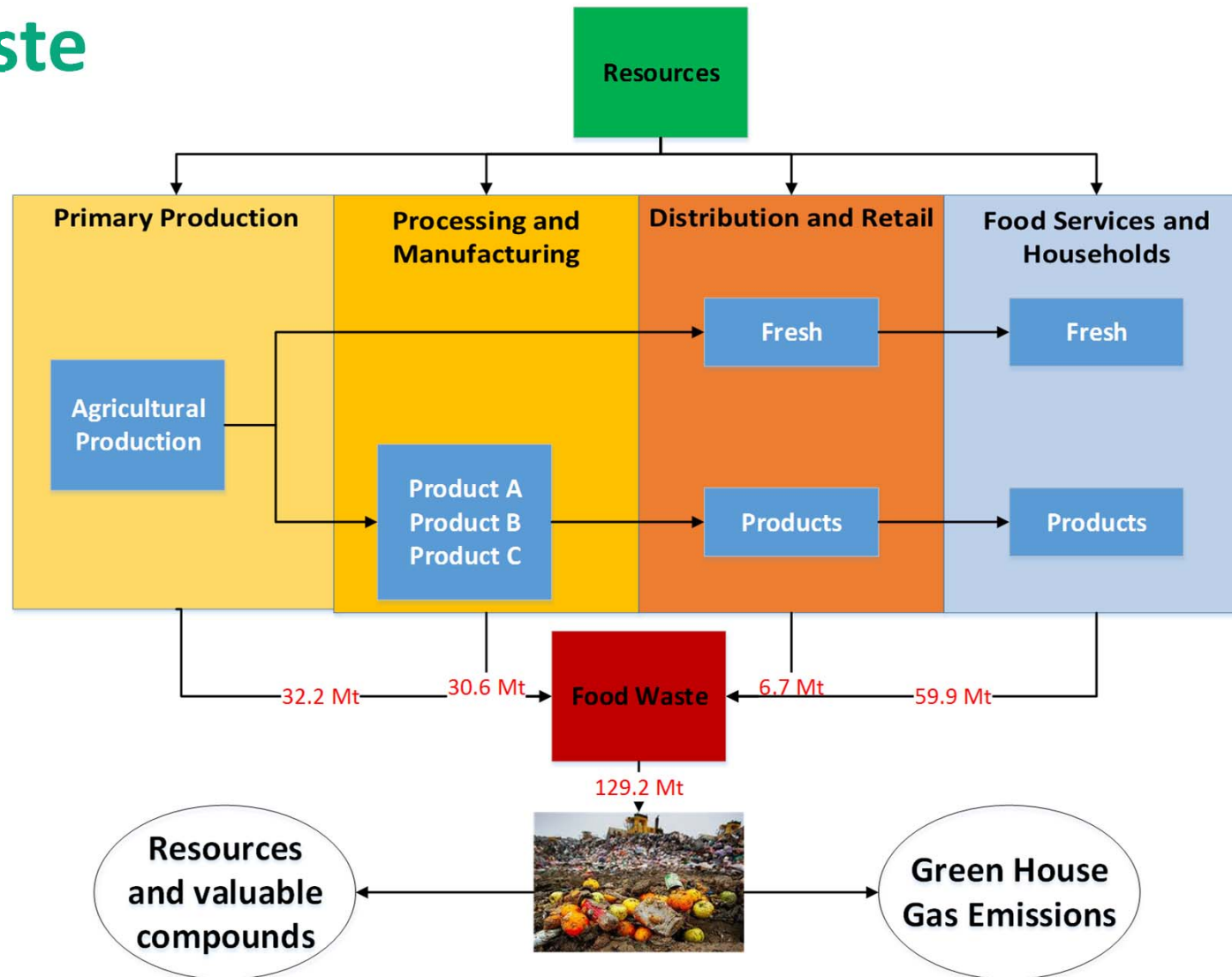


- **Food Waste**
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 - Single Processes
 - Integrated Concept
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Europe has
a food
waste problem

