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# Atmospheric Pressure Matrix Assisted Laser Desorption/Ionization (AP-MALDI) combined with Ion Trap Mass Spectrometer (ITMS) – a New Technique for Fingerprinting and Structural Analysis of Plant Derived Oligosaccharides

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## AIM

- to develop the **mass spectrometric** (MS) method to perform the structural analysis of hydrolysed samples



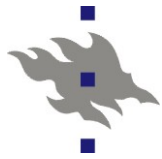
## MATERIALS

- Birch xylan, Sigma
  - alkaline extracted,
  - nonacetylated xylooligosaccharides
  
- Eucalyptus sample
  - steam exploded
  - acetylated xylooligosaccharides



## Sample Preparation

- **Matrix:** 10mg/ml 2,5-dihydroxybenzoic acid (DHB) in 30% (v/v) acetonitrile (ACN) in water
- **Spotting method:**
  - 1  $\mu$ l sample + 1  $\mu$ l matrix
  - dried under constant stream of warm air/vacuum
- **Purification enzymatic hydrolysate**
  - Dowex 50W(H+)
    - Desalting
  - Porous Graphitic Carbon (PGC) SPE column
    - Desalting
    - Separation of neutral and acidic xylooligosaccharides (XOS)



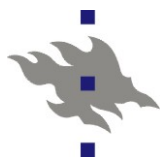
# AP-MALDI-ITMS Setting

## ■ Specifications

- Nitrogen Laser source: 337nm
- Laser Pulse Energy: 264μJ
- Mass analyser: ion trap
  - Standard mass range: 50-2000m/z
  - Extended mass range: up to 4000m/z

## ■ Calibration

- Manufacturer supplied ESI tuning mix
  - m/z: 118.2 – 2121.7
- Custom made acidic XOS (UXX),  
m/z = 627.17

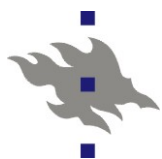


## ■ ADVANTAGE OF AP-MALDI

- Commercially available AP-MALDI source.
- Easy to do interfacing
- Enable to do structural analysis

