



Fresh alfalfa stem properties across positions for bio-based material applications.

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CONTEXT & OBJECTIVES

Legume with deep root network:

- Nitrogen and carbon soil storage

➤ Forage crop with high-quality proteins¹

➤ Valorization of a local resource

Proposition: Alfalfa stem fractioning and specific valorization of some parts as material

Low-input cultivation :

- Biodiversity preservation
- Soil and water quality

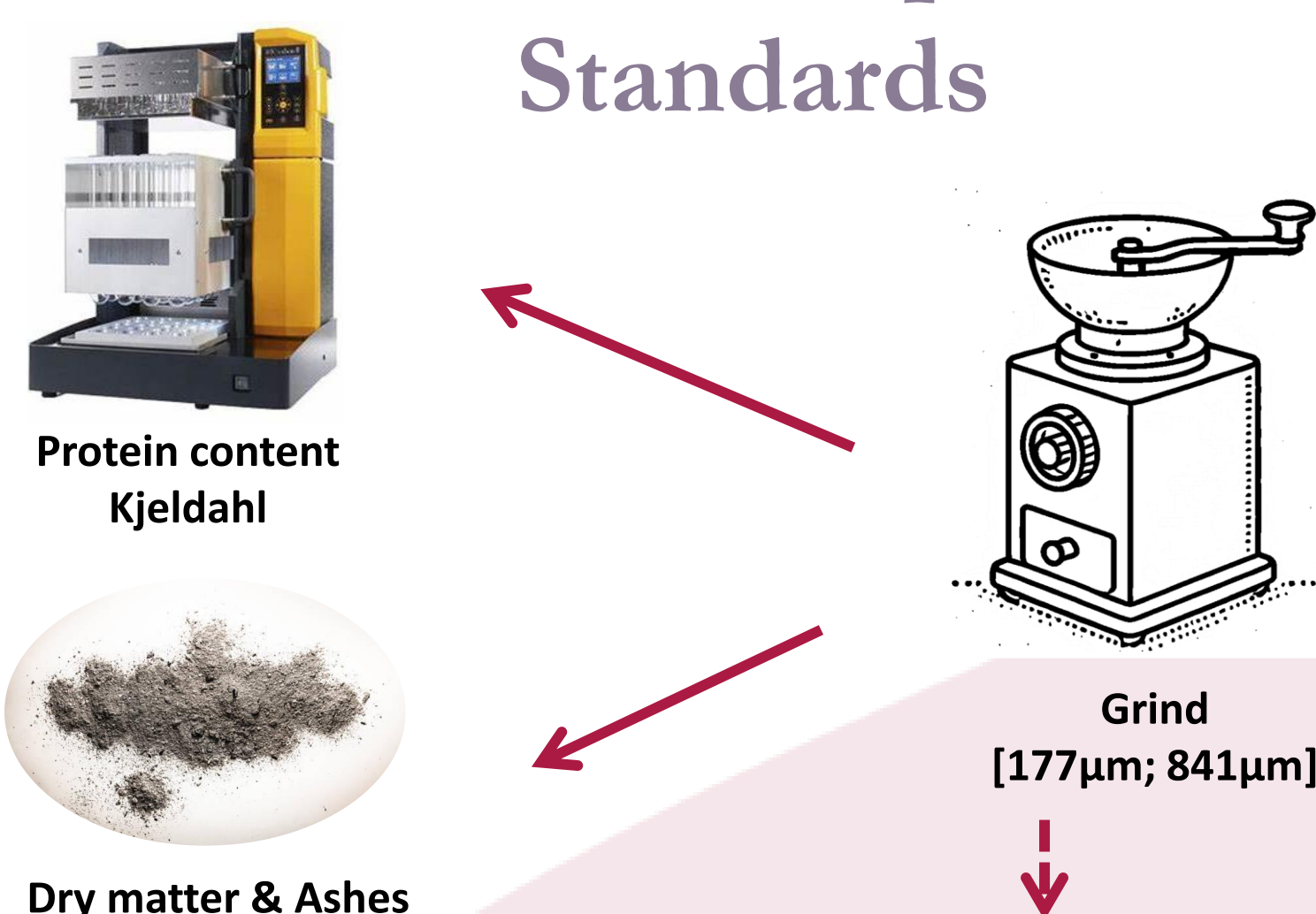
Bio-based material production:

