

# Fractionation of Municipal Green Waste Biomass

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# Lignocellulosic Biomass

Municipal Green Waste

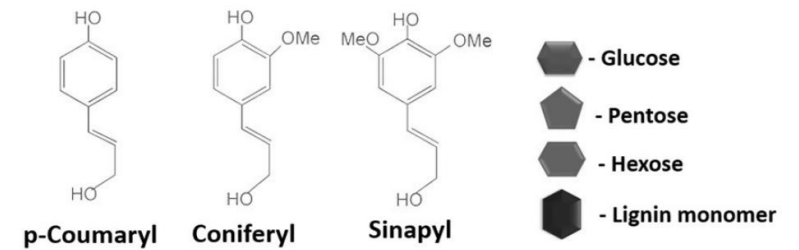
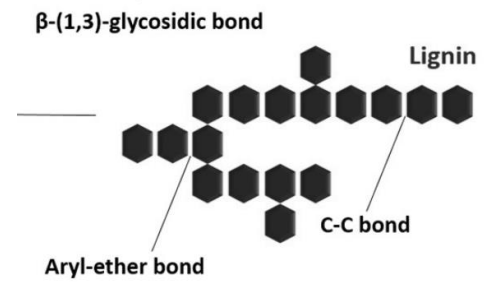
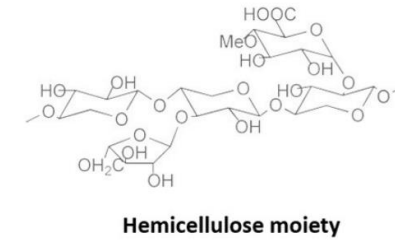
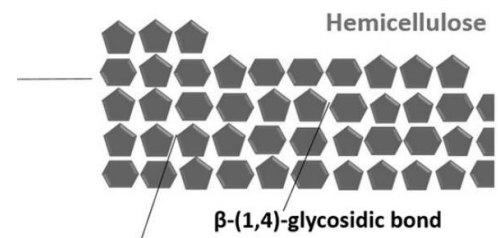
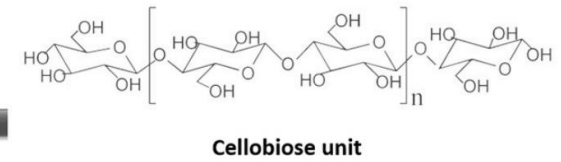
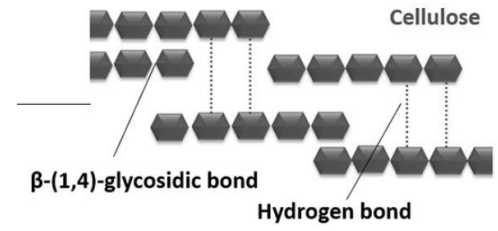
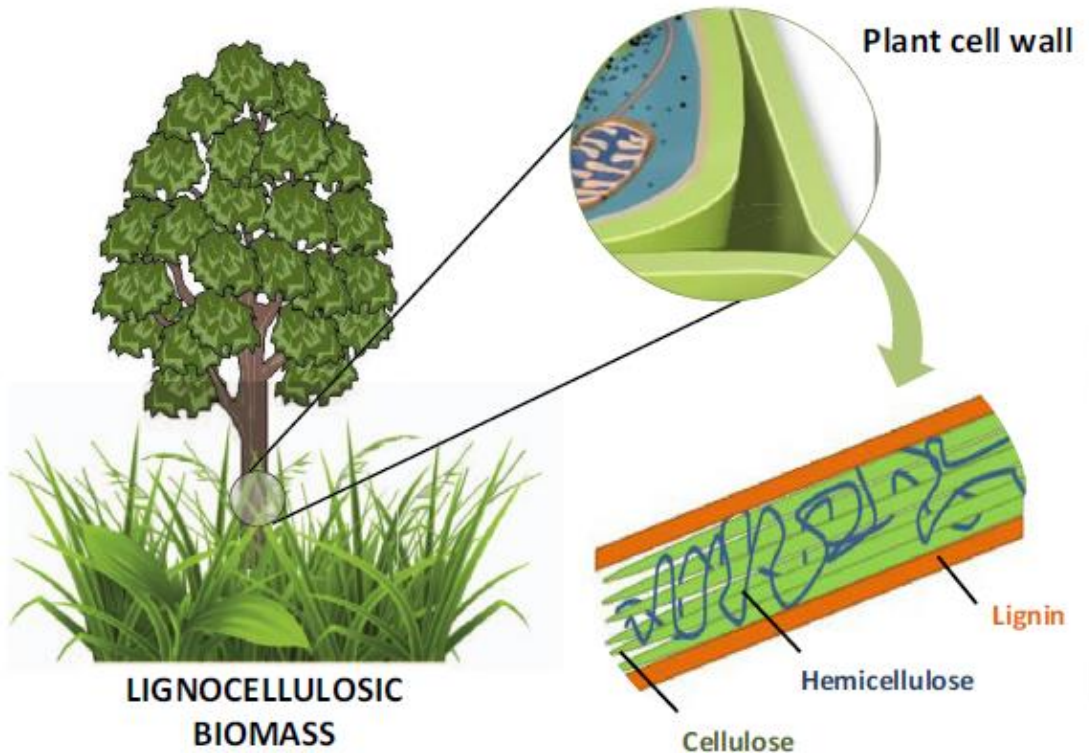
# Lignocellulosic Biomass

