

POSTER FLASH PRESENTATION

BIOSTIMULANTS EXTRACTION FROM DIGESTATES AND THEIR IMPACT ON SOIL BIODIVERSITY AND PLANT GROWTH (VALODIG PROJECT)

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Authors: Chaves B.^{1,2}, Richard-Molard C.², L. Vieublé Gonod², Thevenin N.¹, Lot M.C.³, Salomez M.⁴, Joimel S.², Houot S.², Sambusiti C.^{4*}

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Context

Anaerobic digestion is the complex and robust process that biologically converts organic matter into biogas (or biomethane) and digestate (an organic by-product).

New valorization routes are expected for digestate to...

Overcome technical challenges and limitations due to digestate spreading (regulatory framework, logistics, digestate quality)

Diversify revenue streams linked to digestate

Regulation (EU) 2018/1008¹ applied since July 2022 for fertilizing products extended to biofertilizer => Plant Biostimulants (PFC 6)

A plant biostimulant is any substance or microorganism applied to plants with the aim to enhance nutrition efficiency, abiotic stress tolerance and/or crop quality traits, regardless of its nutrients content.²

Known molecules with biostimulant properties in digestate are humic substances³ (i.e.: fulvic acids, humic acids and humins), phytohormones⁴, hormone-like molecules⁵, proteins and amino acids⁶

Objective

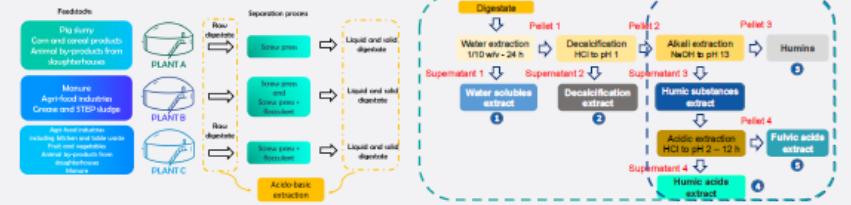
Developing new valorization routes through biostimulant extraction of digestate



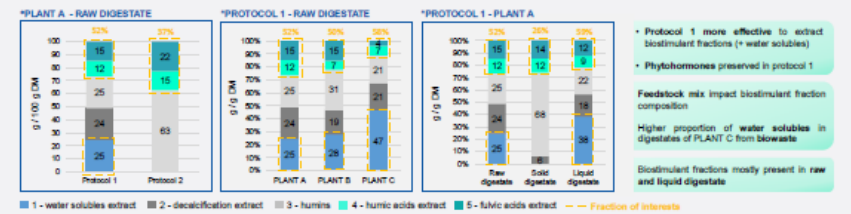
Novelties ValoDig

Plant model: CIVE - Rye
 Digestate biostimulant evaluation in soil
 Impact of dig. extract on soil biodiversity (+/-)

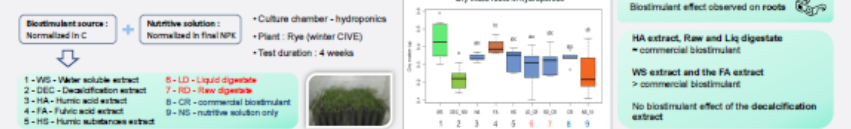
Digestate sampling and biostimulant extraction