- Carbon footprint reduction
- Good insulation properties
- Biodegradability and waste reduction

Sustainable biocomposite

METHODOLOGY

Chemical composition Standards



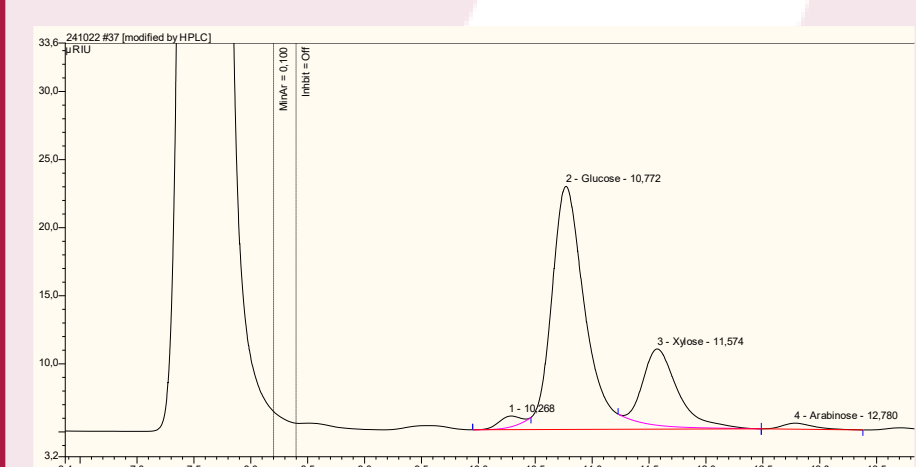
Ethanol extraction



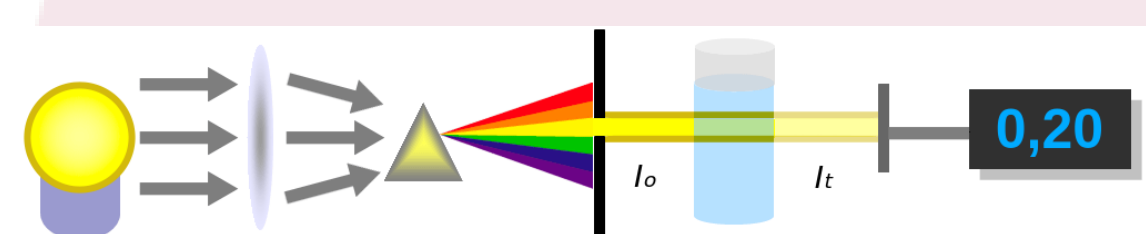