- Biomass collected from municipal gardens in Madrid
- Continuous and local production
- Varying composition:
  - 37.8% cellulose**
  - 14.0% hemicellulose**
  - 29.1% lignin**



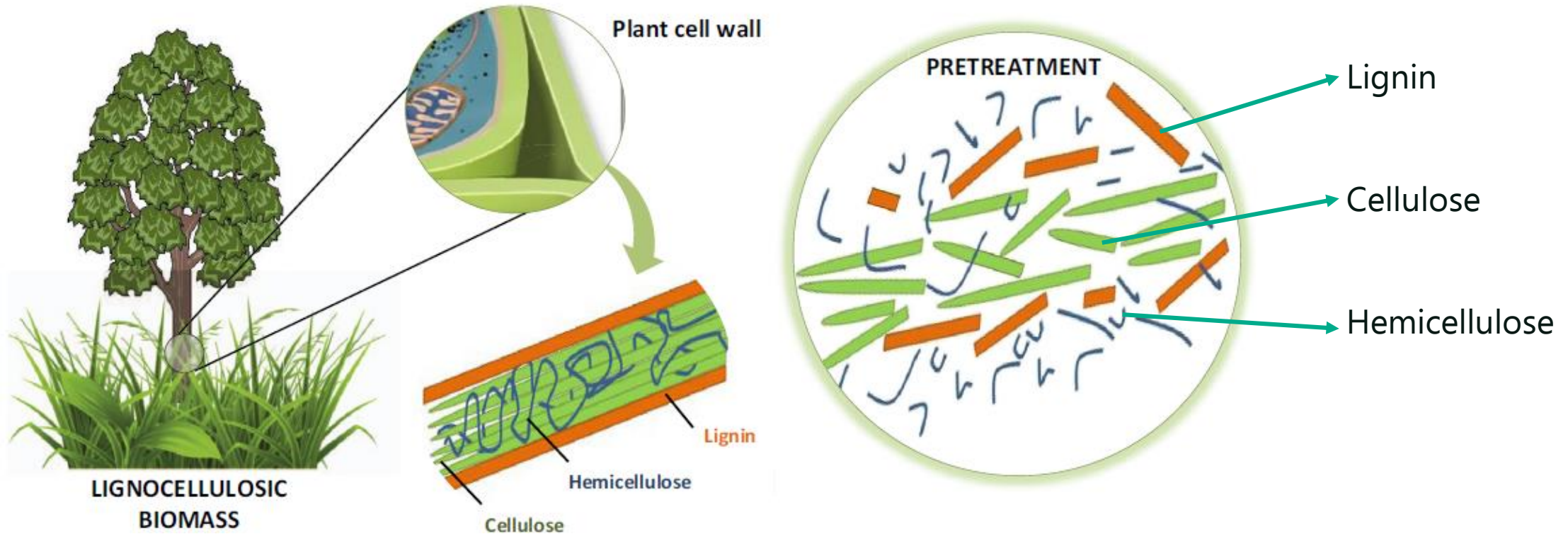
Municipal Green Waste

# Lignocellulosic Biomass



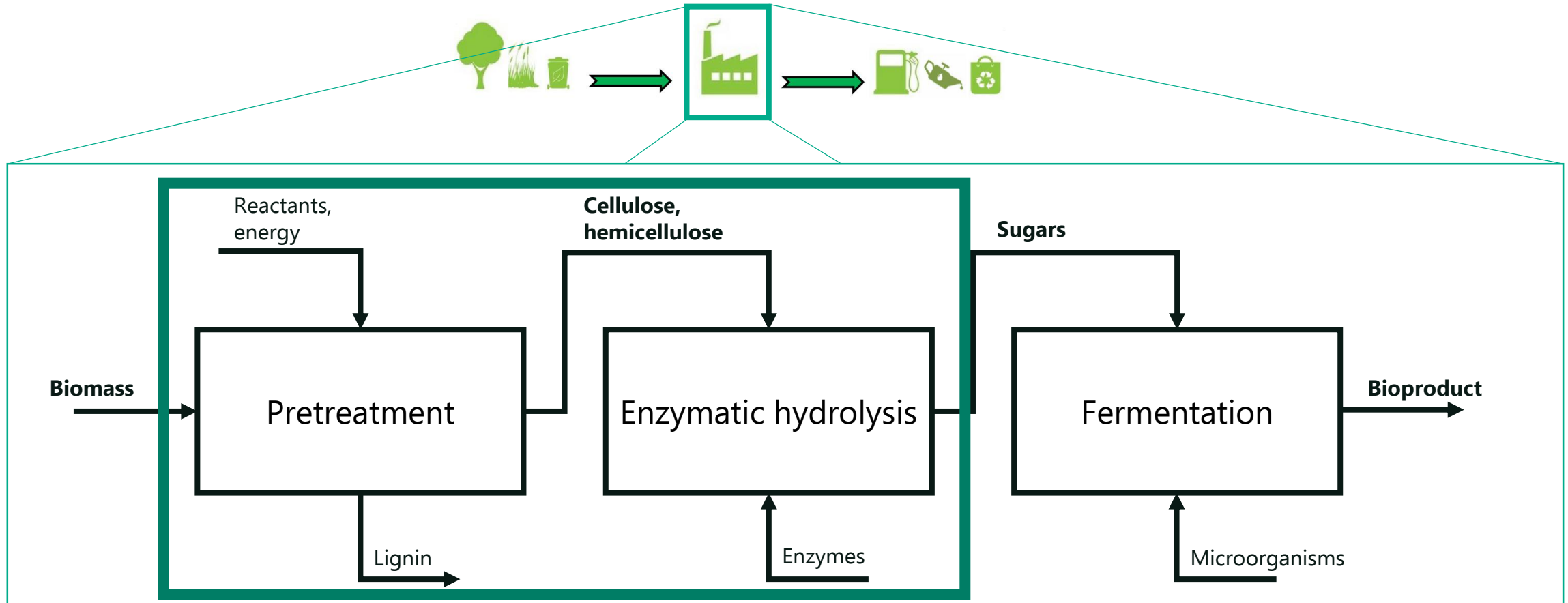
## Structure and sources

# Lignocellulosic Biomass



Structure and sources

# Lignocellulosic Biomass



Fractionation and Valorisation

# Biomass Fractionation

Pretreatment and  
Hydrolysis

# Biomass Fractionation

## Steam explosion

Hydrothermal technique

- 60 mg H<sub>2</sub>SO<sub>4</sub>/g MFGW
- L/S = 1
- Impregnated for 16 h
- 195°C for 10 min

## Organosolv

Chemical technique

- Acetic acid + hydrogen peroxide  
80°C, 150 min, L/S = 10
- EtOH + n-propylamine, anthraquinone  
150°C, 30 min, L/S = 10

