

# Natural Extractives from Invasive Species: A Citizen Science Approach

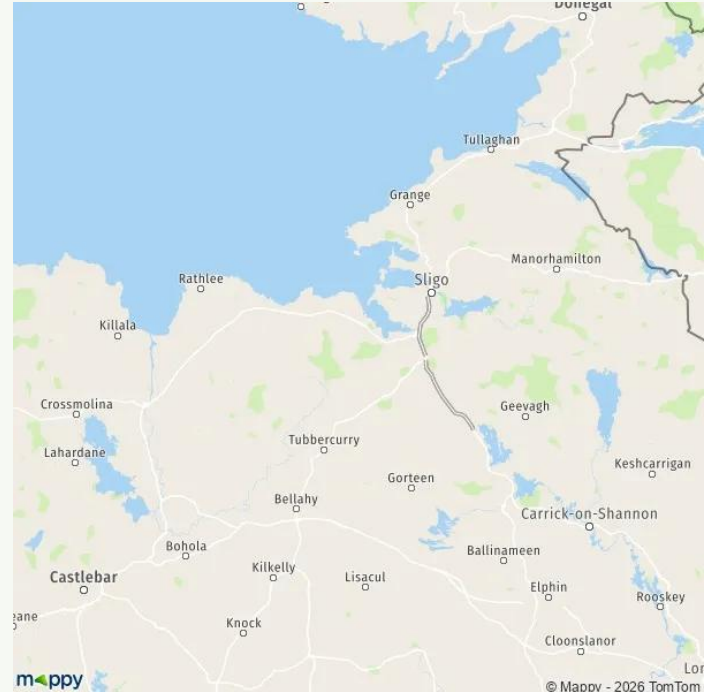
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Presented by Via Narasimhan



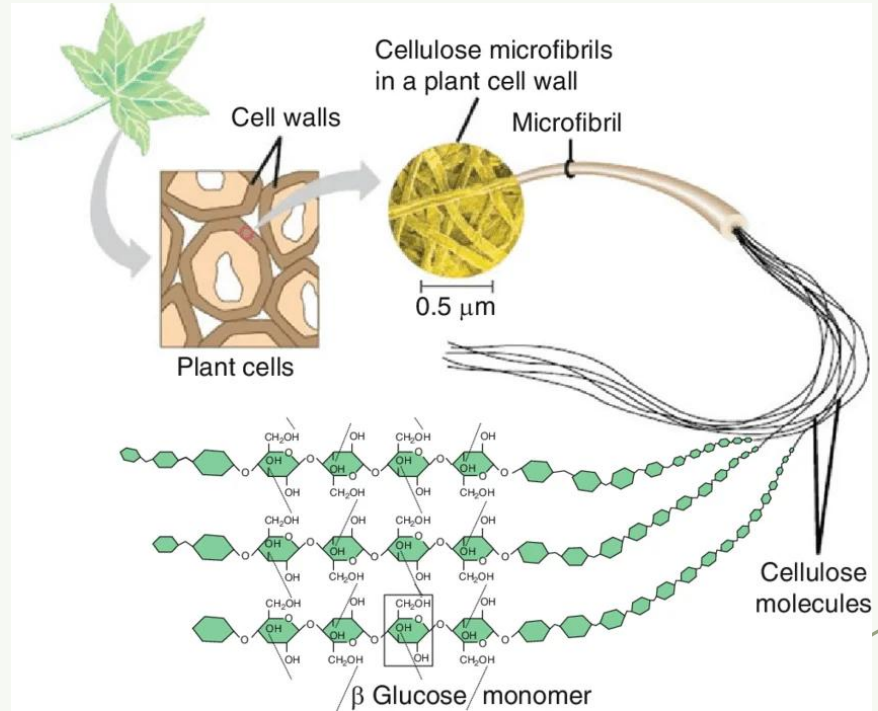
# Background

- **Sligo** has many freshwater ecosystems, which are becoming increasingly affected by **invasive alien aquatic species (IAAS)**
- **IAAS**→ degrade water quality, reducing water flows and nutrition transportation and increasing runoff and erosion leading to hyper-eutrophication, also interferes with the nitrogen cycle
- **Controlling invasive plants** through existing methods: biological, chemical and physical



# Background

**Plants** have valuable **extractives!**  
From oils, to fibers like cellulose  
and hemicellulose



# What is this project?

2 year project aiming to investigate transformative ways to control invasive alien aquatic plant species through mapping locations using citizen science and characterizing extracts from these plants

Year 1

**Sligo's living lab** → using citizen science methodology to help raise awareness on invasive species and map growth around the county

Year 2

Use **green chemistry routes** (ie Soxhlet, DES) to characterize extractives such as cellulose, lignin, hemicellulose and oils and assessing their value and potential as biocomposite materials.