Food Waste



Source: Caldeira et al, 2019

Food Waste: Impact

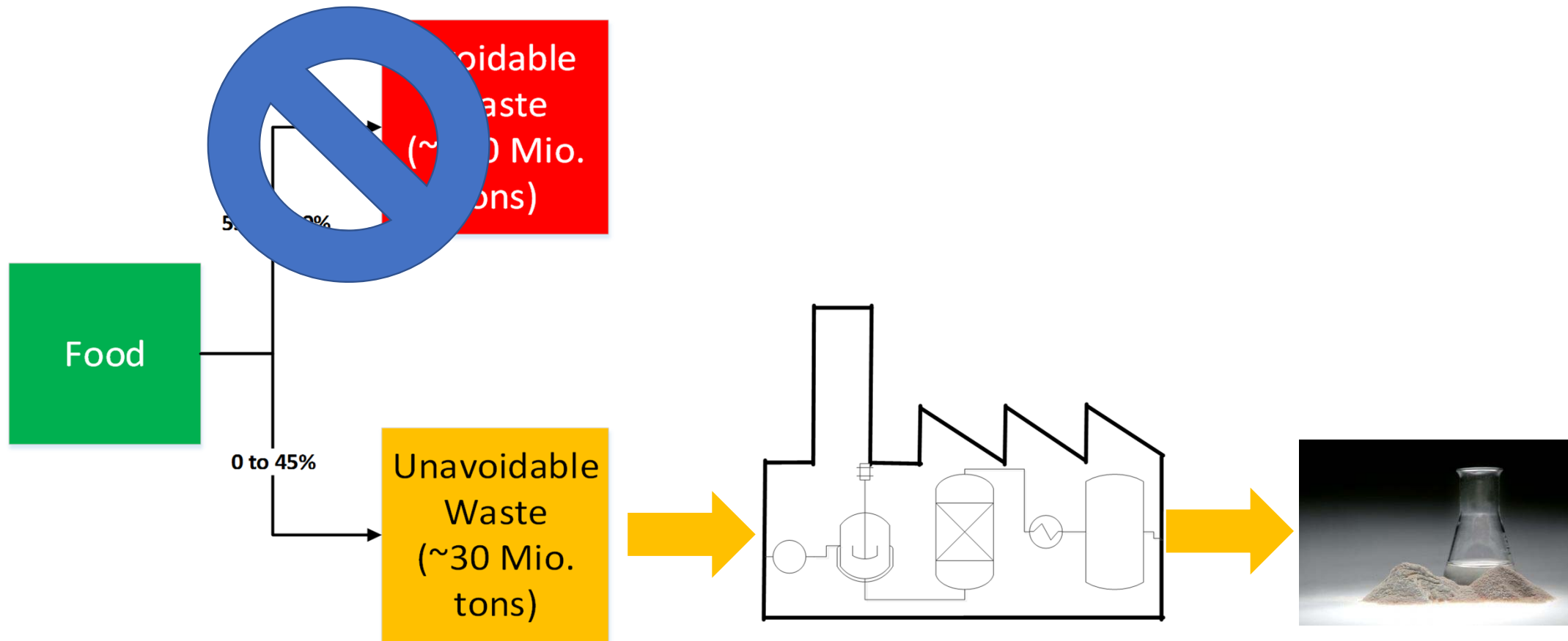


- Approx. 129.2 Mt of food are wasted in the EU each year (~20% of food produced; ~173 kg/capita)
- Food waste in Europe is associated with costs of ~143 billion Euros
- Europe's food waste would be able to nourish ~31 Mio. people
- European food waste is responsible for:
 - 8% of Green House Gas Emissions
 - 15% freshwater Use
 - 15% Cropland Use
 - 20% Nitrogen Use
 - 15% Phosphorous Use



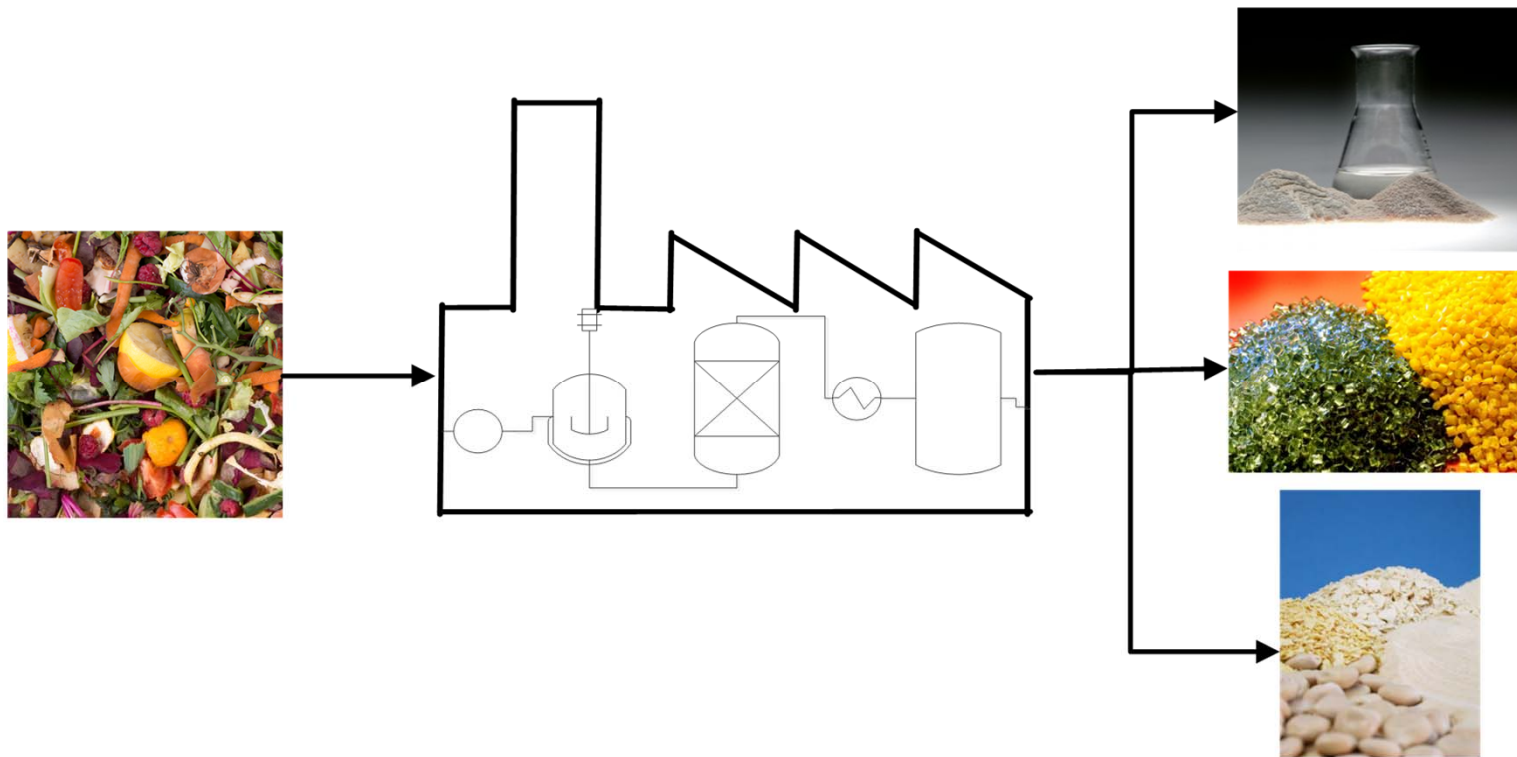
Source: Chen et al, 2020

Food Waste: What to do?



