



Procesos de biorefinería según materias primas y plantas piloto

Biorefinery processes according to raw materials and pilot plants

Andreas Stäbler, Fraunhofer IVV

15th of April 2021

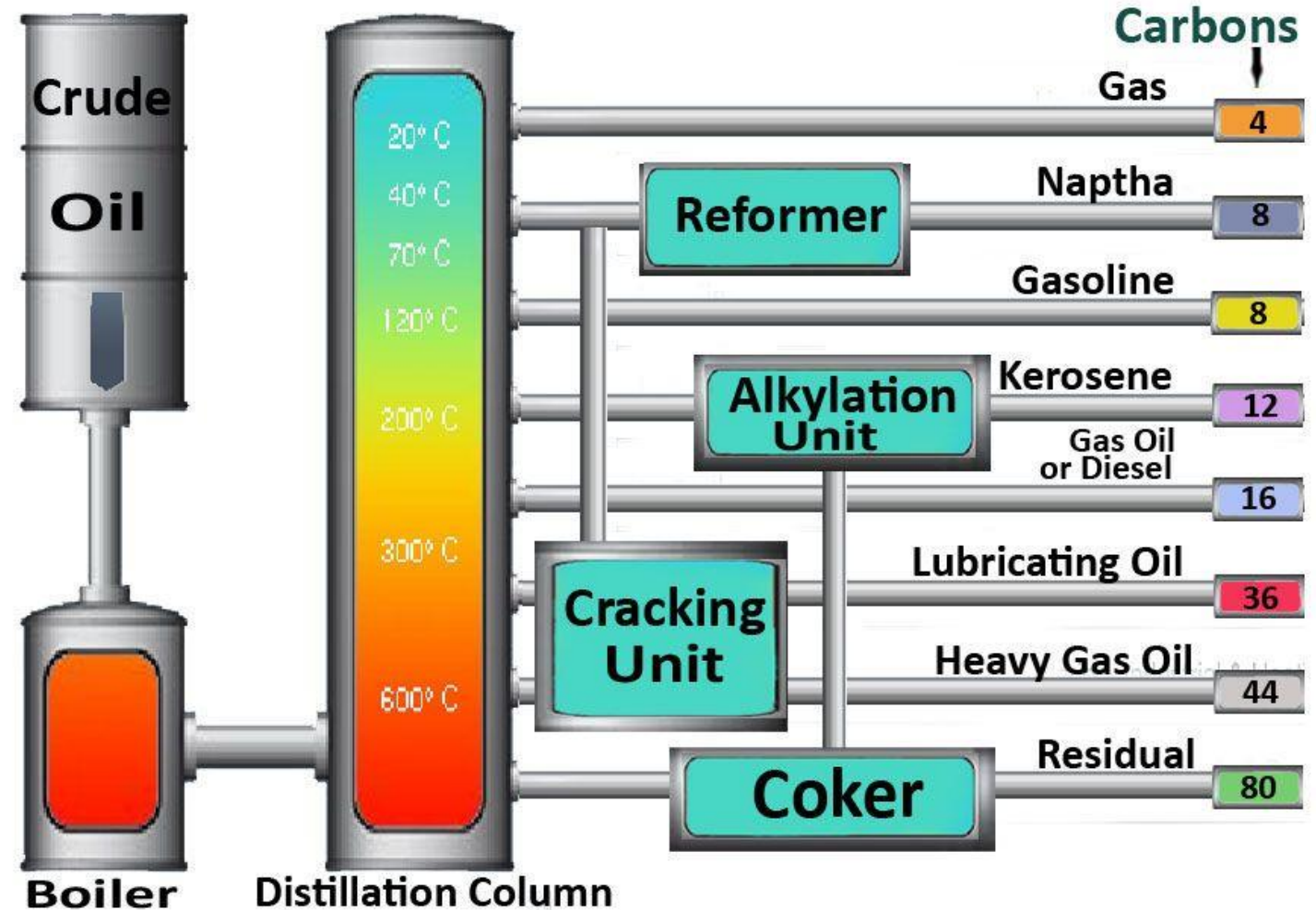
Webinar sobre valorización de subproductos agrarios a través de biorefinerías

The International Energy Agency Bioenergy Task 42 defined biorefining as "**the sustainable processing of biomass into a spectrum of bio-based products and bioenergy**".