Acid hydrolysis



Acid Insoluble Lignin

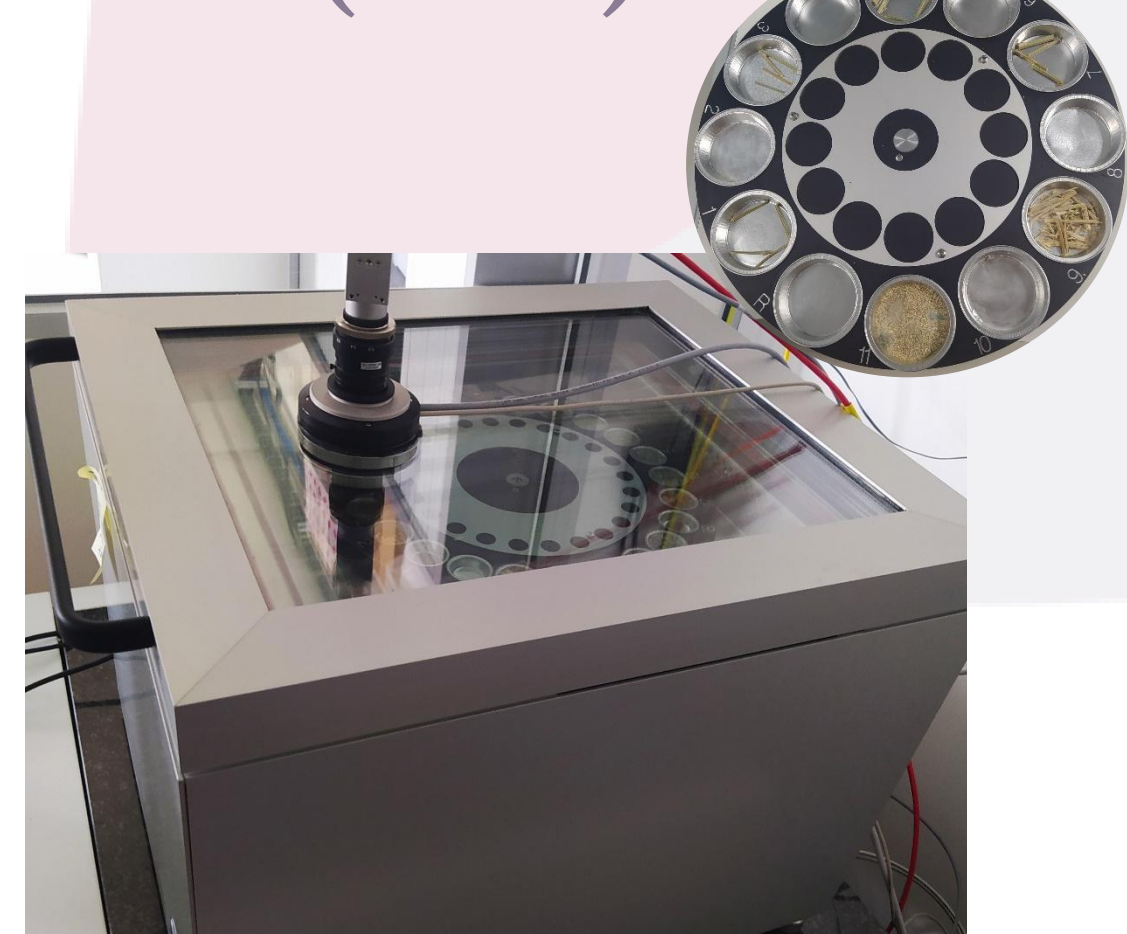


HPLC analysis: Sugars = cellulose & hemicellulose



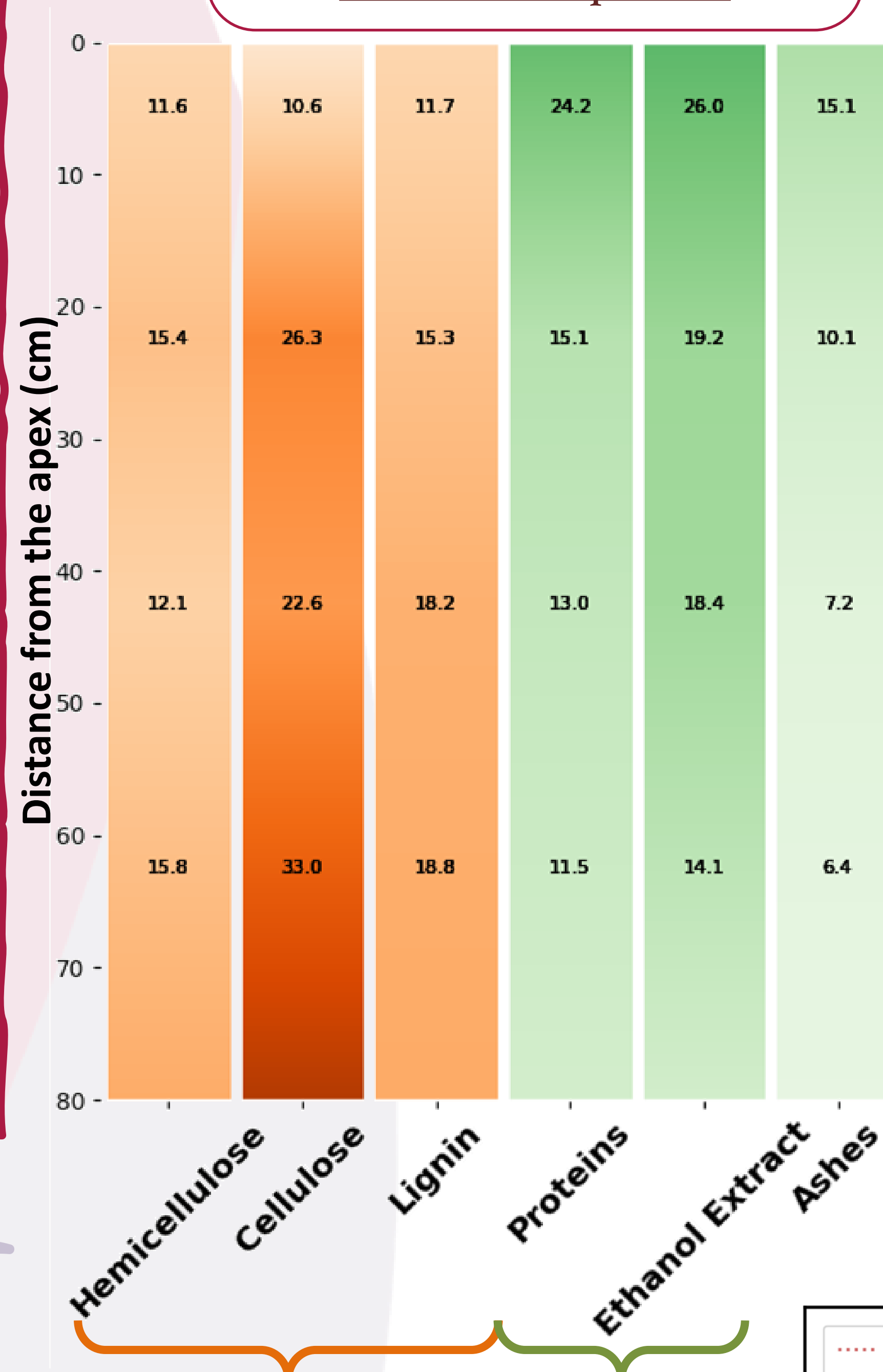
Spectrophotometer UV-Visible: Acid Soluble Lignin

Dynamic Vapor Sorption (DVS)