**Take Home:** Transform the role that IAAS plays in our ecosystem and contribute to reducing reliance on non-renewable resources



# Target IAAS Species

American Skunk  
Cabbage



Fringed  
Water-lily



New Zealand  
Pigmyweed



Curly  
Waterweed



Nuttall's  
Waterweed



Least  
Duckweed





# Extractions from plants

## Soxhlet

Current trials using this method underway...

A relatively simple extraction method for hydrophobic materials



[10.1016/j.sajce.2021.06.007](https://doi.org/10.1016/j.sajce.2021.06.007)

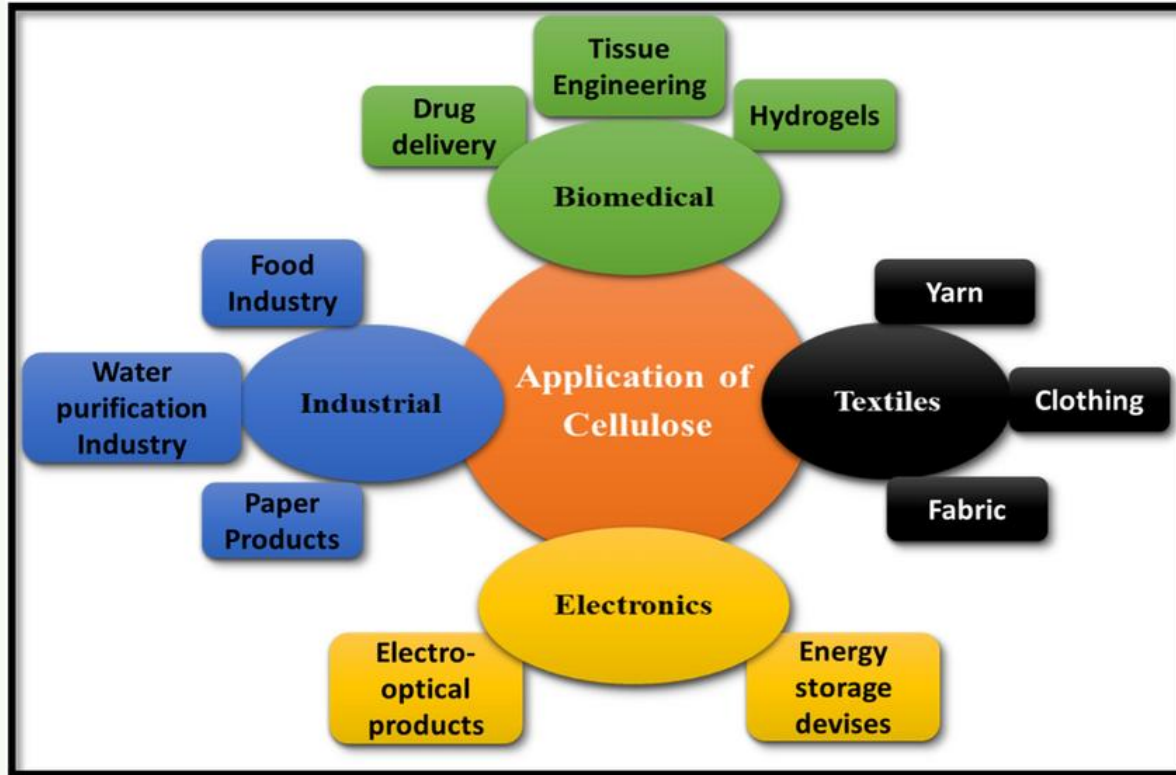
## Deep Eutectic Solvent

Emerging green chemistry route for cellulose extraction as opposed to the acid/alkali route.



<https://doi.org/10.1016/j.nxmte.2025.101532>

# The versatility of cellulose!



# Outcome & Impact

## Sligo's Living Lab

Greater understanding among stakeholders of AIS's environmental and economic impact and its potential for value-added applications

## Proof of concept: extracts

Establishing the first step in extracting IAAS in the lab. New knowledge on efficient, scalable, and green cellulose extraction methods

## Sustainable development Goals (SDGs)

**SDG 6** (Clean water), **SDG 9** (Industry Innovation and Infrastructure), **SDG 12** (Responsible Consumption), **SDG 14** (Life Below Water), **SDG 17** (Partnership for the Goals)



Thank you!