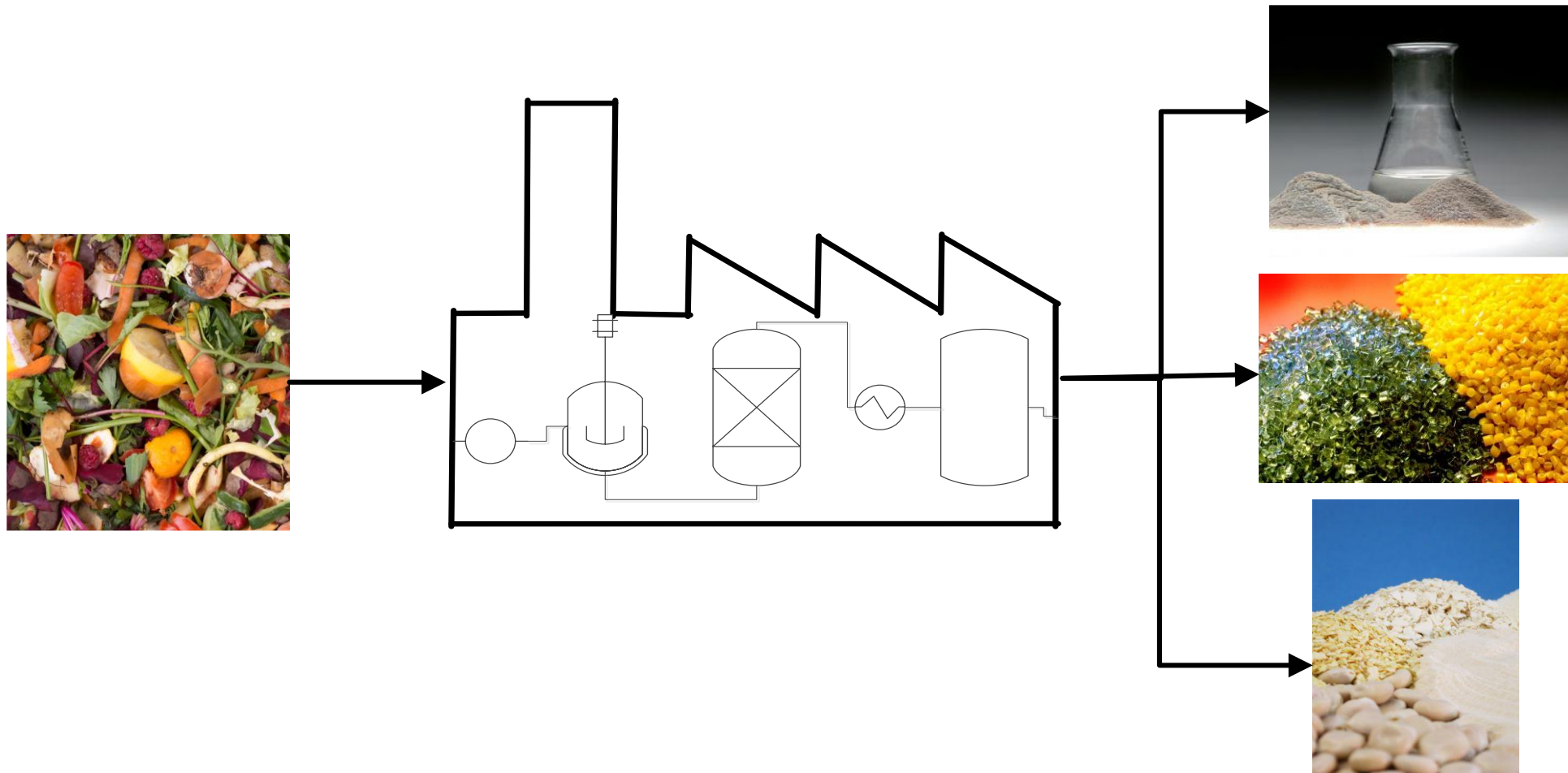
Refineries

Oil refinery:

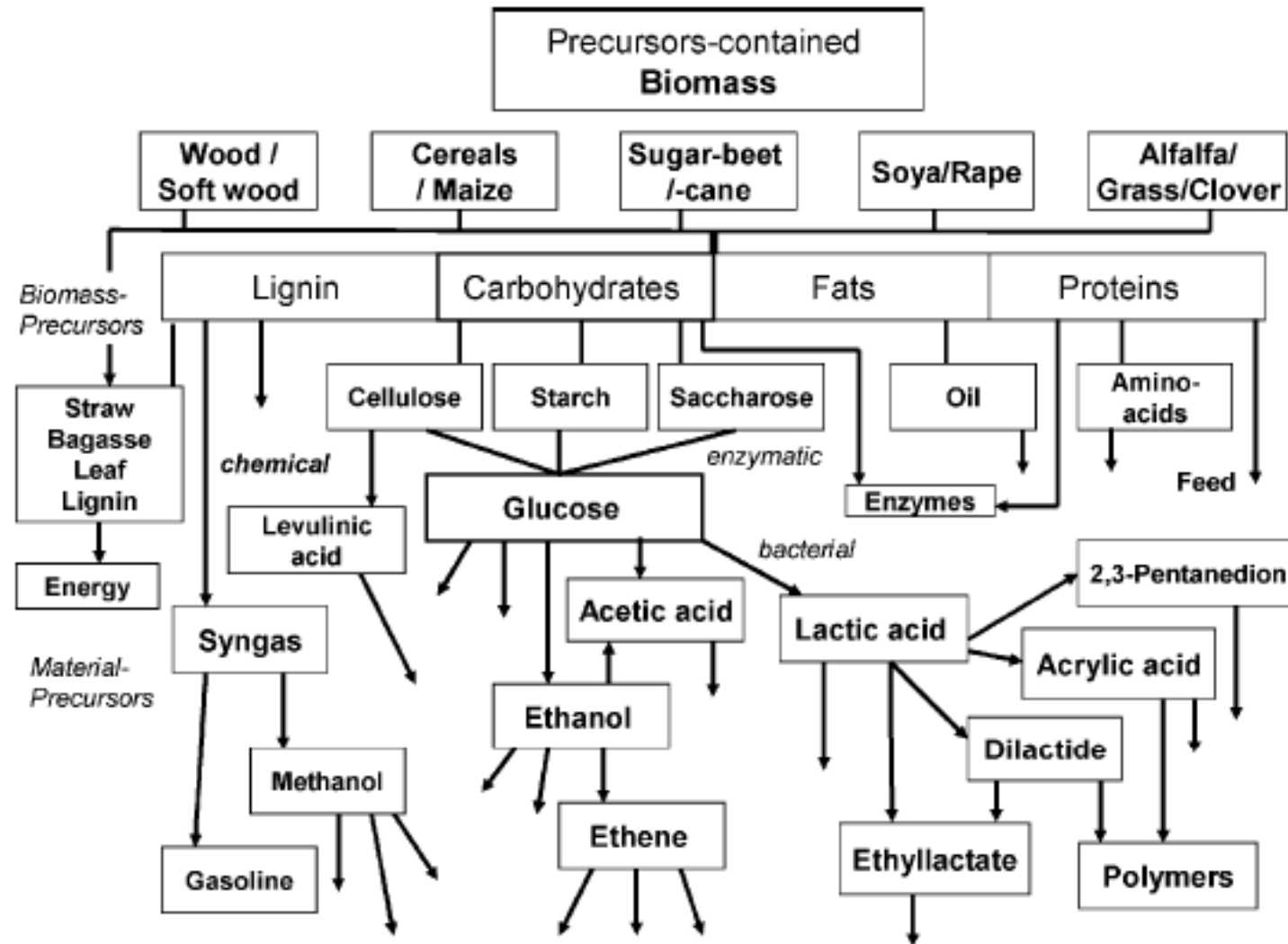
- Crude (undefined) feedstock
- Highly efficient conversion and fractionation
- Several products
- (almost) No by- products