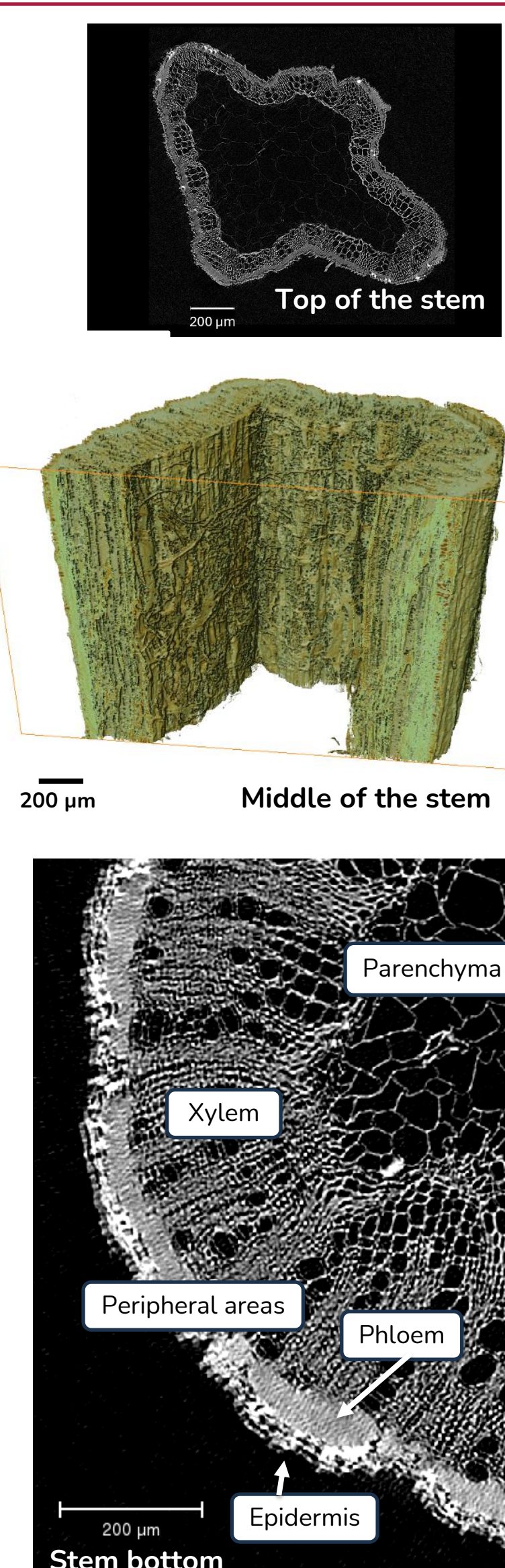


RESULTS

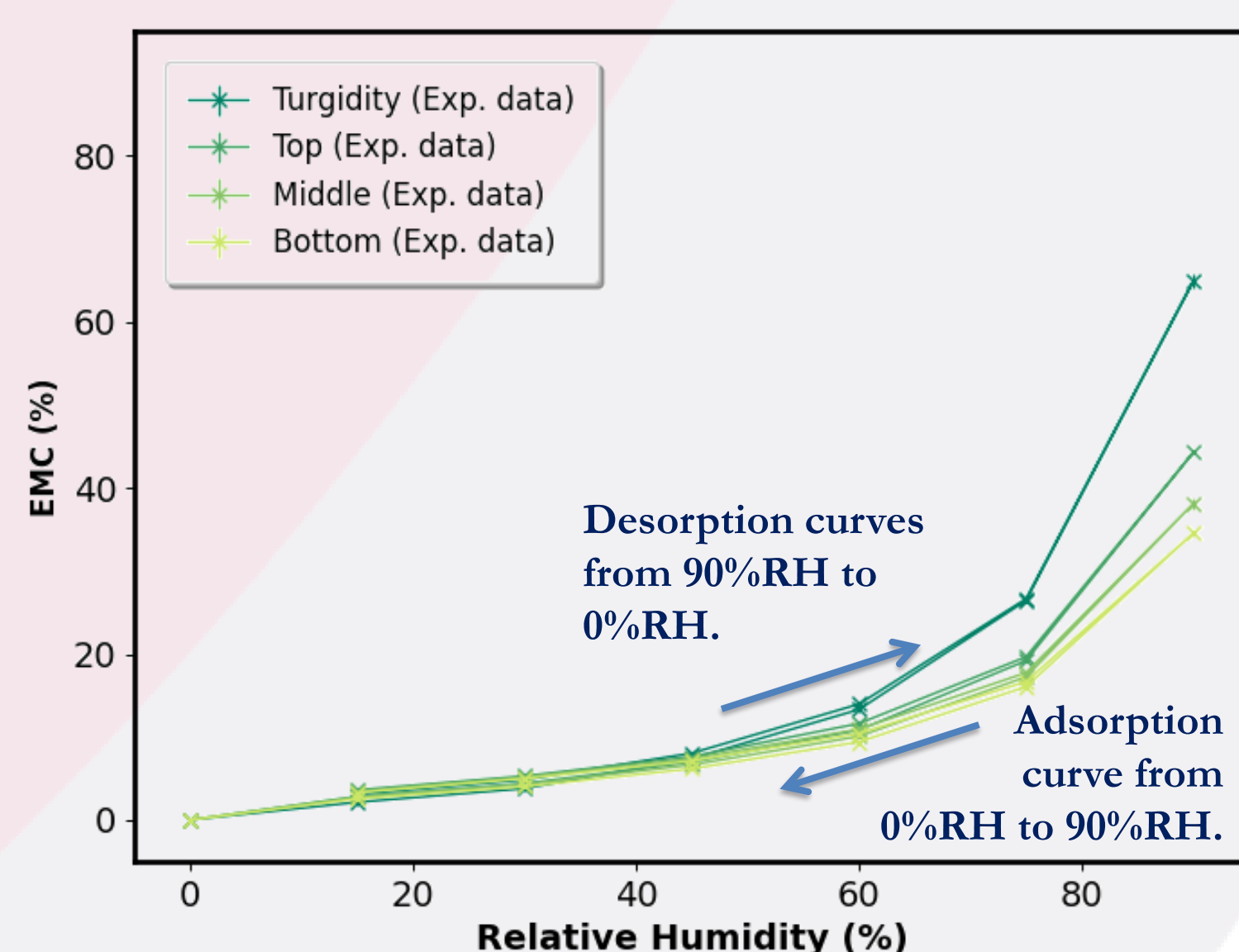
Chemical composition



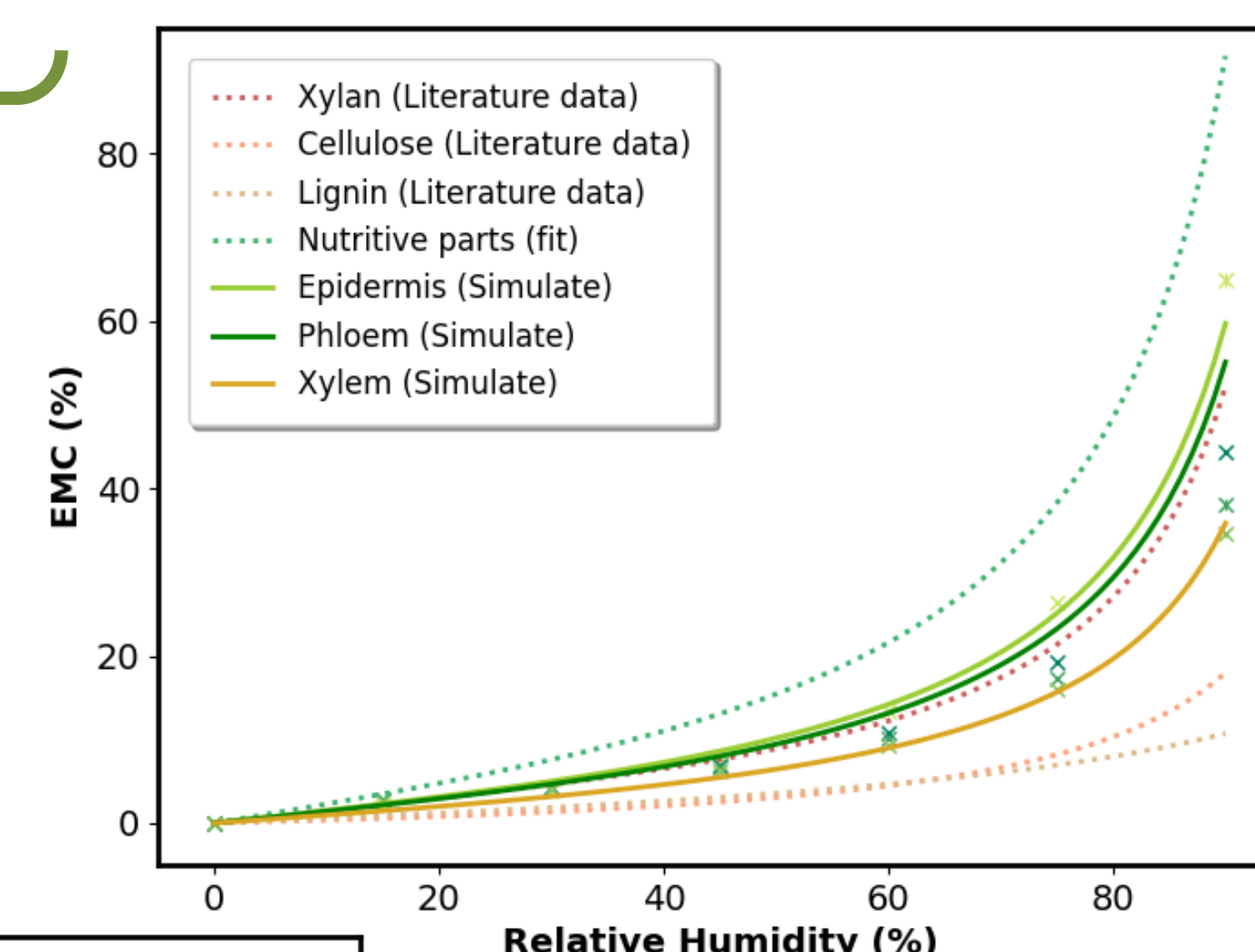