Results biostimulant extraction - dry matter distribution

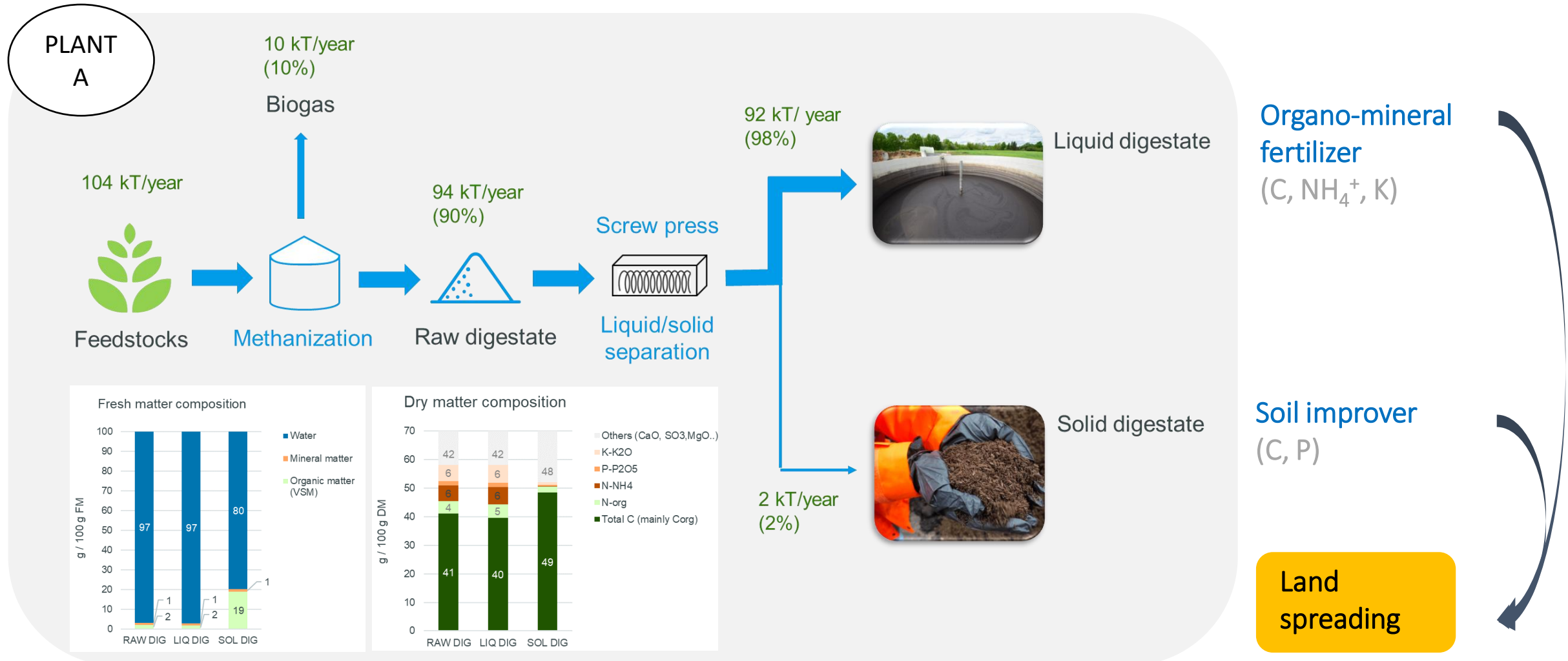


Biostimulant properties - hydroponic test



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Context and Objectives



Context and Objectives

Context - Biostimulants and digestates

- **Objective : New valorization routes** are expected for **digestate** to...



Overcome technical challenges and limitations due to digestate spreading (regulatory framework, logistics, digestate quality)



Diversify revenue streams linked to digestate

- A plant **biostimulant** is any substance or microorganism applied to plants with the aim to enhance nutrition efficiency, abiotic stress tolerance and/or crop quality traits, regardless of its nutrients content. ²
- Biostimulant as a solution for a sustainable agriculture
- Known molecules with biostimulant properties in digestate are **humic substances** ³ (i.e.: fulvic acids, humic acids and humins), **phytohormones** ⁴, **hormones-like molecules** ⁵, **proteins and amino acids** ⁶