Biorefinery Definition

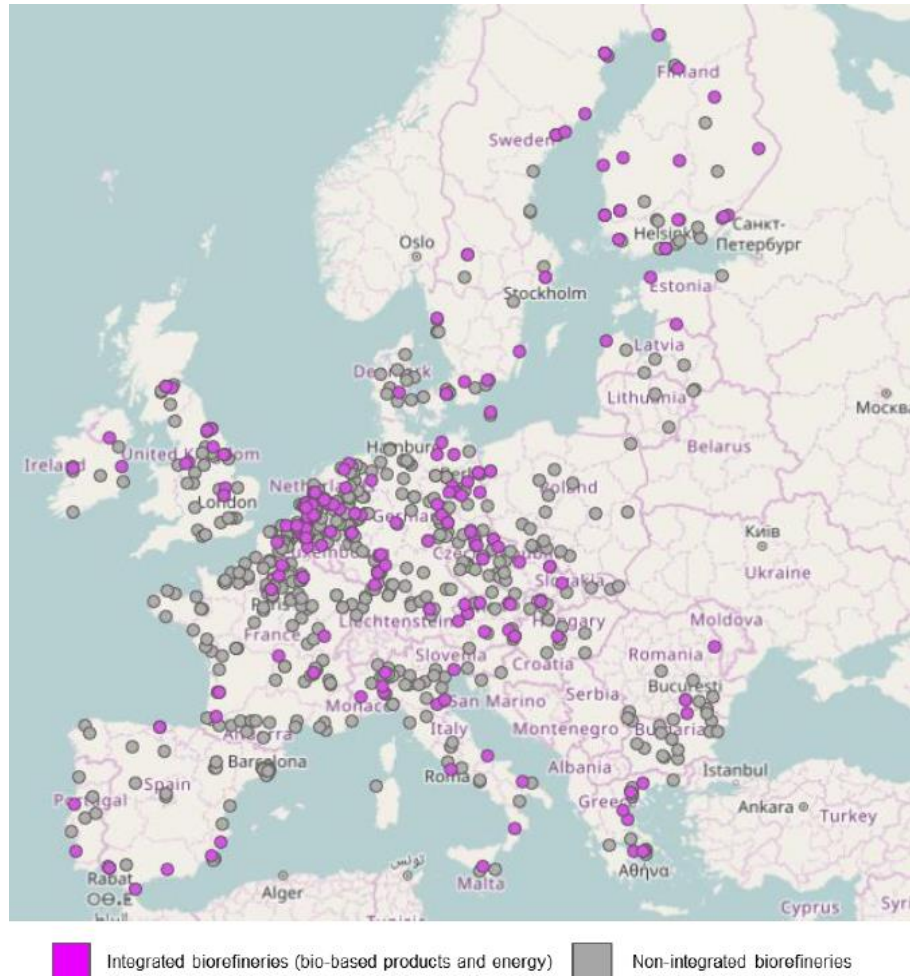


Biorefining



Source: Kamm et al, 2004

Biorefineries in Europe



- EU (incl. UK) in 2018: **803 biorefineries** of which¹:
 - 503 produce chemicals
 - 363 produce liquid biofuels
 - 141 produce fibres and composites

Origin	Feedstock categories	N. of facilities
Agriculture	Sugar/starch-based feedstock	216
Agriculture	Oil/fat-based feedstock	275
Marine	Oil/fat-based feedstock	34
Agriculture	Agricultural residues (in the field)	76
Agriculture	Secondary residues and by/co-products of industry utilising agricultural products	111
Agriculture	Intermediate products derived from agriculture-based feedstock*	23
Agriculture	Vegetable fibres	67
Agriculture	Other agricultural products	13
Forestry	Wood	77
Forestry	Forestry intermediate products OR secondary residues and by/co-products of industry utilising forestry products	124
Grasses and SRC	Grasses and SRC (short-rotation coppice), including derivatives	57
Waste	Waste	136
Other	Other	2

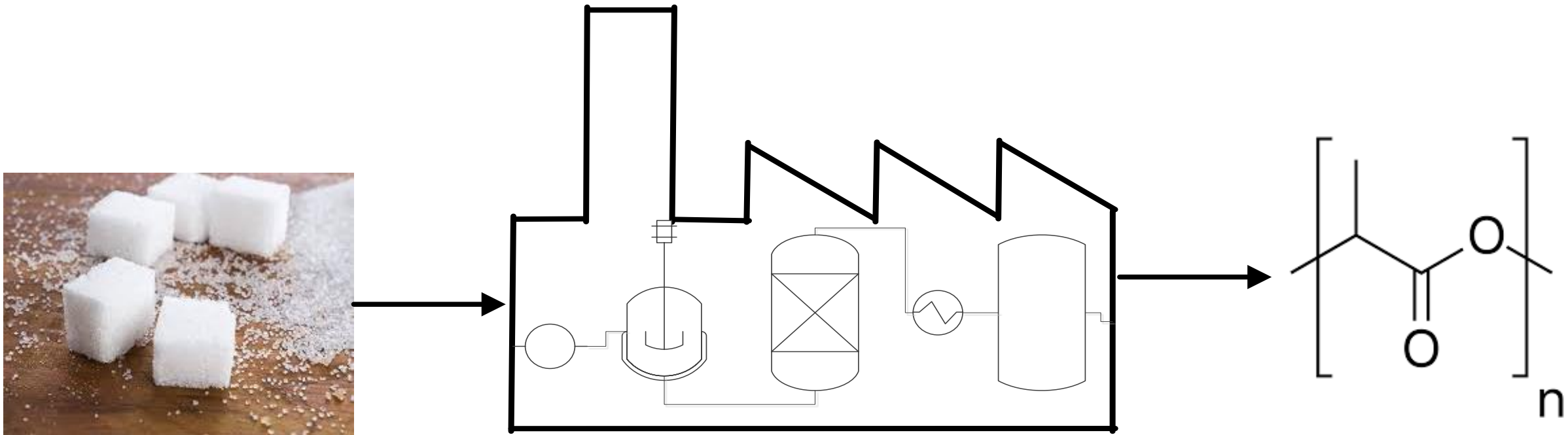
*Intermediate products refer to bio-based chemicals (e.g. ethanol, lactic acid, PLA, etc.) used as feedstock for new bio-based products (usually polymers and composites)