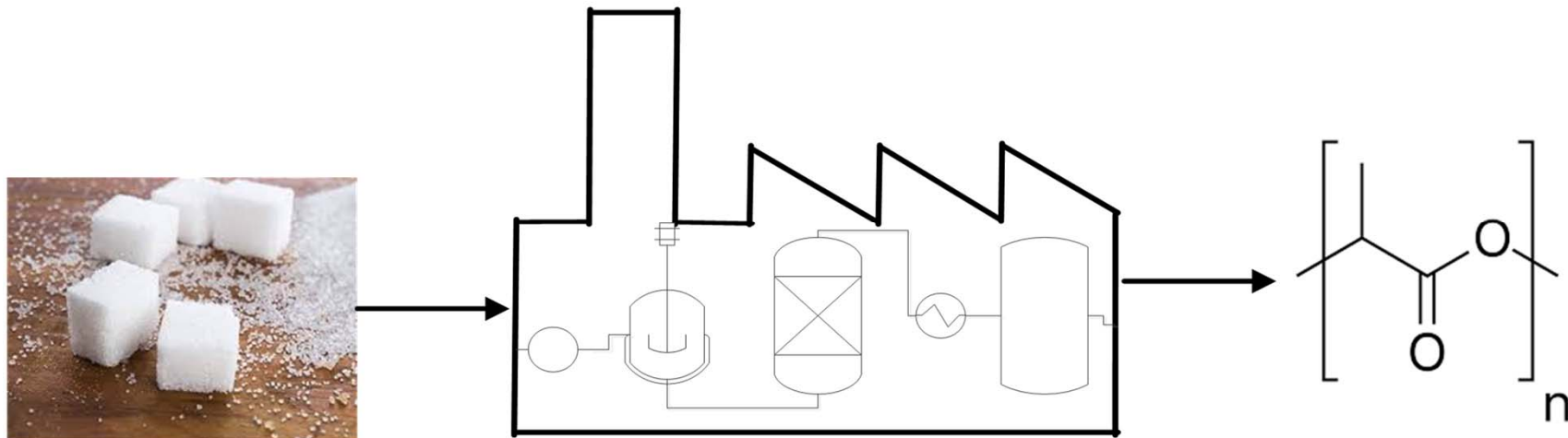
Valorization of Food Waste

What is needed:



Valorization of Food Waste

What is available:



⇒ Approach: Copy concept from oil industry

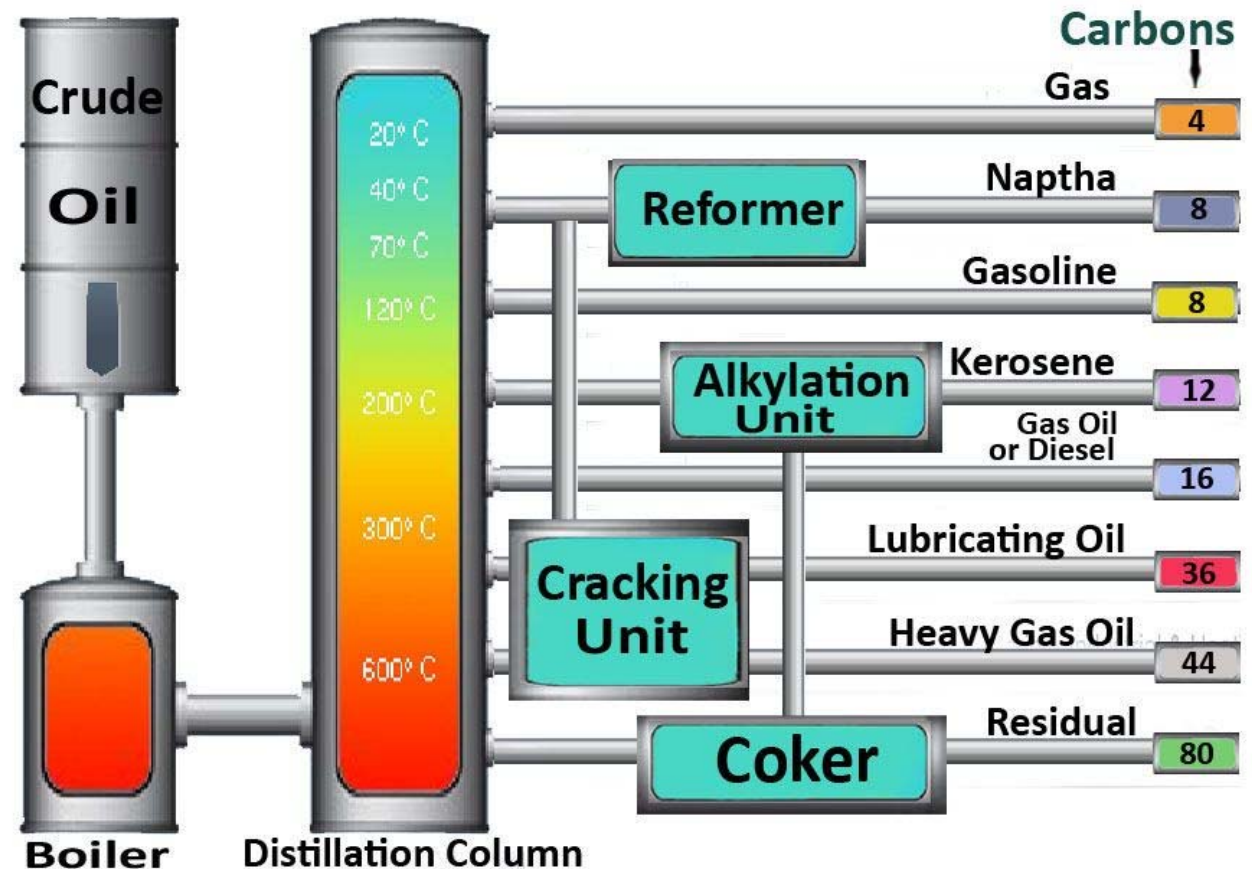
The refinery concept

Oil refinery:

- Crude (undefined) feedstock
- Highly efficient conversion and fractionation
- Several products
- (almost) No by- products