P r e t r e a t m e n t

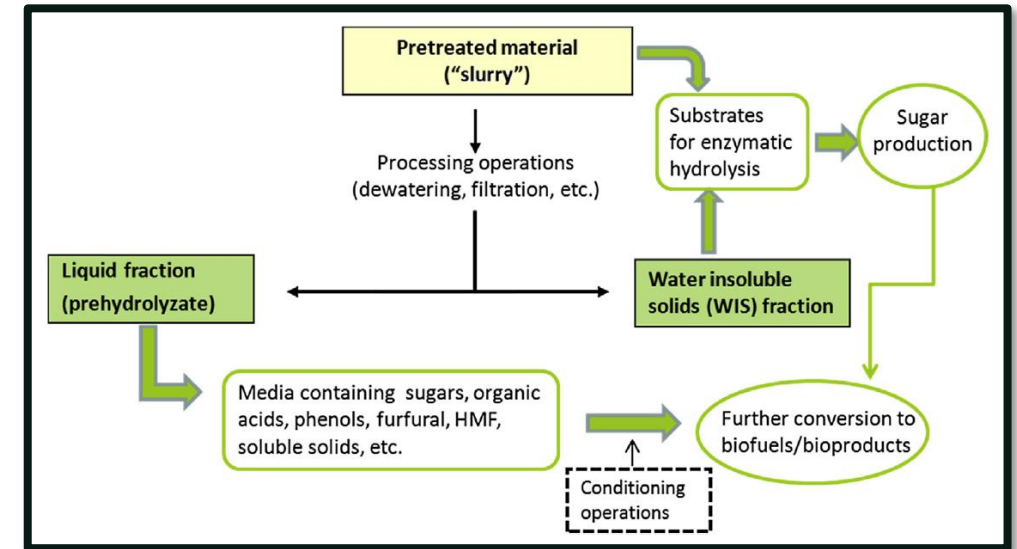
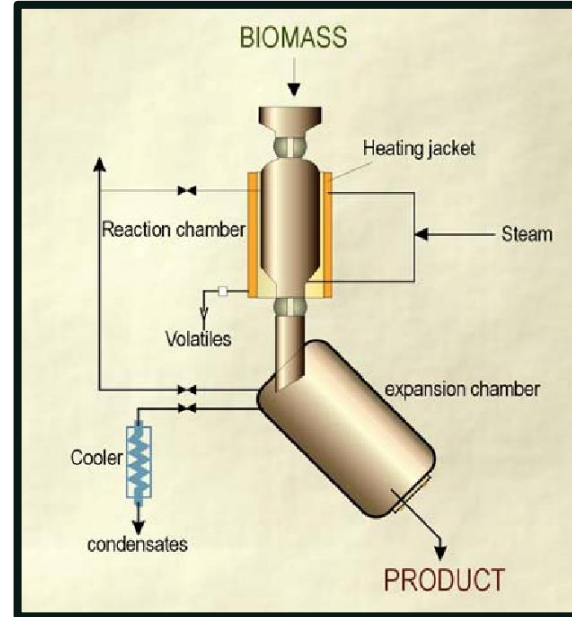


# Biomass Fractionation

## Steam explosion

Hydrothermal technique

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Pretreatment

# Biomass Fractionation

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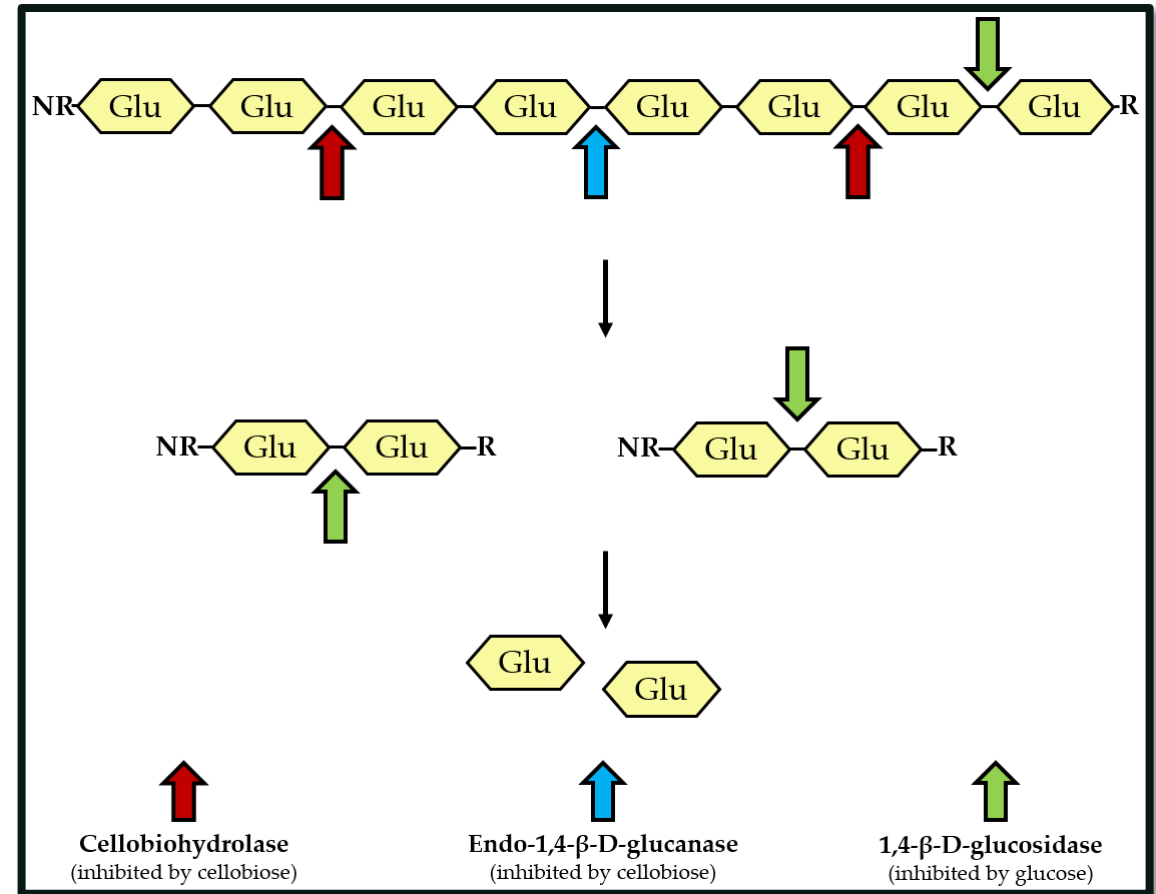
Pretreatment