[1] Multi-product biorefineries are counted more than once

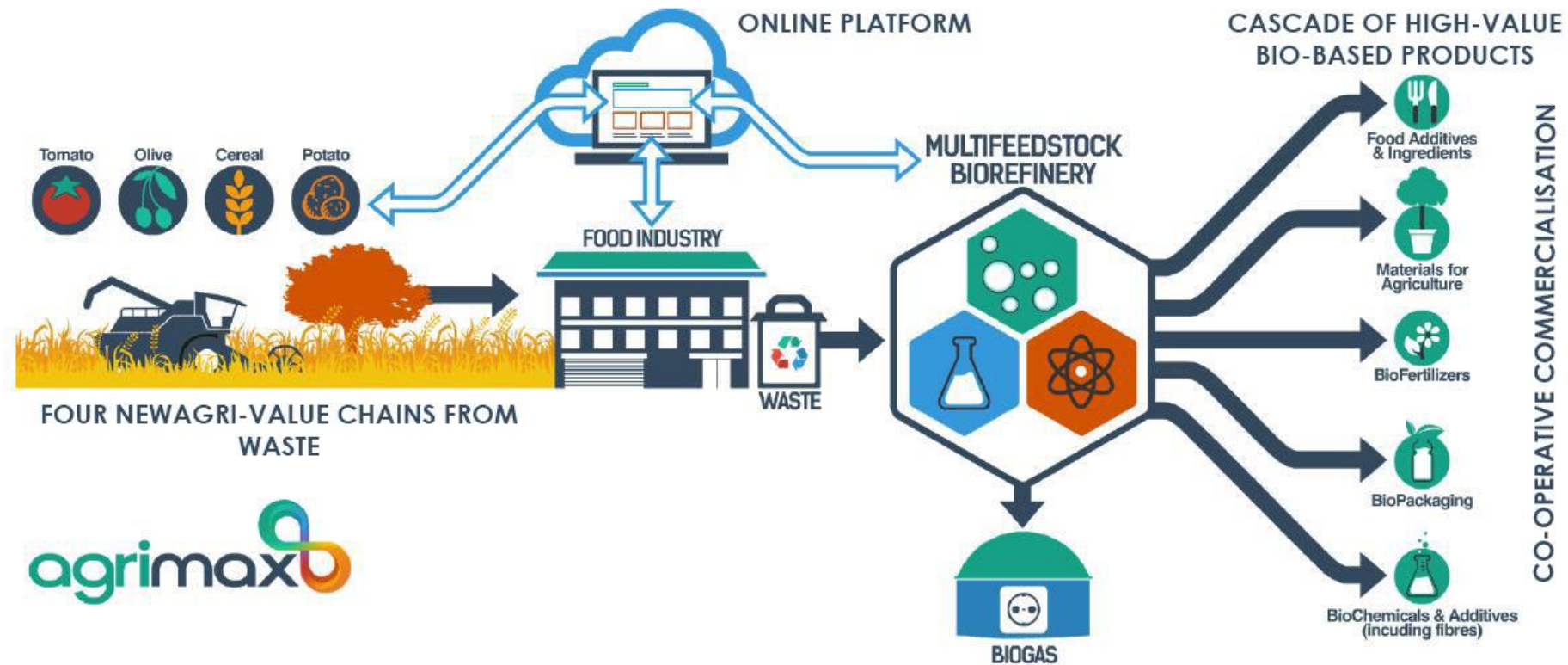
Source: Biorefineries distribution in the EU, EC, 2018

The International Energy Agency Bioenergy
Task 42 defined biorefining as "**the**
sustainable (?)
processing of
biomass (some)
into a
spectrum of bio-based product (some)"

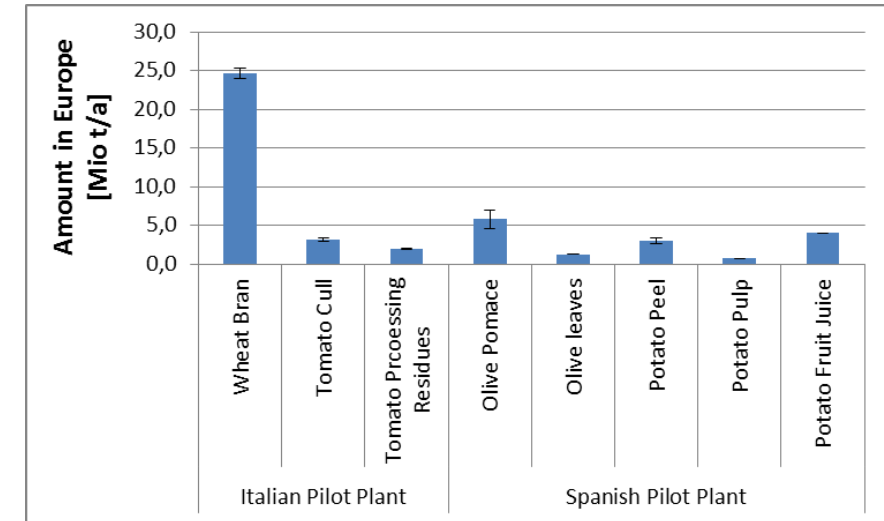
Biorefineries in Europe



AgriMax: Two multi-feedstock multi-product pilot 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