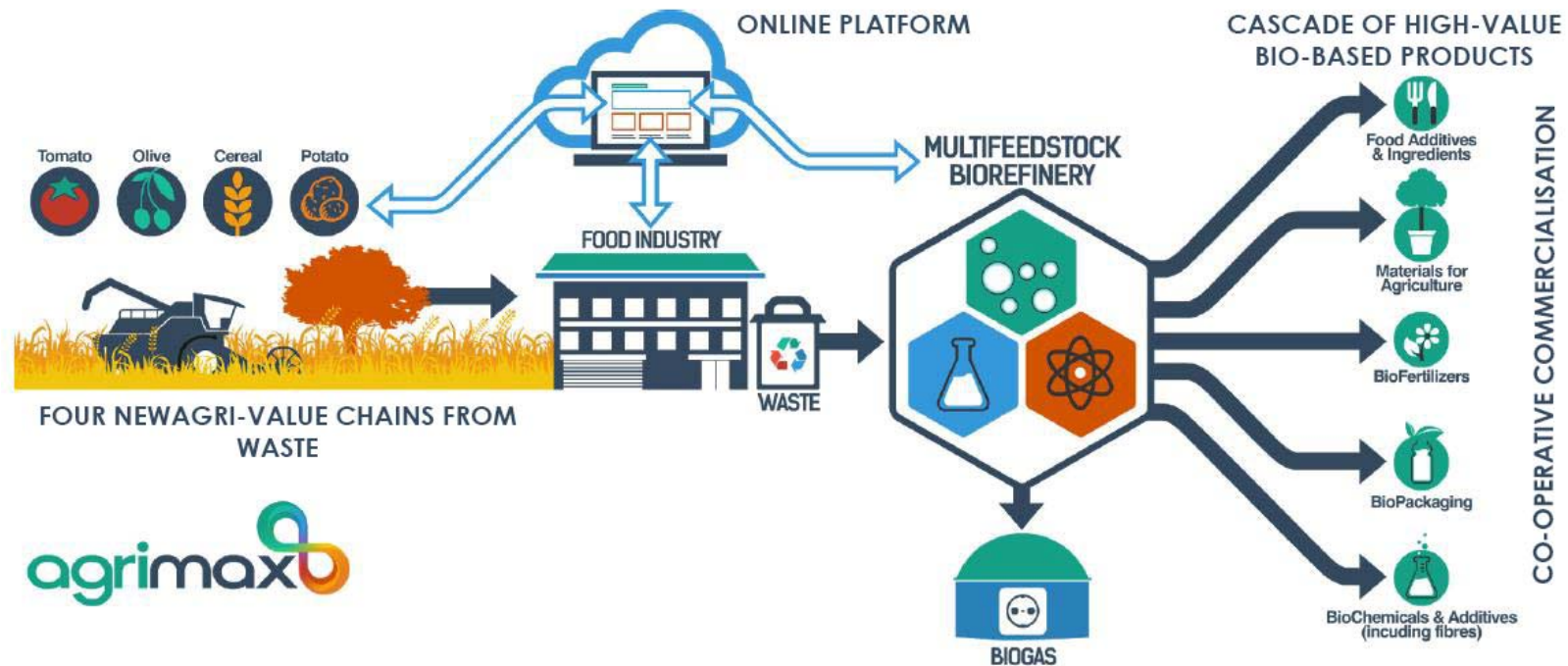
Development of Biorefineries



The AgriMax Biorefinery



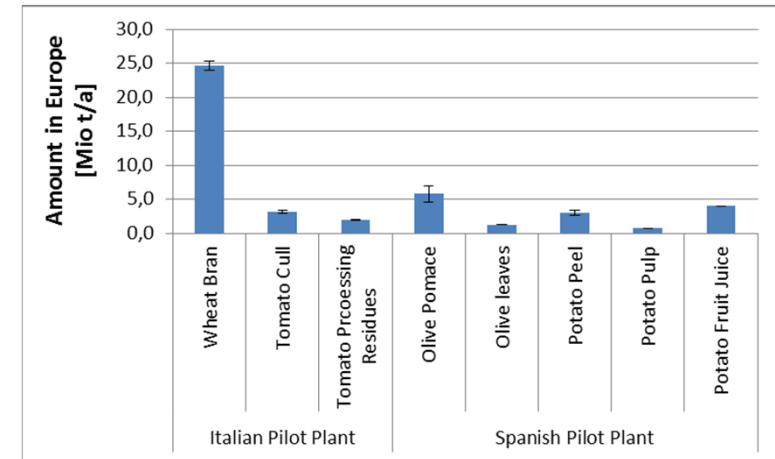
AgriMax: Two multi-feedstock multi-product pilot biorefineries



AgriMax Biorefineries



- Multiple feedstocks- Residues from processing of
 - Olives
 - Tomatoes
 - Cereals
 - Potatoes
- High volume, underutilized by-products**



- Independent from crop season

		January	February	March	April	May	June	July	August	September	October	November	December
Italian Pilot Plant	Wheat Bran												
	Tomato Cull												
	Tomato Processing Residues												
Spanish Pilot Plant	Olive Pomace												
	Olive leaves												
	Potato Peel												
	Potato Pulp												
	Potato Fruit Juice												

- Cascade approach with multiple use of equipment
- Closed material cycles
- Several products for various sectors (Agriculture, Food ingredients, Packaging, Chemicals)