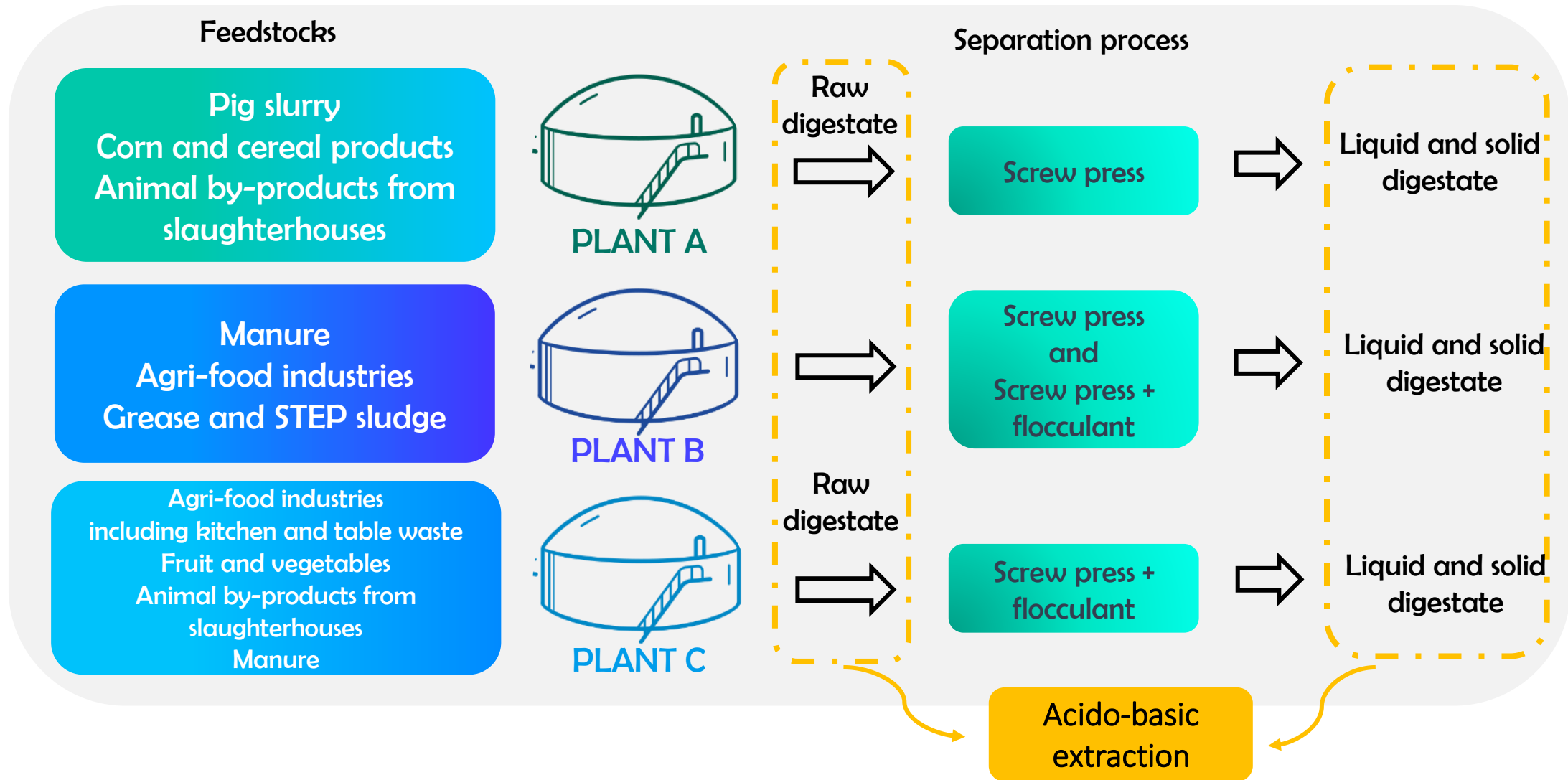
Novelties

Plant model : CIVE - Rye

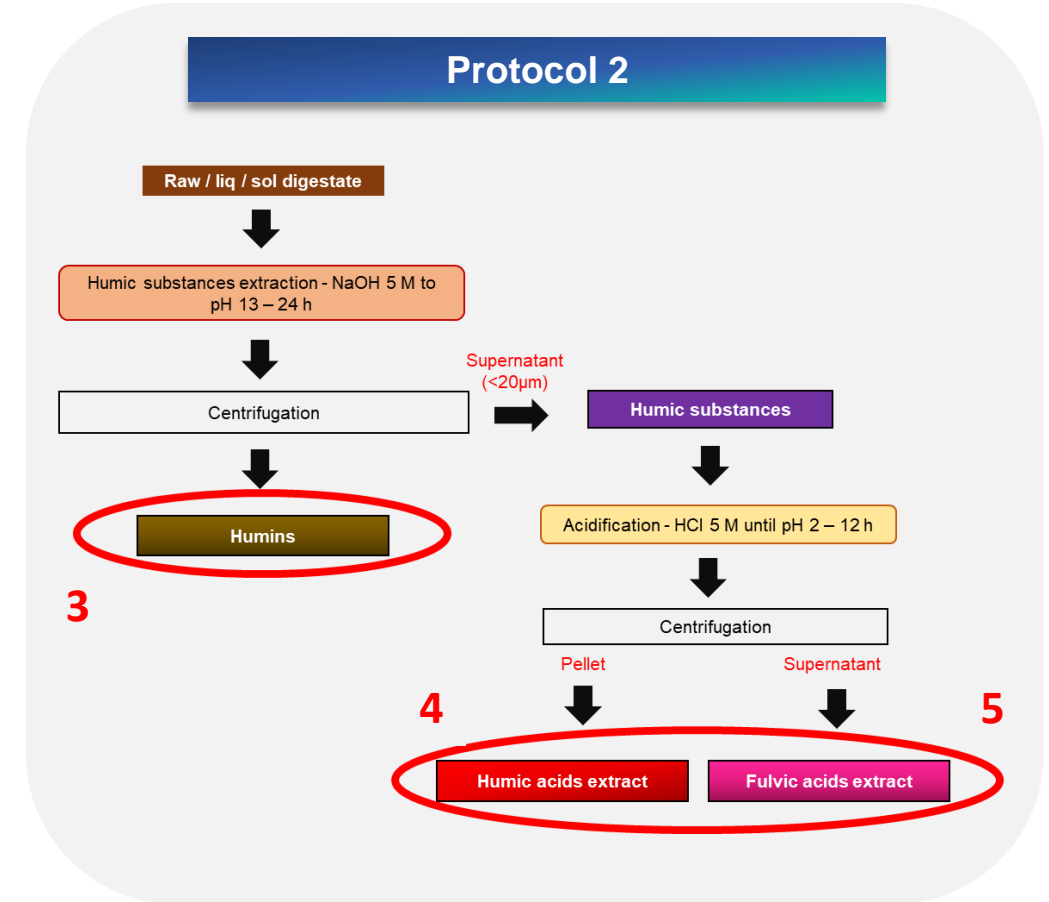