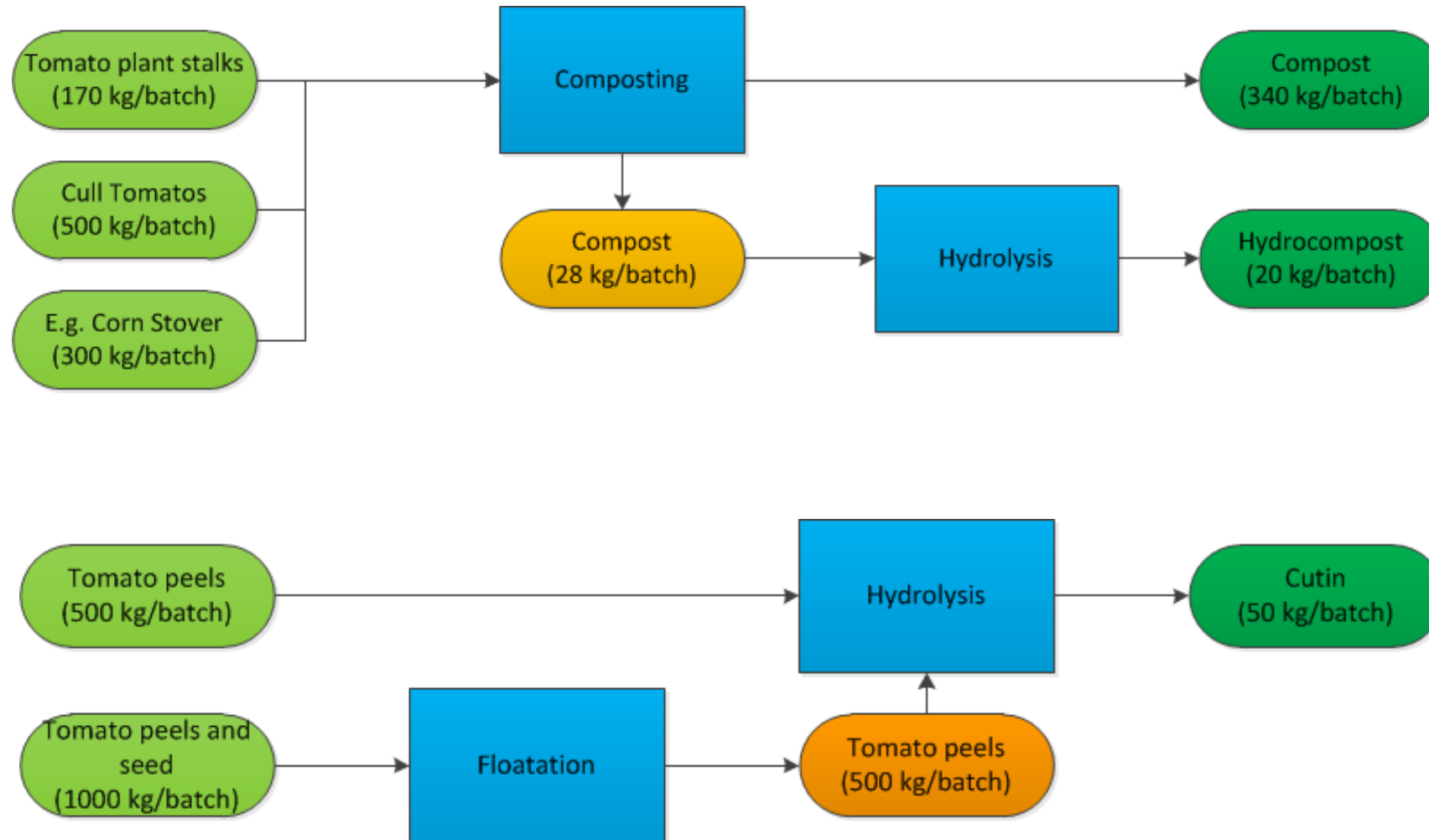


Italian Pilot Plant

Chiesa Virginio, Canneto sull'Oglio

Processing of tomato and cereal residues

Italian Pilot Plant