AgriMax: Pilot plants



Spanish Pilot Plant

Indulleida SA, Lleida

Processing of olive and potato residues

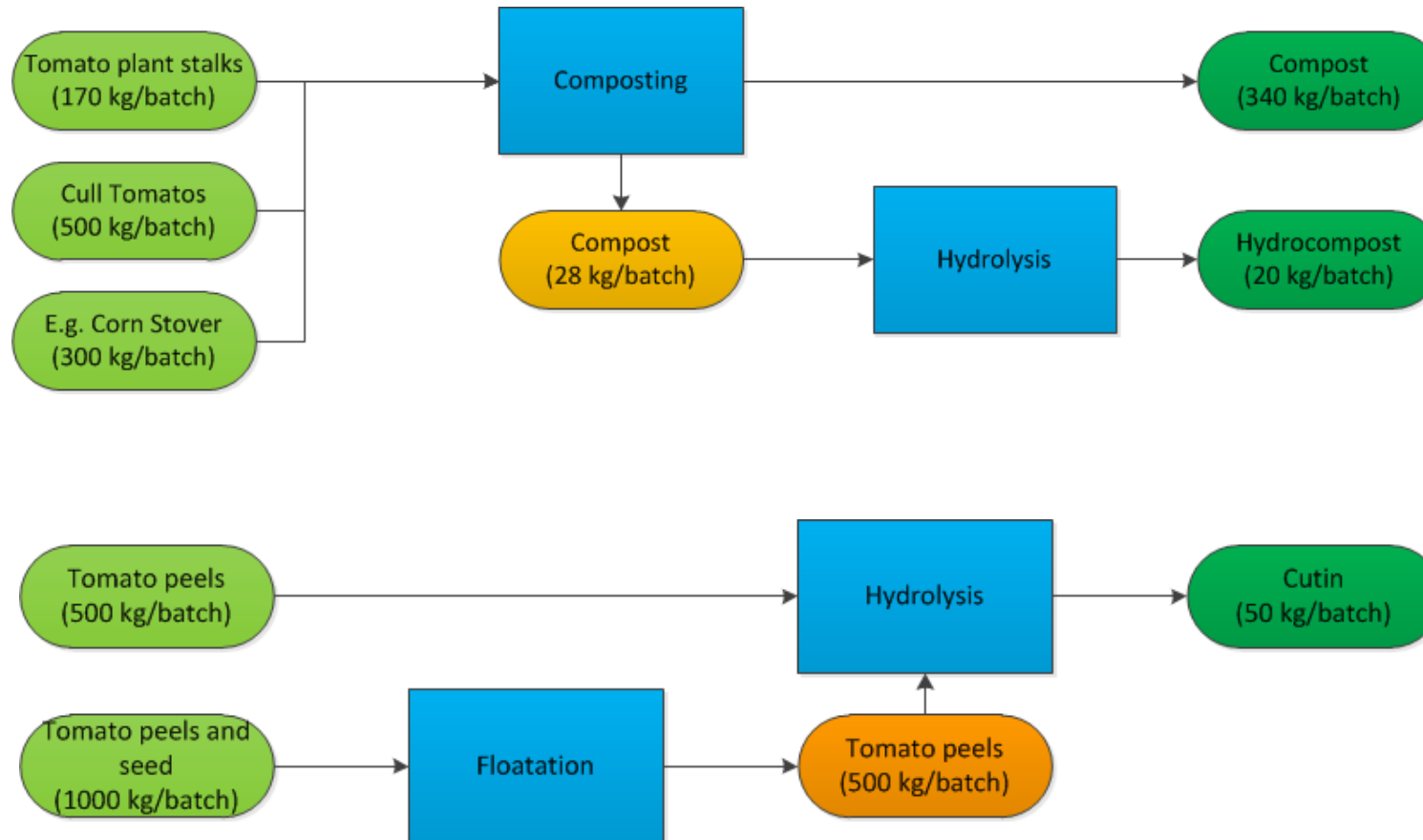


Italian Pilot Plant

Chiesa Virginio, Canneto sull'Oglio

Processing of tomato and cereal residues

Italian Pilot Plant

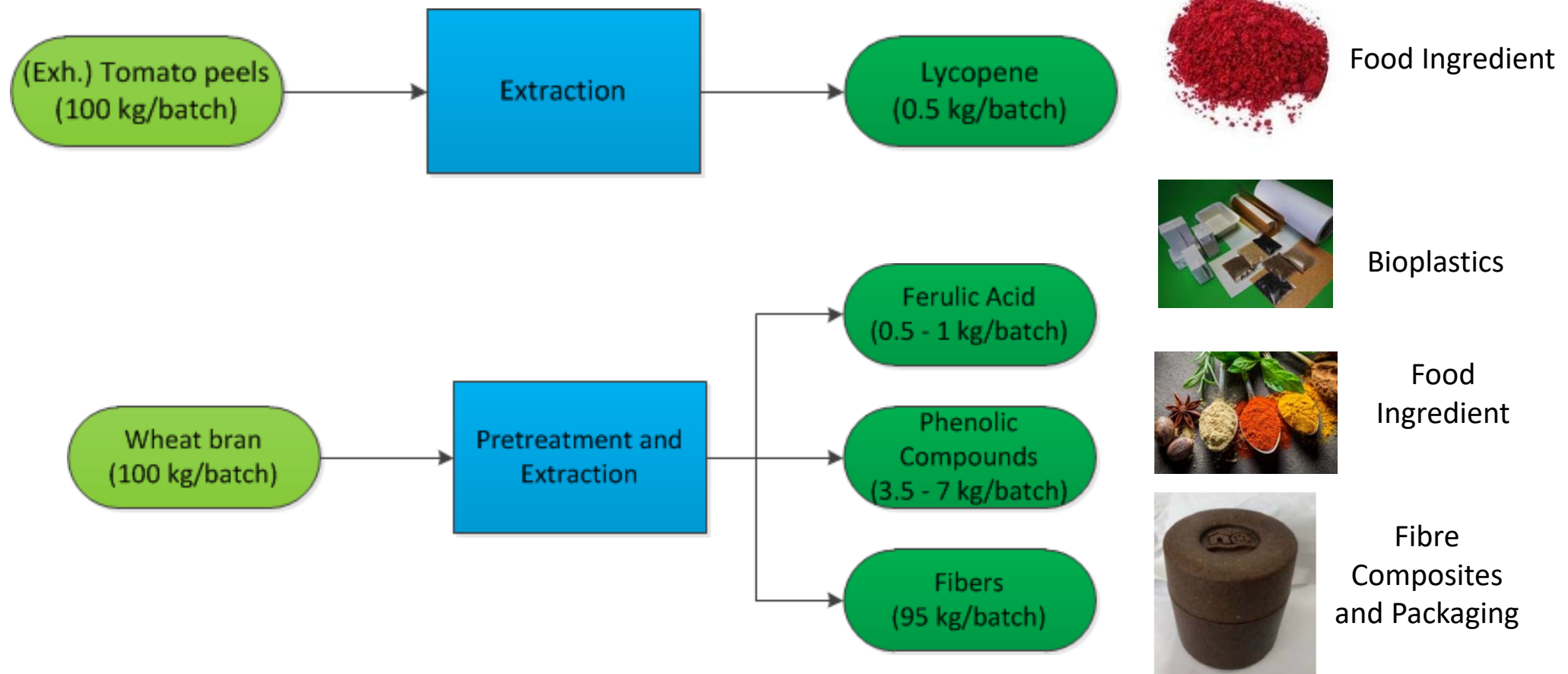


Agriculture

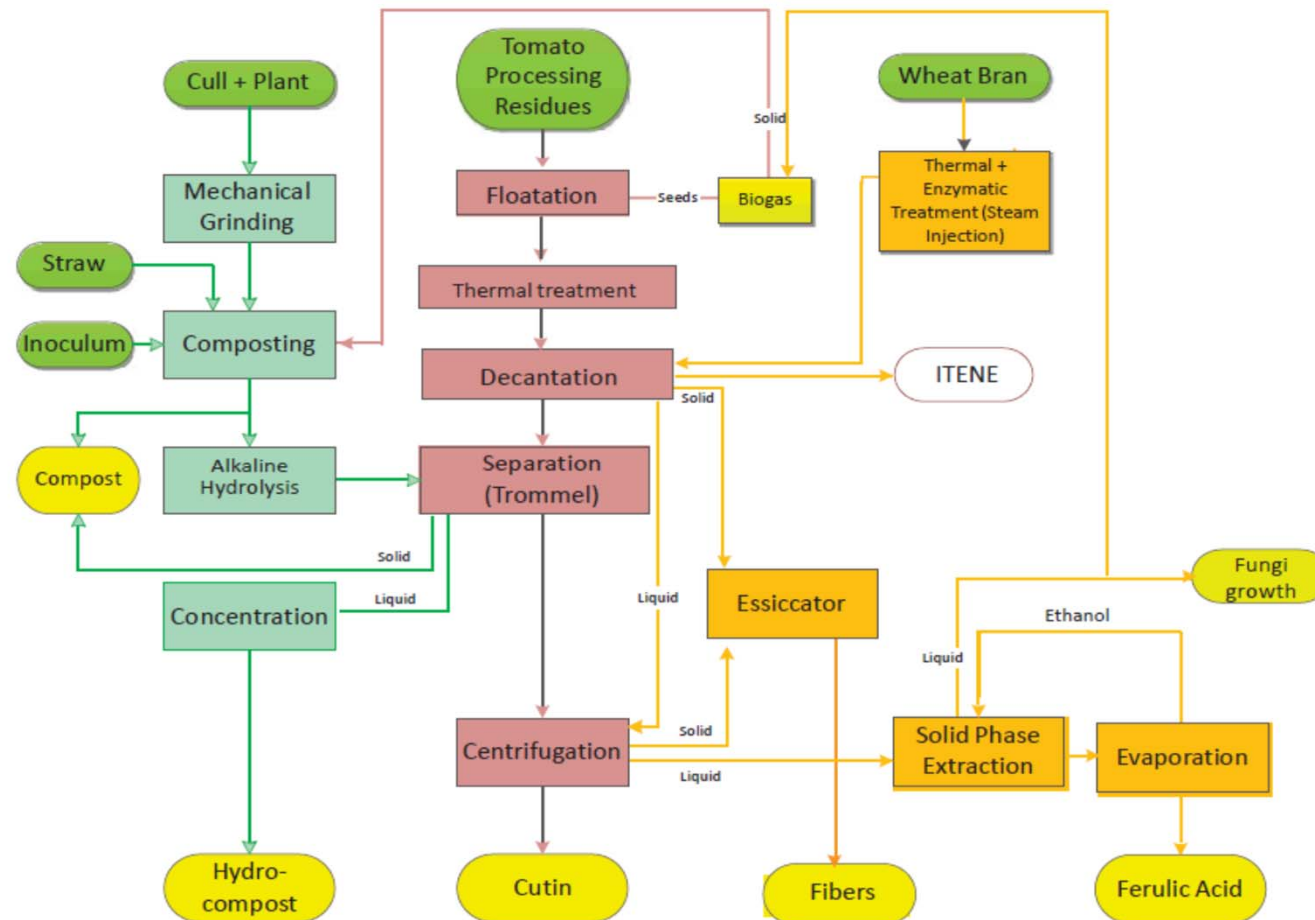