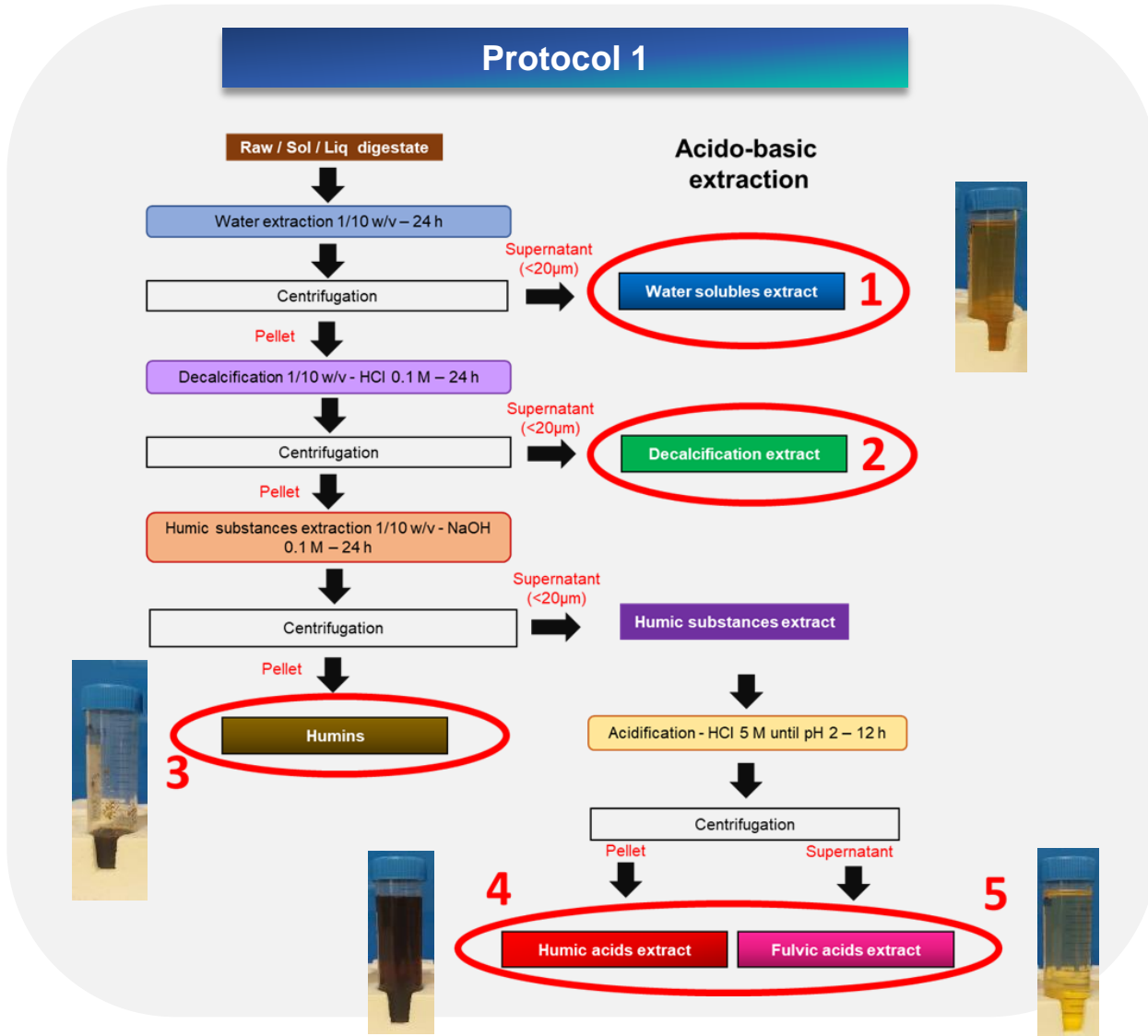
Digestate biostimulant evaluation in soil