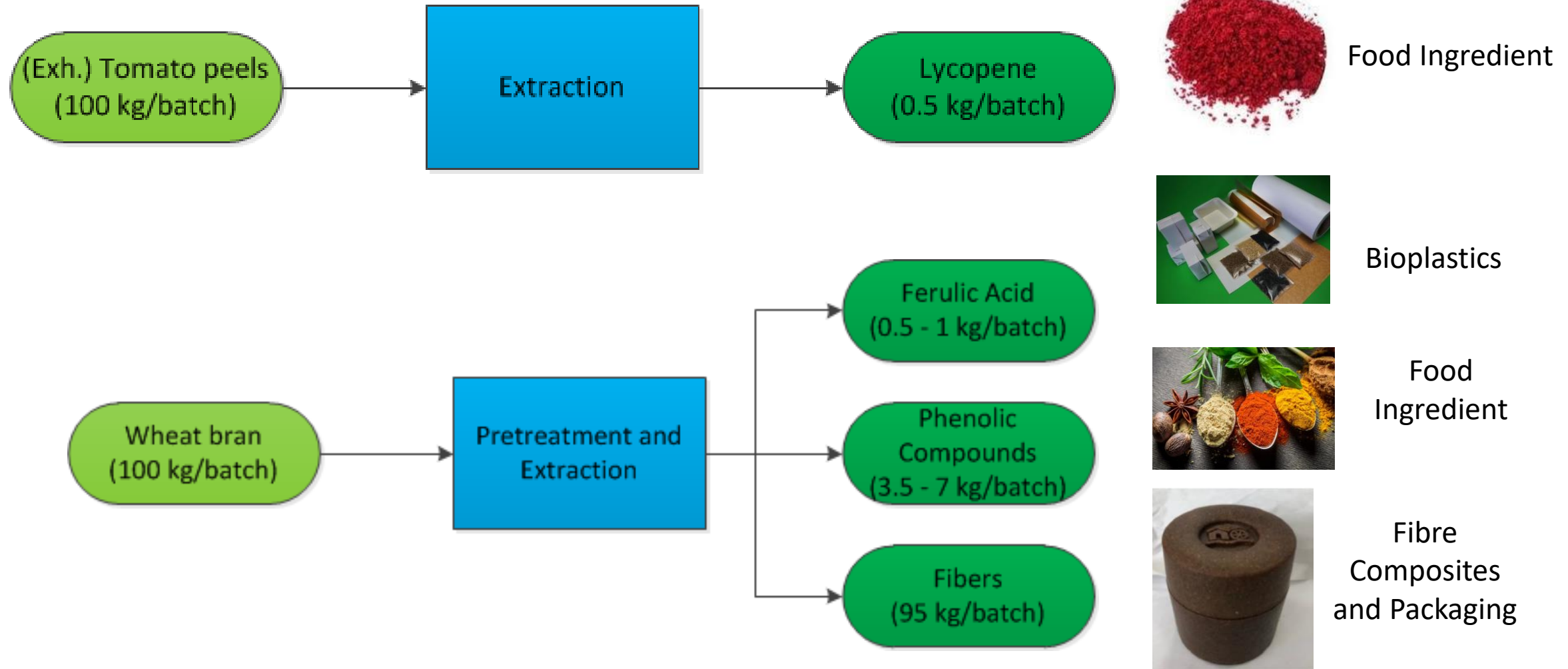


Agriculture

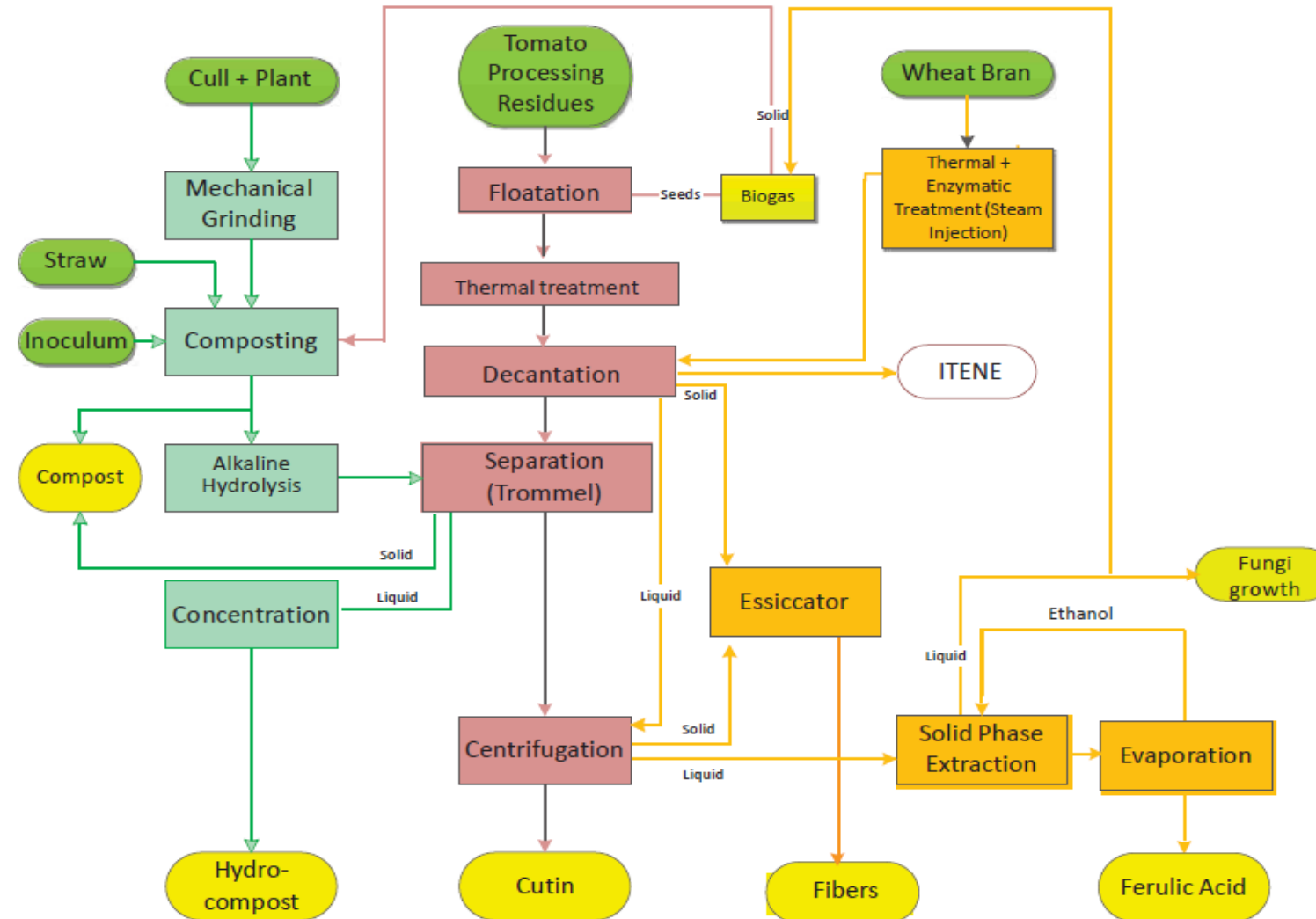


Packaging

Italian Pilot Plant

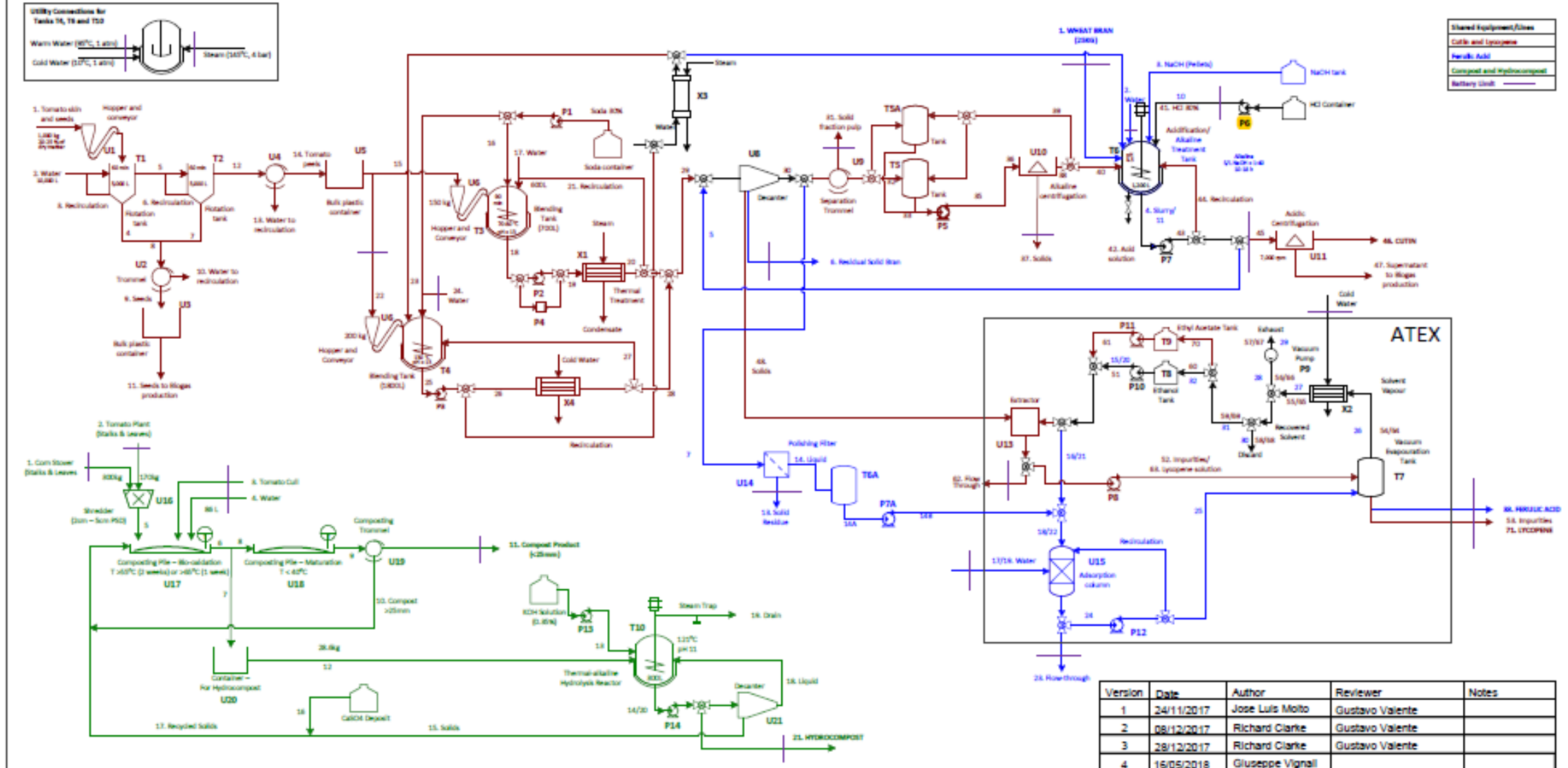