Packaging

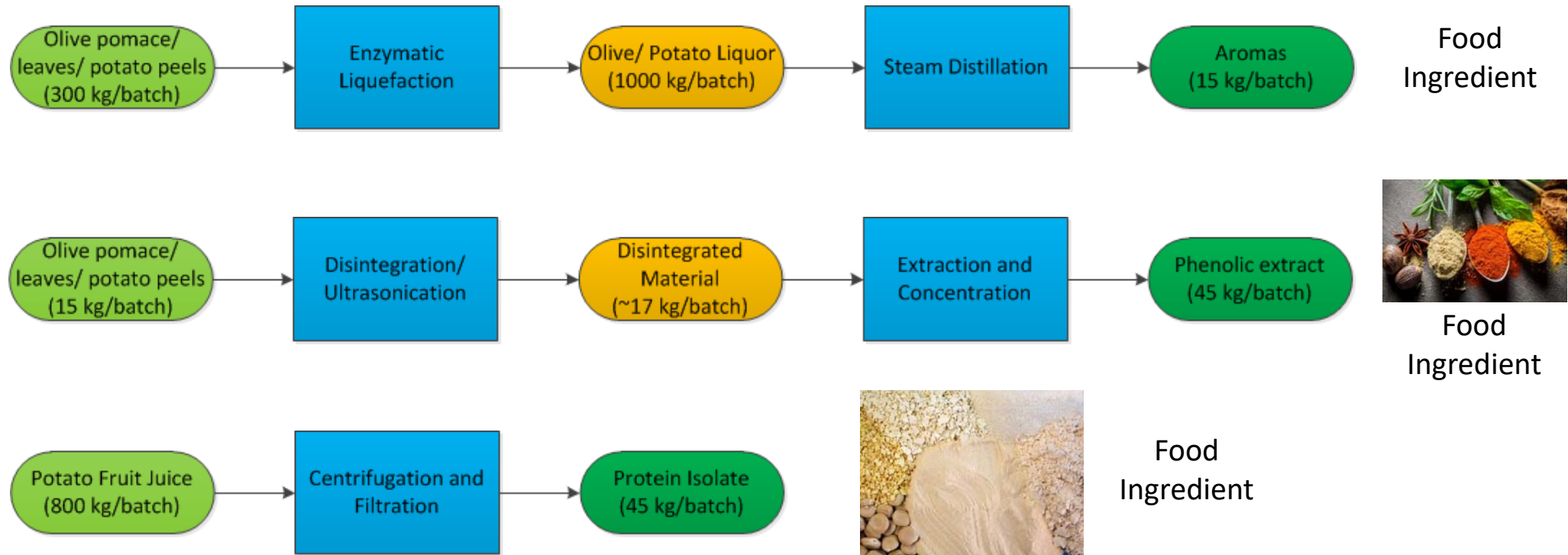
Italian Pilot Plant



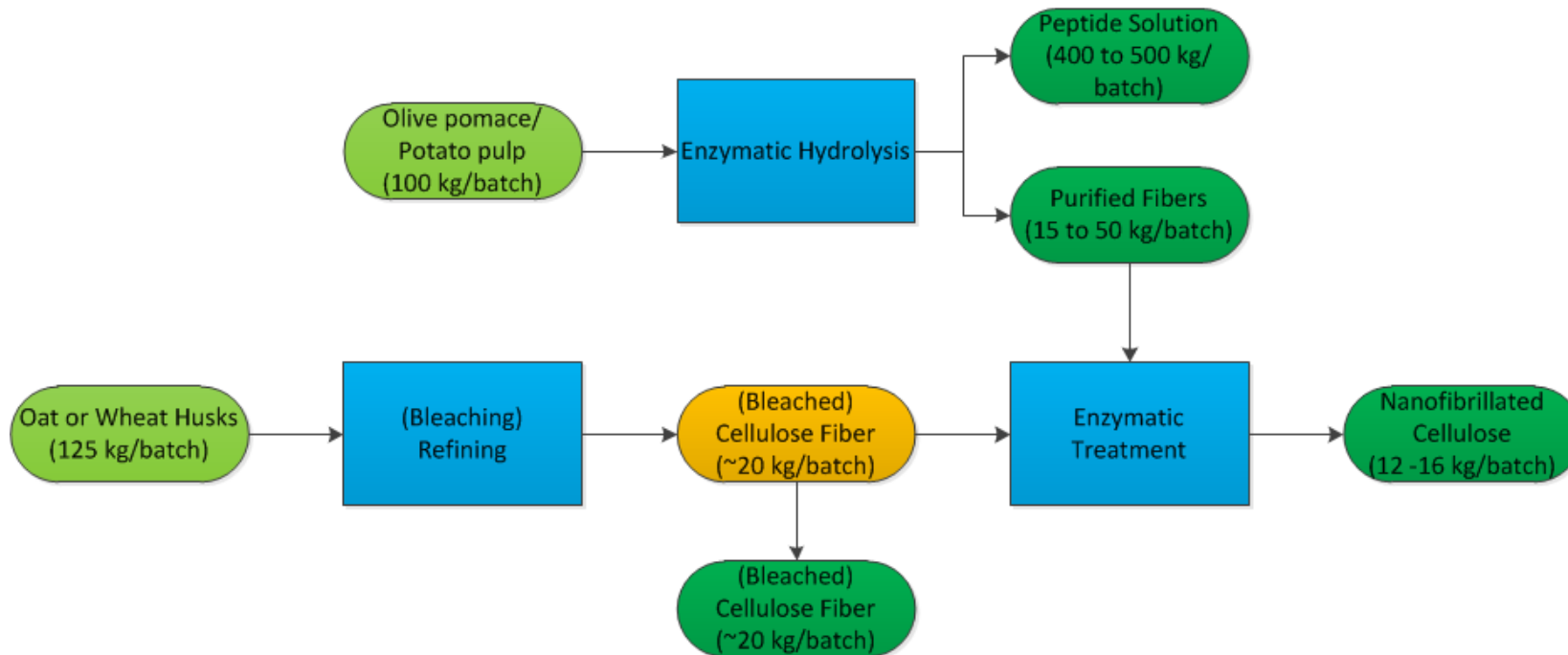
Italian Pilot Plant



Spanish Pilot Plant

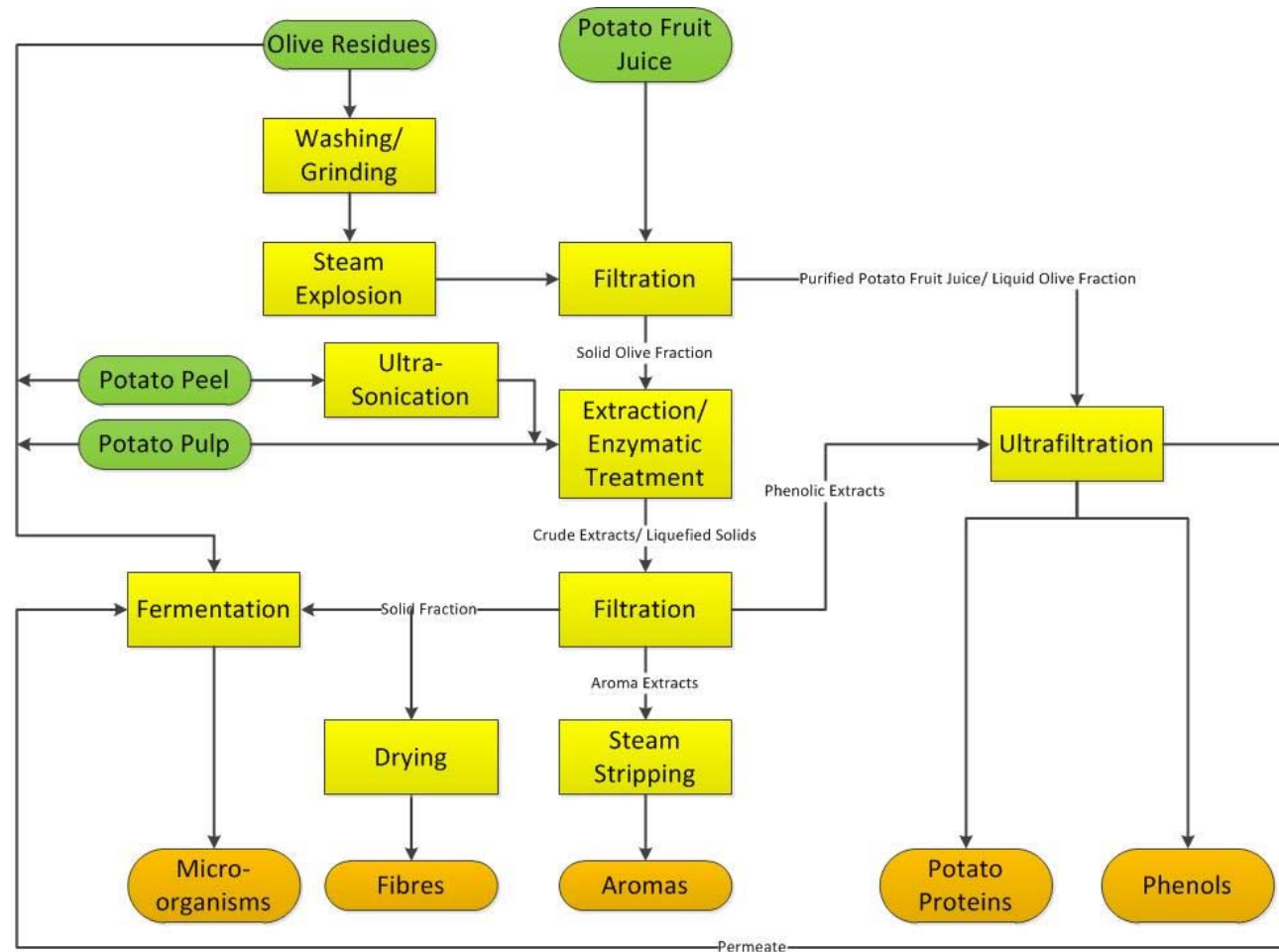


Spanish Pilot Plant

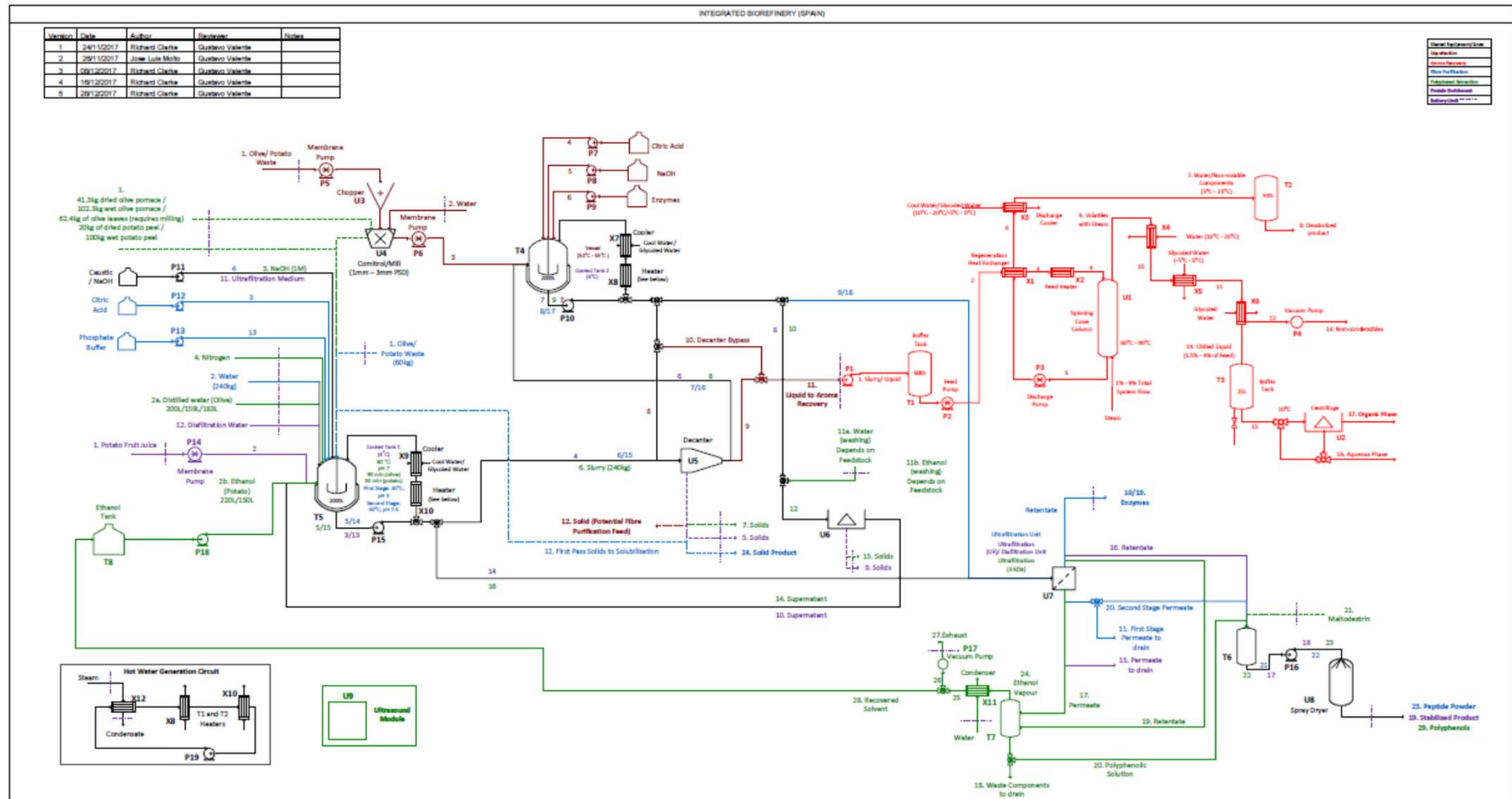


Packaging

Spanish Pilot Plant



Spanish Pilot Plant



AgriMax Products



	IPP	SPP	Application	Market Price [€/kg]
Phenolic Extracts	X	X	Food Ingredient	40 to >1000
			Active Packaging Constituent	
Protein Isolate		X	Food Ingredient	6 to 8
Aromas		X	Food Additive	5 to 100
Cellulose Fibers	X	X	Biocomposite Material	0.4 to 2
			Thickening Agent in Food	0.5
			Barrier Coating for Packaging	5 to 10
Nanofibrillated Cellulose	X	X	Barrier Constituent for Packaging	100
Compost	X		Fertilizer	10 to 30
Hydrocompost	X			
Cutin	X		Coating for Metal Packaging	~2
Lycopene	X		Food Additive	2.000 to 5.500
Ferulic Acid	X		Building Block for Biopolymers	20 to 500
			Edible Coating	
			Active Packaging Constituent	



Thanks for your attention!



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