

# WADABI – Aquatic plants from danube region as urban biorefinery feedstock

Winter A.<sup>1</sup>, Geiger P.<sup>1</sup>, Gindl-Altmutter W.<sup>2</sup>, Frischenschlager H.<sup>3</sup>, Schreiber H.<sup>3</sup>, Potthast A.<sup>1</sup>, Rosenau T.<sup>1</sup>, Beaumont M.<sup>1</sup>

1 Institute of Chemistry of Renewable Resources, University of Natural Resources and Life Sciences, Vienna (BOKU), Austria  
2 Institute of Wood Technology and Renewable Materials, University of Natural Resources and Life Sciences, Vienna (BOKU), Austria  
3 Umweltbundesamt, Environmental agency Austria

## Goals

- Valorization of an underutilized resource stream
- Creation of a value chain based on aquatic plants as additional resource stream for Bioeconomy activities
- Development of a sustainable production process for different nature-based building blocks
- Environmental Assessment of the Value Chain

## Preliminary Outcomes

- Chemical characterization and analysis
- Paper & Packaging Prototypes
- Established different Pulping and Bleaching procedures, focusing on low energy demand and chemical load
- Assessment & Impact on mechanical properties

## Characteristics Aquatic Plants for a blue Bioeconomy

- Local biomass with no utilization (composting)
- For Austria, there is no quantity data on the availability of biomass.
- Fresh-harvested plants have high water content causing challenges in storage, logistics, and processing. Therefore, it is very suitable for material use in a wet process.
- Issues related to storage & load prevent utilization as a feeding stock.
- Valuable precursors for bioeconomy, *i.e.*, proteins, extractives, polysaccharides
- Low recalcitrance and lignin content



Myriophyllum Spicatum

### Main Components

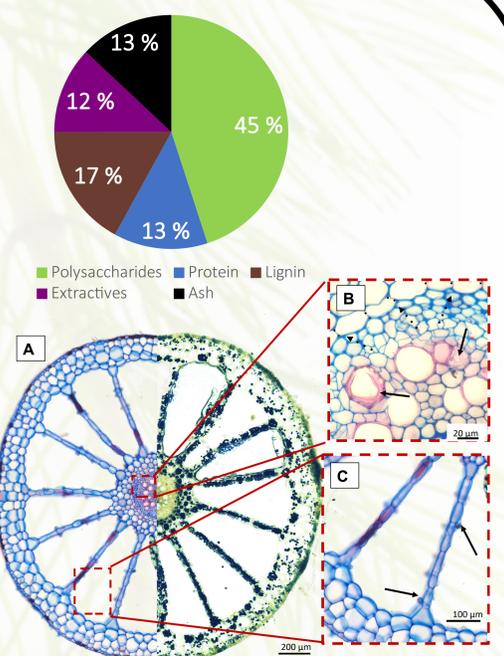


Fig. 1: Myriophyllum Spicatum and chemical composition. Quantitative and qualitative chemical composition with Astra Blue and Safranin Red staining, and iodine staining for starches.

## Application of the polysaccharide fraction for paper based material

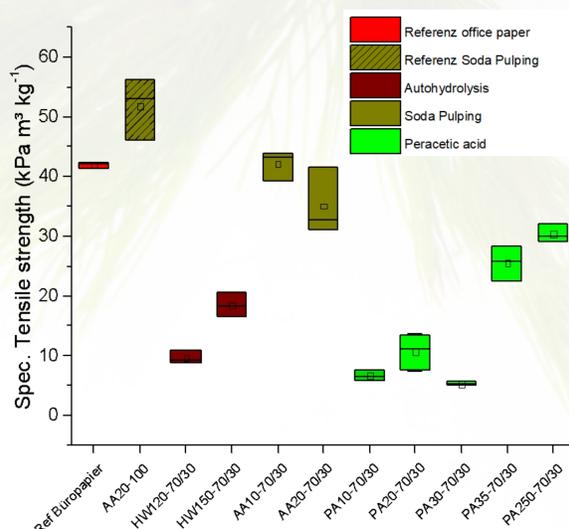


Fig. 2 Prototypes from Myriophyllum Spicatum Pulp, specific tensile strength from different treatment methods, AA Soda Pulping, HW Autohydrolysis, PA Peracetic acid, Neat 100% Aquatic Plant Pulp or 70 % aquatic plant pulp with 30% Kraft pulp mixture to improve rigidity

## Future Development

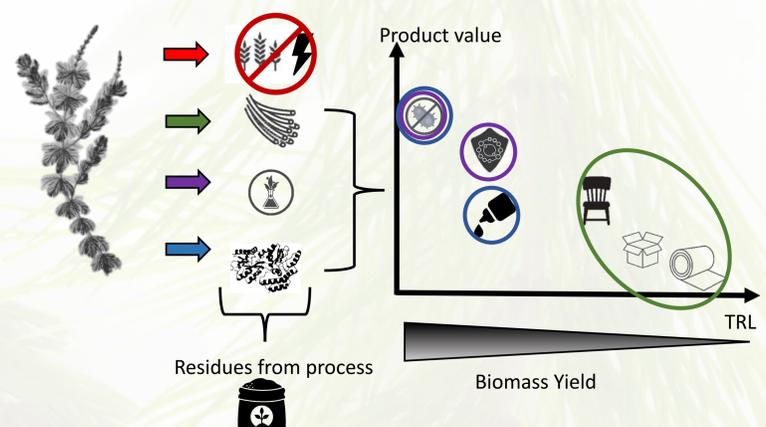


Fig. 3: Utilization Pathways. Green: Polysaccharides for paper-based materials. Blue: Proteins for adhesive and microbial applications. Violet: Extractives for microbial and antioxidative applications.

Development of a process technology for the holistic utilization of the plant components with additional recycling of the nutrients that are produced during the process