Italian Pilot Plant

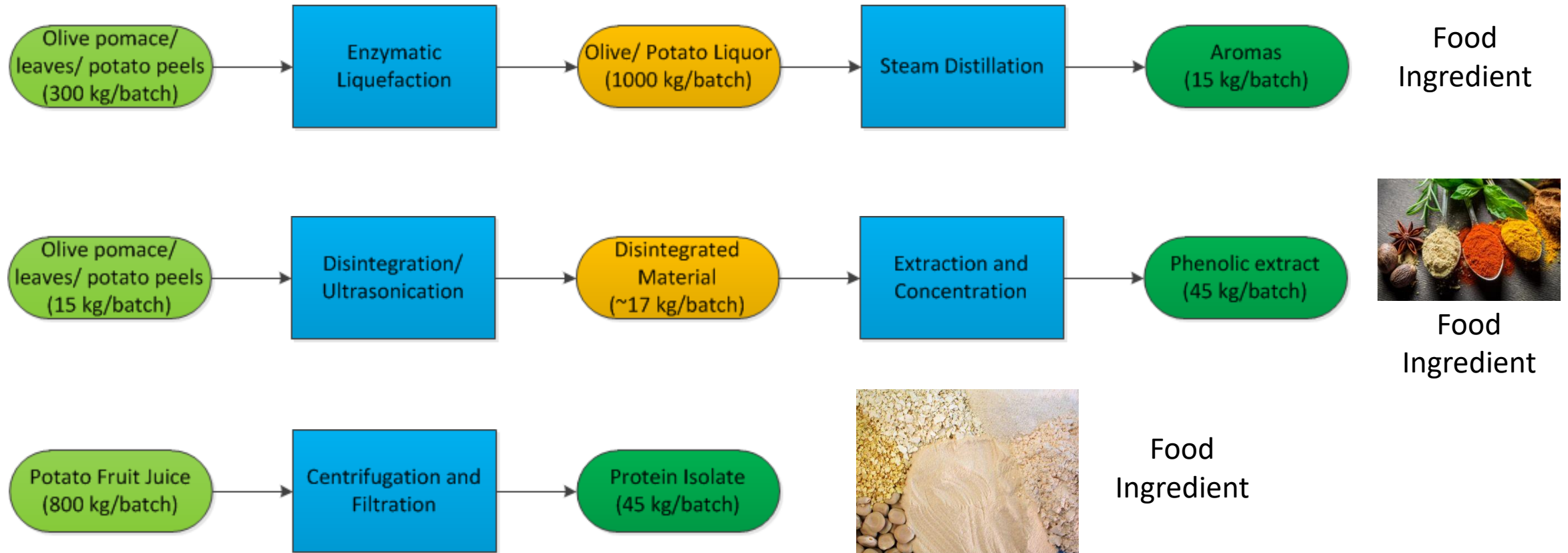


Italian Pilot Plant

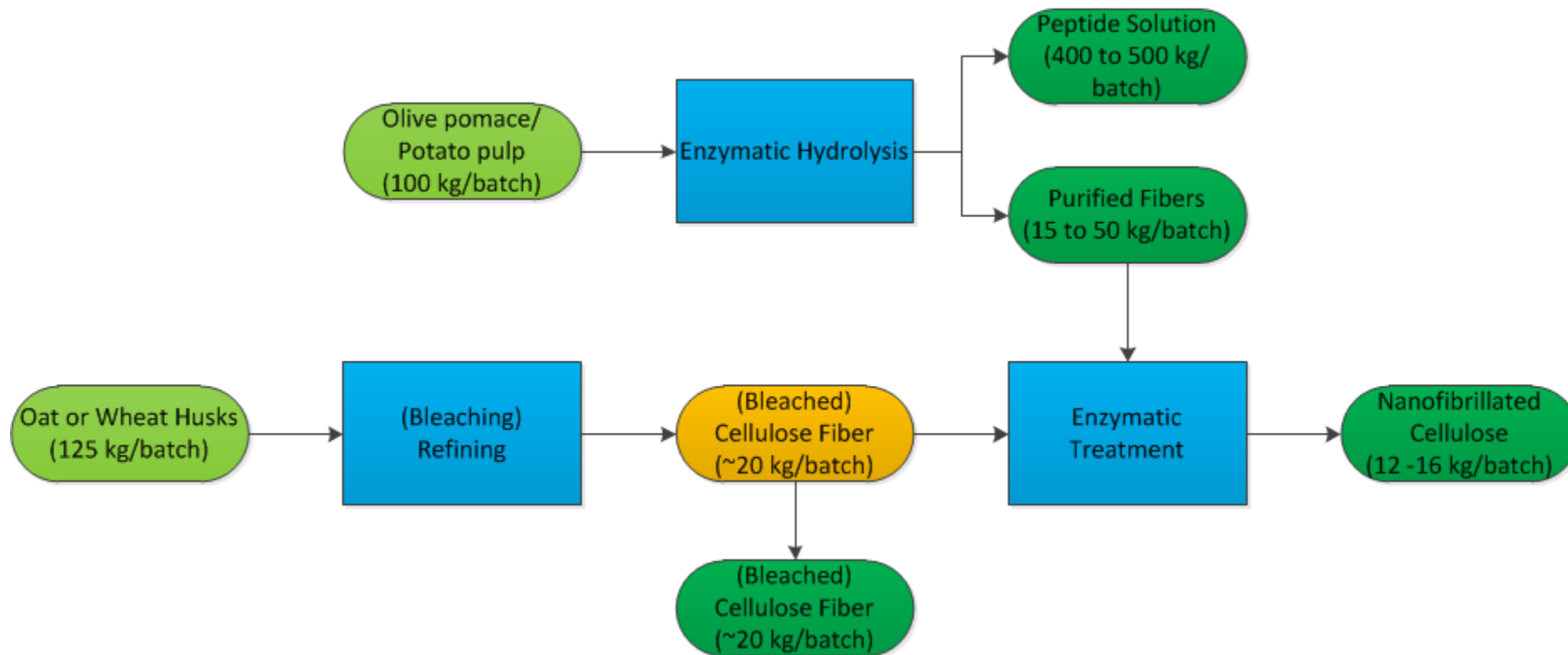
INTEGRATED BIOREFINERY (ITALY)