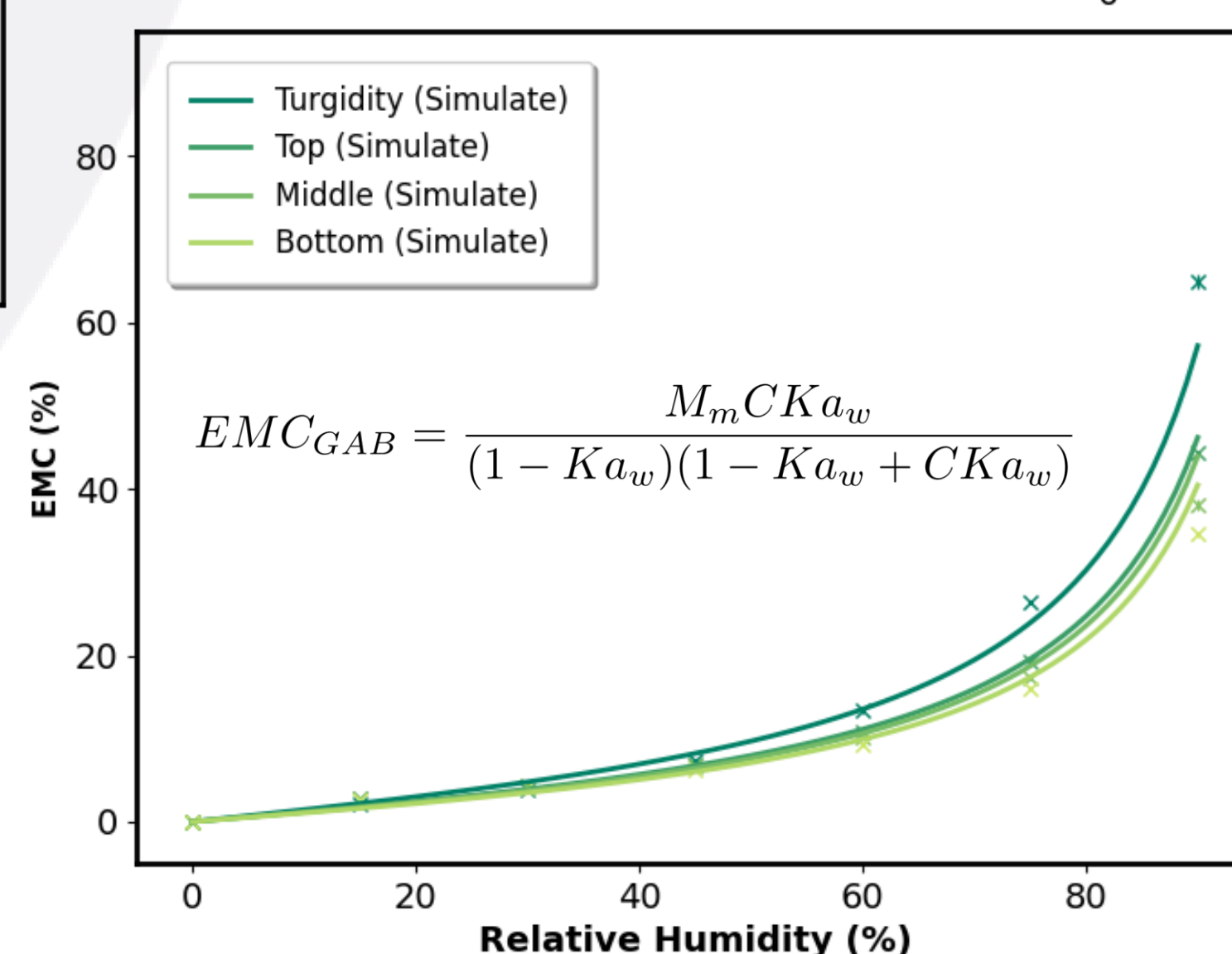
Nanotomography images



Sorption isotherms



Fit GAB model



Simulate tissues composition and sorption behaviors

Alfalfa stem study across position:

- Chemical composition,
- Morphology,
- Vapor Sorption.

CONCLUSIONS

Data analysis and model

Alfalfa fibers composition and sorption behavior:

- Application in biobased material production.

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