Impact of digestate extract on soil biodiversity (+/-)

Materials and methods - Methanization sites



1 Materials and methods-Extraction protocol comparison



* Protocol 1 adapted from Eyheraguibel, 2004; Domeizel et al., 2004; Ndira, 2006; Guilayn et al., 2020

* Protocol 2 similar to Guilayn et al., 2020

2 Materials and Methods - Hydronopic tests

- Conditions**
- Culture chamber - hydroponics
 - Plant : Rye (winter CIVE)
 - Replicates : 6 per treatment
 - Test duration : 4 weeks
 - Biostimulant application after 5 days of germination
 - Hydroponics medium renewed each week



Biostimulant source (1-9) :
Normalized in C
Eq 50L/ha of commercial reference

Nutritive solution :
Normalized in final NPK
Eq 66-10-73 U NPK/ha

- 1 - WS - Water solubles extract
- 2 - DEC - Decalcification extract
- 3 - HA - Humic acid extract
- 4 - FA - Fulvic acid extract
- 5 - HS - Humic substances extract
- 6 - LD - Liquid digestate (2.2 kg N/ha)
- 7 - RD - Raw digestate (1 kg N/ha)
- 8 - CR - commercial biostimulant / humifirst
- 9 - NS - nutritive solution only



- Analysis**
- LEAVES:**
- Chlorophyll content (SPAD)
 - Projected Leaf Area (PLA)
 - Fresh/Dry mass
 - Leaves number
 - Plant height
 - C and N content
- ROOTS :**
- Fresh/Dry mass
 - Root length
 - C and N content



THANK YOU