BIO3

# Biomass Fractionation

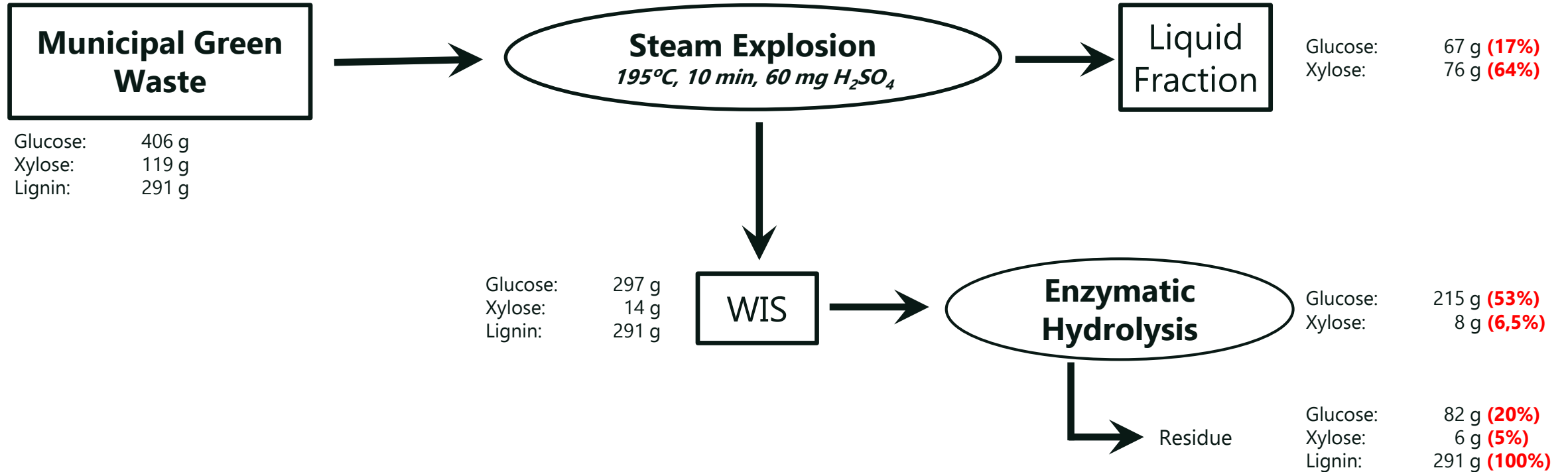
Liberation of monomeric sugars from carbohydrates

- Cellic® CTec2 (Novozymes)
- Solid loading: 15% (w/w)
- Enzyme loading: 45 FPU/g glucan
- Temperature: 50°C
- pH: 5.0 (Na-Cit buffer)



Enzymatic Hydrolysis

# Biomass Fractionation



Pretreatment + Hydrolysis

# Biomass Fractionation

- **Lactic acid (ongoing):** 50 g/L,  $Y_{P/S} \approx 0.9$
- **Caproic acid**
- **PHAs**
- **Lignin utilization**

**Further info:** Negro et al., Energies 2020 13(17), 4432

**S u g a r s U t i l i z a t i o n**



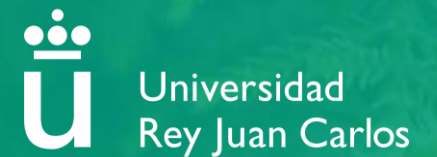
Proyecto BIOTRES-CM (P2018/EMT-4344),  
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# Thank you for your attention!



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**CIBERIMAGINARIO**