Spanish Pilot Plant

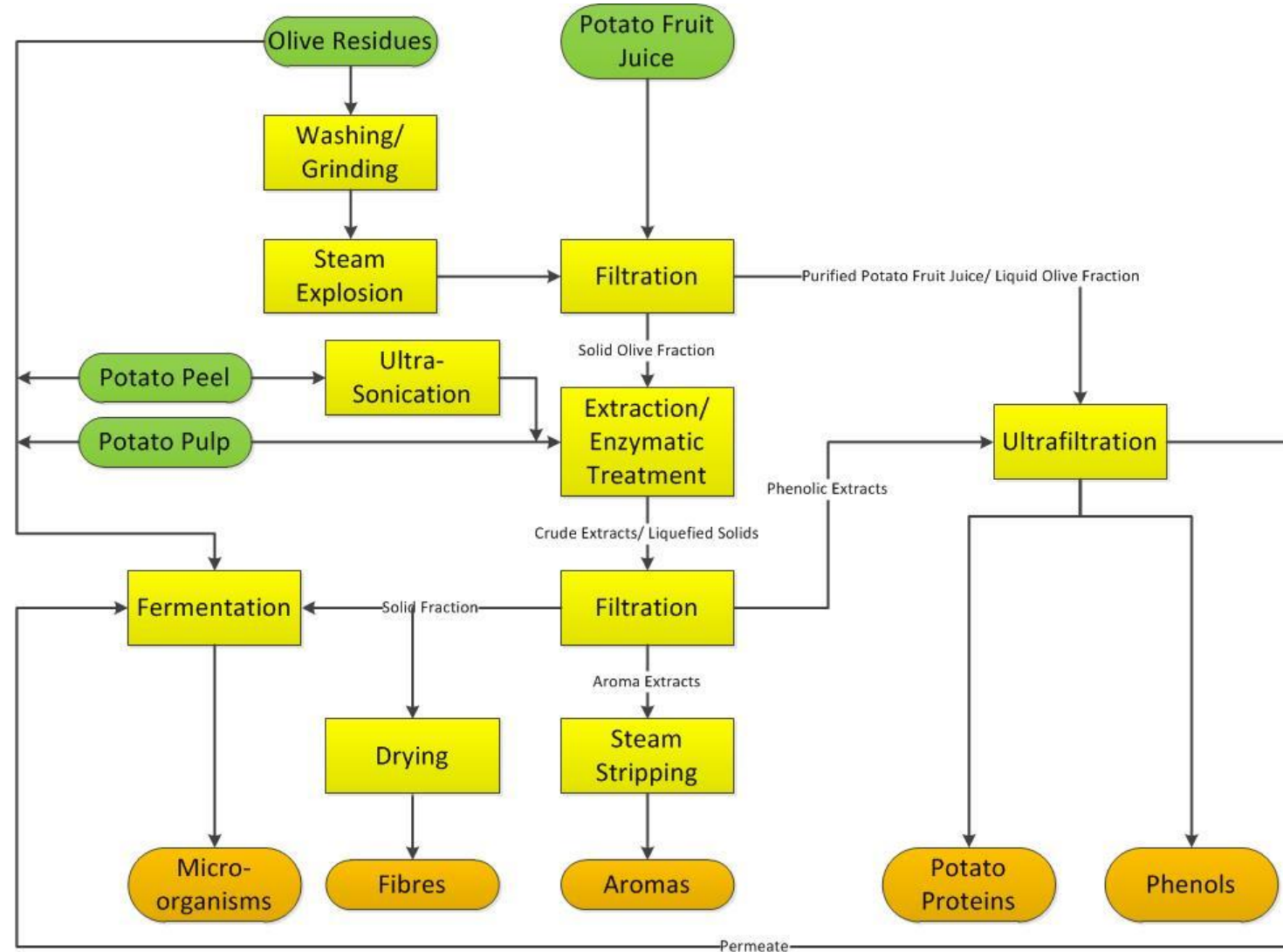


Spanish Pilot Plant

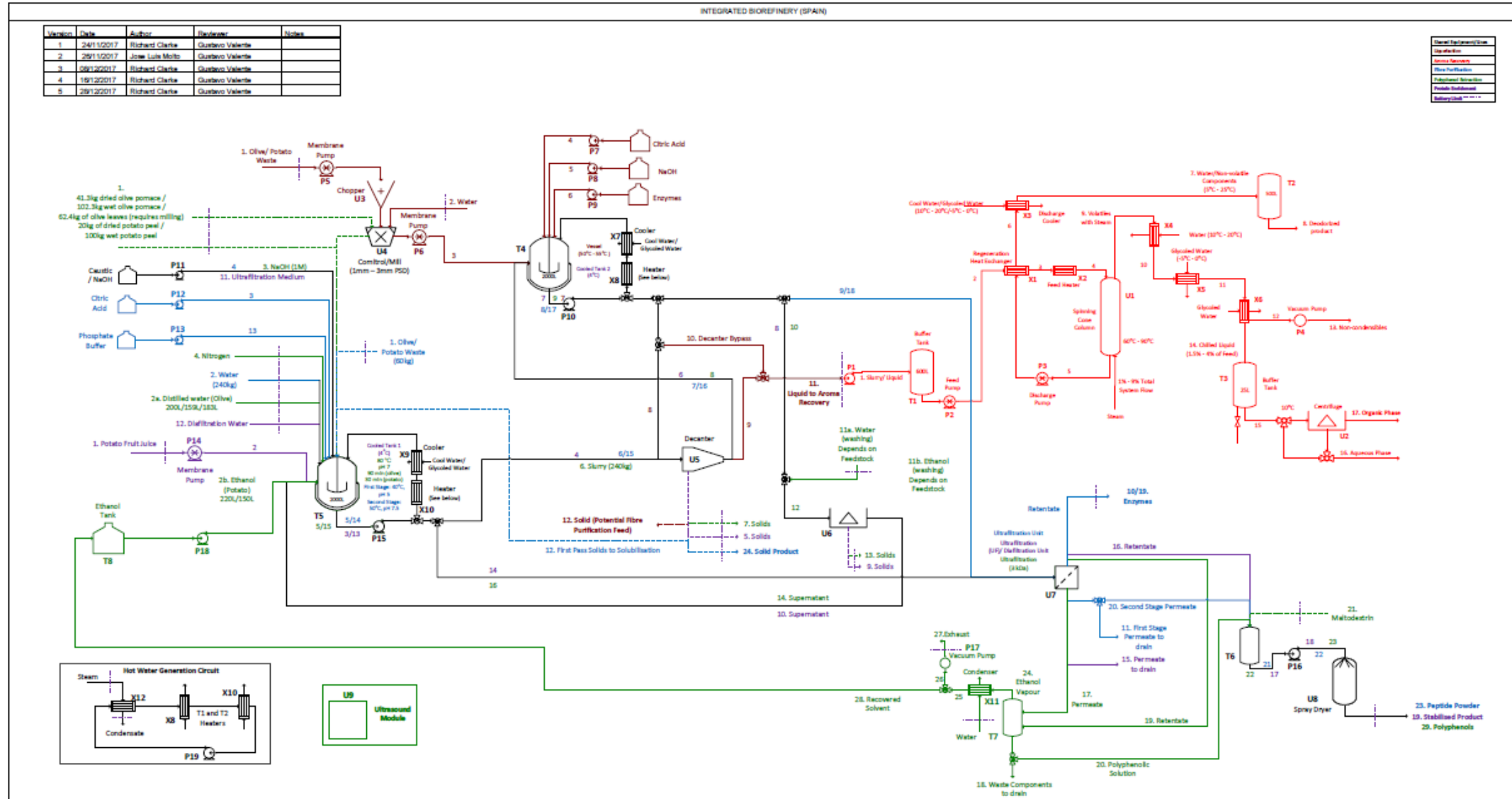


Packaging

Spanish Pilot Plant



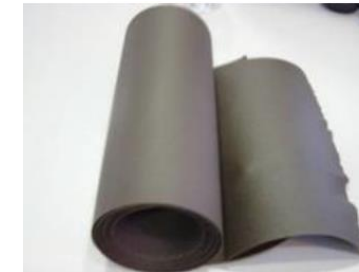
Spanish Pilot Plant



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!



gchalkias@iris.cat
Project Coordinator

emma.needham@biovale.org
Communications Manager

www.agrimax-project.eu
Website

@Agrimax_EU
Twitter