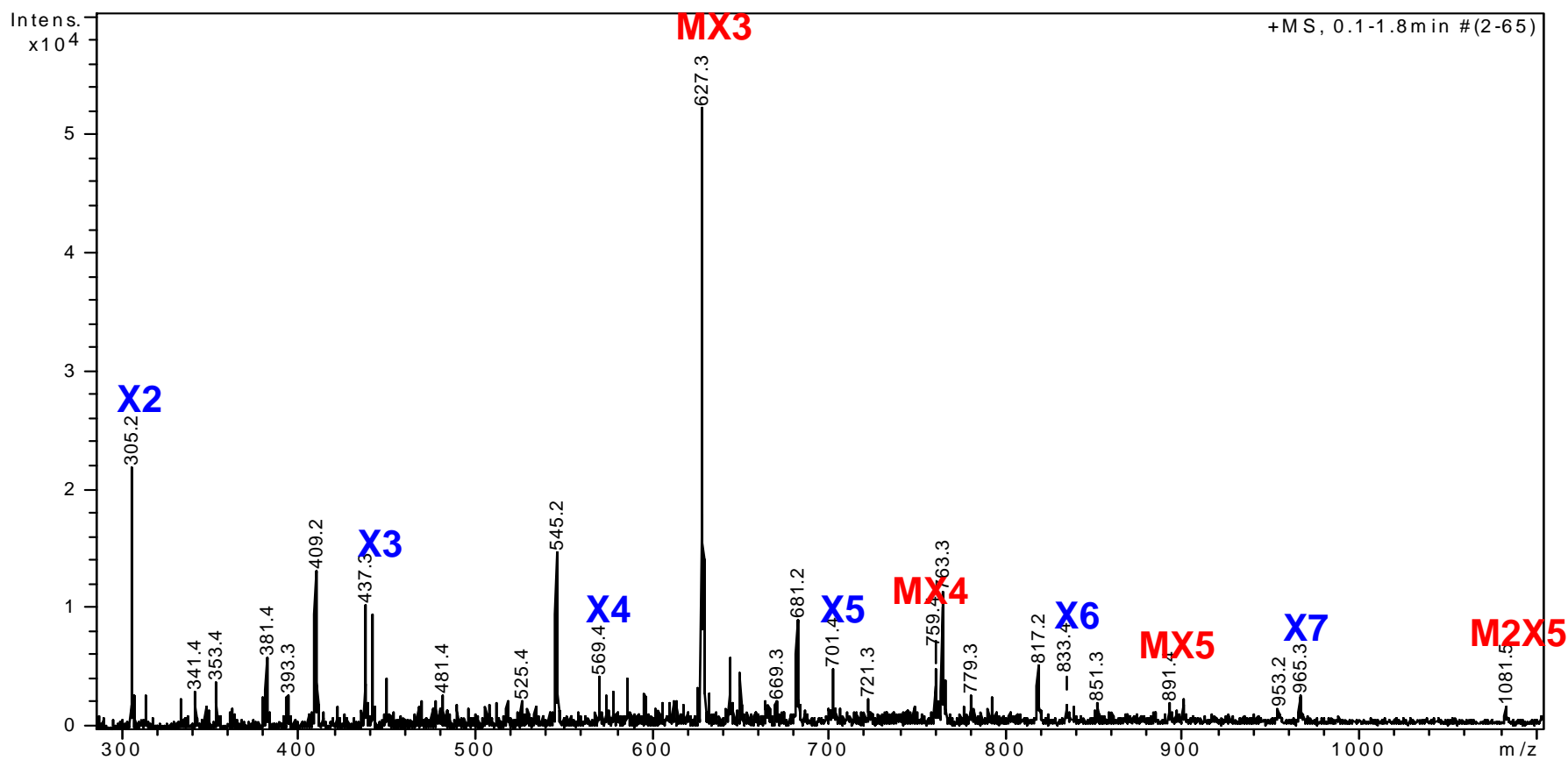


# RESULTS



# Deacetylated Birch Xylan/ Shearzyme (GH10) Hydrolysed AP-MALDI

Dowex 50W(H+) desalting





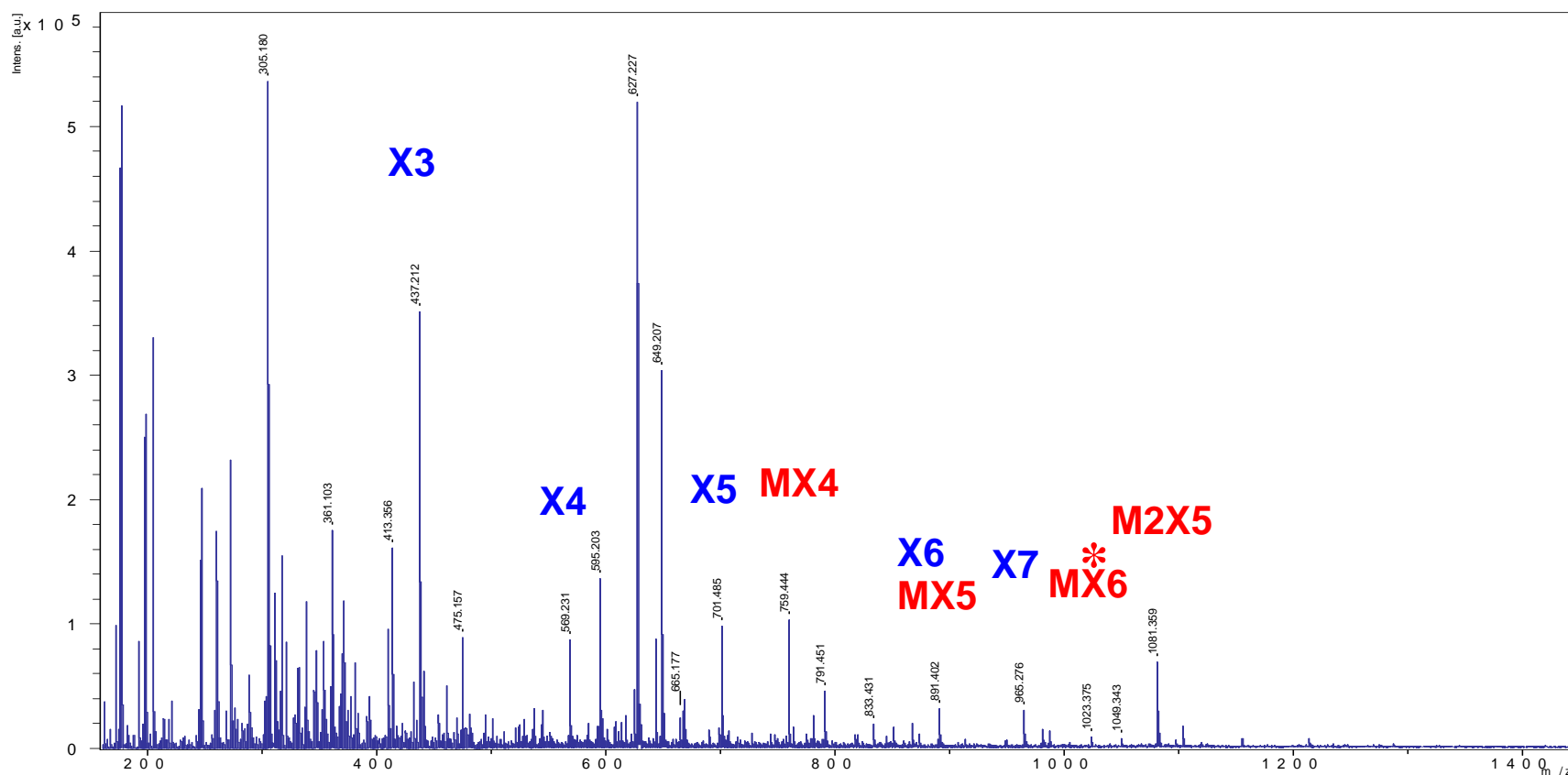


# Deacetylated Birch Xylan/ Shearzyme (GH10) Hydrolysed MALDI-TOF

Dowex 50W(H+) desalting

X2

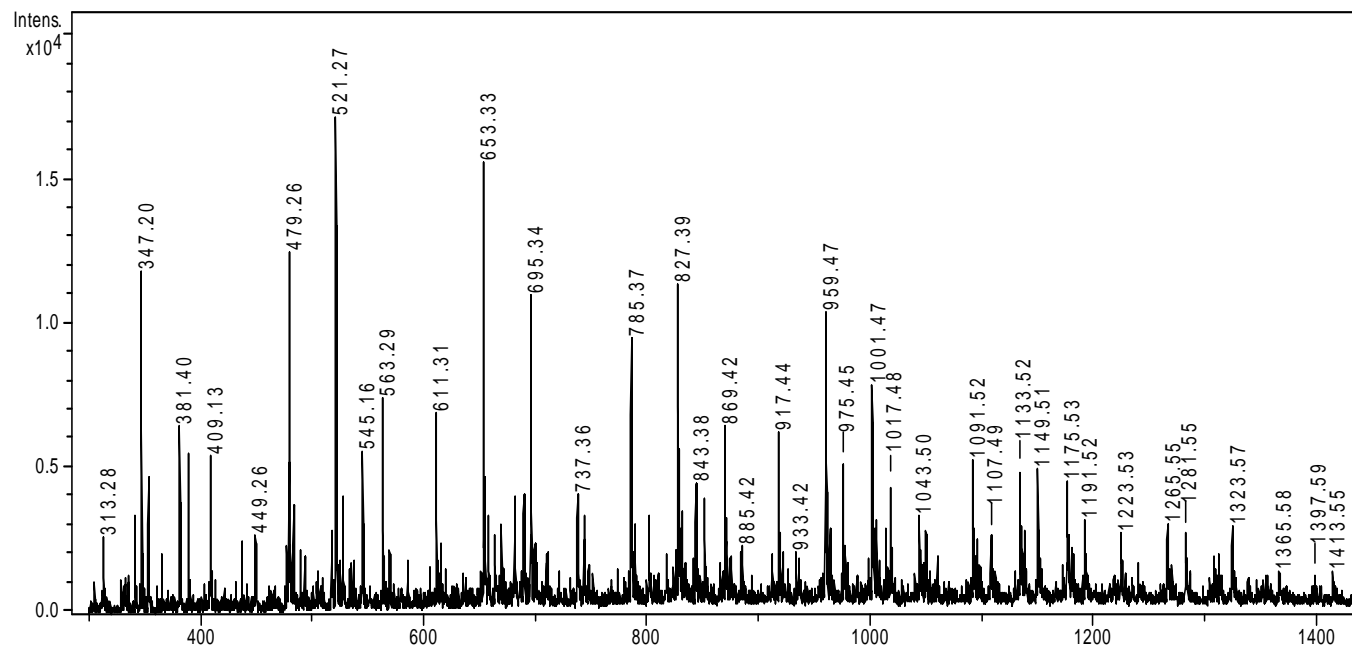
MX3



\* undetected in AP Maldi

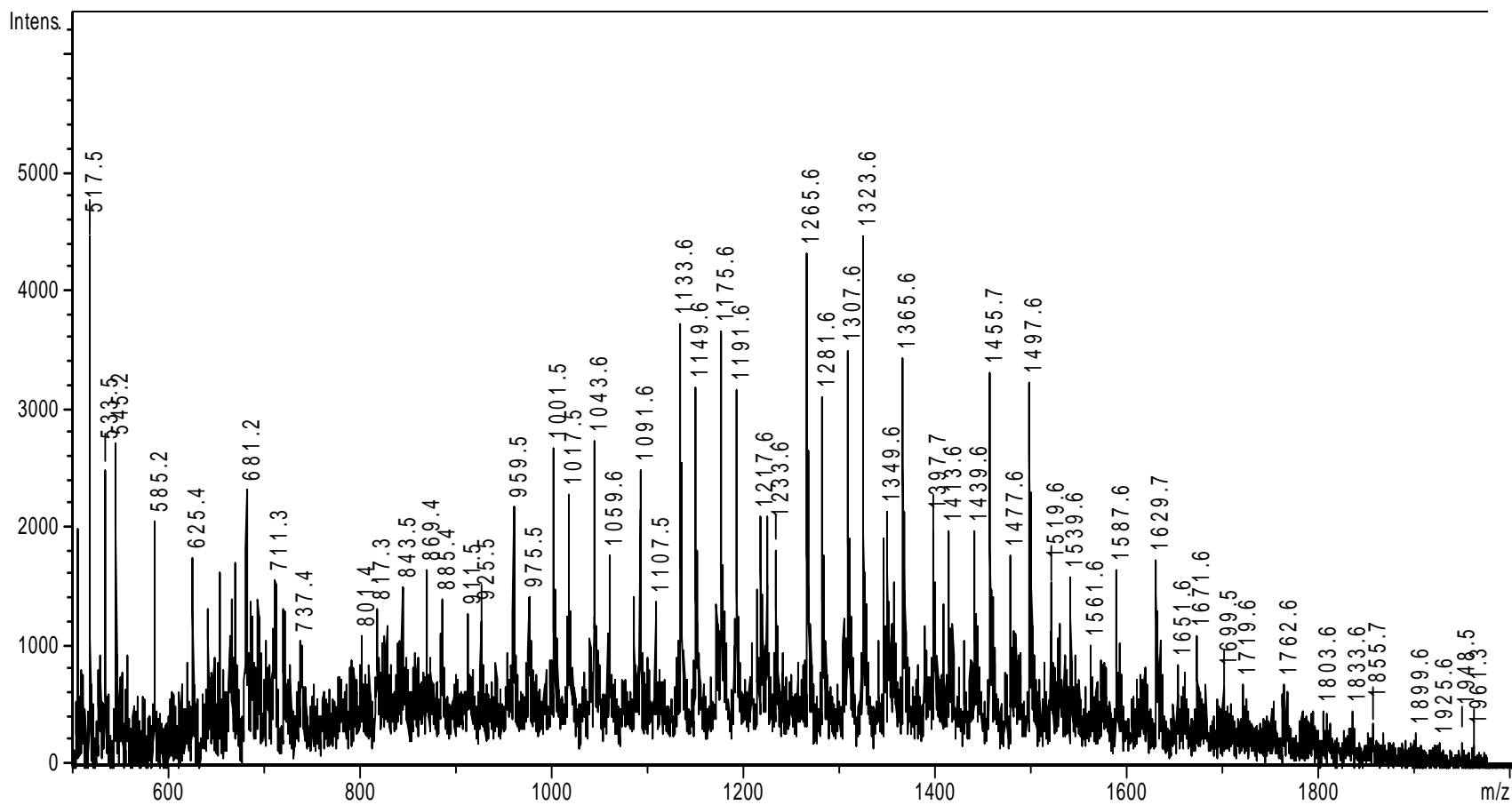


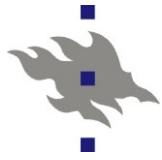
# Neutral XOS purified from Eucalyptus samples AP-MALDI





# Acidic XOS purified from Eucalyptus samples AP-MALDI





## CONCLUSIONS

- **AP-MALDI-ITMS is a potential technique for fingerprinting**
- **Structural analysis of plant oligosaccharides is possible**