



# Laboratory Services supporting Process and Product Development

Eva Sandås, KCL  
Ville Tarvo and Huy Quang Lê, Scitech-Service  
Mats Källdström, Walki

# Developing the KCL Laboratory Services in the BIOHUB

- Our main customer group has been pulping and paper industry with related industries - we have a very long experience from testing and developing biomaterials for our customers
- There is a customer need for new analyzing possibilities – new tests of new materials
- Our goal is to grow and expand our offering
- Thanks to the BIOHUB project we have been able to update equipment and expand our activities and customer base.

## What the BIOHUB support has enabled

- Establishment of a chemical analysis laboratory
- Establishment of a microbiology laboratory
- Complementing of the recyclability service
- Updating of the Labrefiner software
- Complementing of the testing possibilities of barrier materials

# Ion Chromatography

Industry expertise and tailored solutions



## Carbohydrates

(Arabinose, glucose, xylose, mannose, galactose, rhamnose)

- Pulp, paper, biomaterials
- Chips & black liquor
- Process waters
- Side streams
- Analyses according to ISO, SCAN and NREL standards

## Anions

( $\text{SO}_4^{2-}$ ,  $\text{SO}_3^{2-}$ ,  $\text{PO}_4^{2-}$ ,  $\text{S}_2\text{O}_3^{2-}$ ,  $\text{NO}_3^-$ ,  $\text{Cl}^-$ ,  $\text{F}^-$  and oxalate)

- Liquors, precipitations and ash samples related to the chemical circulation of the mill
- Raw materials and Process waters (circulation water, bleaching effluents etc.)

## Organic Acids

(Formic acid, acetic acid, lactic acid etc.)

- Black Liquor
- Pulp
- Process waters etc.



Inquiries



kaarina.fagerholm@kcl.fi



+358 40 829 4548



# Chemical Analysis

Biomaterial analysis with various methods



## Gravimetry

- ✓ Ash
- ✓ Klason lignin
- ✓ Suspended solids
- ✓ Fiber content (black liquor)

### From:

- Biomaterials
- Pulps
- Grass plants
- Black liquor
- Chemical circulation

## Extraction

- ✓ Acetone
- ✓ Ether
- ✓ Water
- ✓ Ethanol

### From:

- Biomaterials (e.g. food, industry residues)
- Pulps
- Paper
- Grass plants

## Titration

- ✓ Sulphate
- ✓ Chloride
- ✓ Sulfide
- ✓ Active, effective and total alkali
- ✓ Available lime
- ✓ Residual alkali
- ✓ Carboxyl and carbonyl groups

### From:

- Liquors
- Process waters
- Pulps

## Spectrometry

- ✓ UV-lignin
- ✓ Color
- ✓ Starch content
- ✓ COD<sub>CR</sub>
- ✓ BOD

### From:

- Process waters
- Pulp
- Black liquor
- Other biomaterials

## Catalytic combustion

- ✓ TOC
- ✓ TIC
- ✓ TC
- ✓ Carbonate

### From:

- Process waters
- Black liquor
- Chemical circulation



Inquiries

 [kaarina.fagerholm@kcl.fi](mailto:kaarina.fagerholm@kcl.fi)

 +358 40 829 4548

# Total composition of unbleached kraft pulp

## Lignin

Grav. lignin, %	3,0
Soluble lignin, %	0,6
<b>Total lignin %</b>	<b>3,6</b>

## Extractives

Acet. Extract., %	0,15
-------------------	------

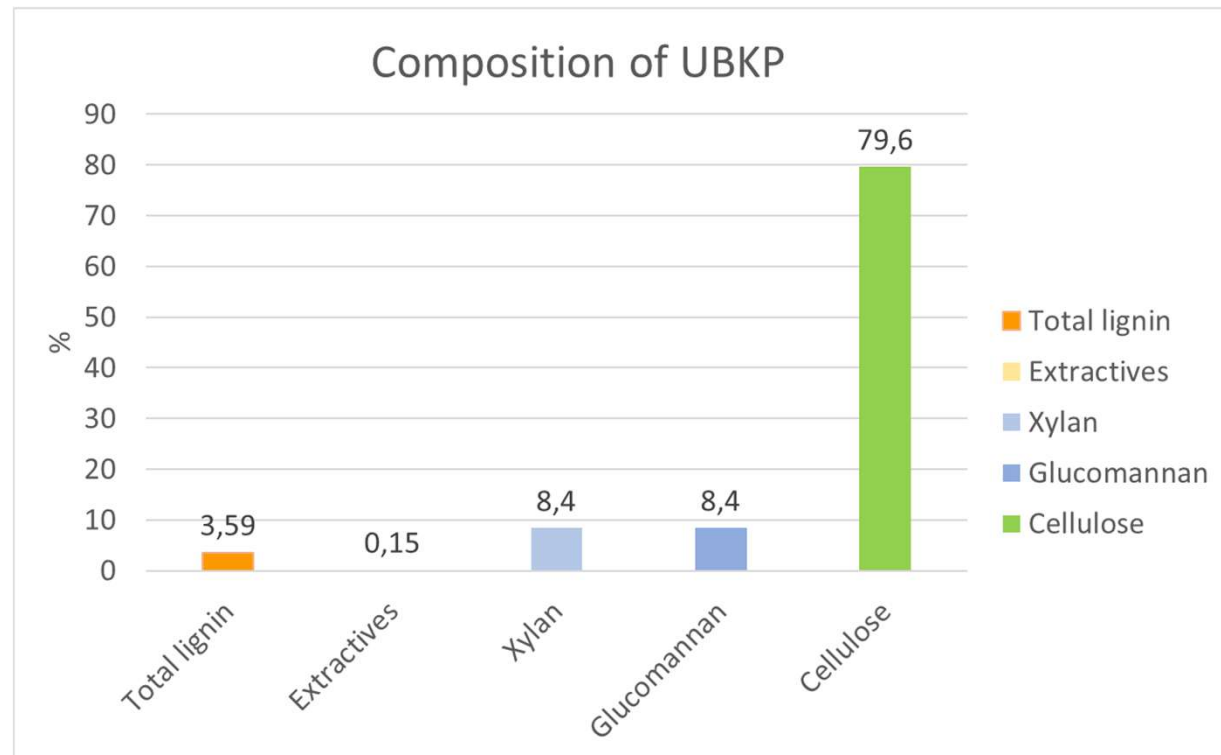
## Monosaccharides

Arabinose, %	0,7
Galaktose, %	0,4
Glukose, %	84,4
Xylose, %	7,8
Mannose %	6,7
Ramnose %	0,0

Total monosaccharides  
89,12 mg/100 mg

## Polysaccharides

Xylan %	8,4
Glucomannan %	8,4
<b>Cellulose %</b>	<b>79,6</b>





Ville Tarvo, [ville.tarvo@scitech.fi](mailto:ville.tarvo@scitech.fi)

Huy Quang Lê, [huyquang.le@scitech.fi](mailto:huyquang.le@scitech.fi)

“Technology is the application of science for business objectives”

# KCL piloting services for SciTech-Service

## SciTech-Service operated as on-site expert for customers

- SciTech provides “from idea to concept” design services with kg-scale testing.
- KCL’s versatile collection of biomass processing equipment enable the scale-up from kg to 100 kg.
- Readiness to modify the equipment to adapt the requested process.
- Exceptional openness in joint project planning and execution.





# KCL analytical services for SciTech-Service

## SciTech-Service subcontracted the analyses of customers' samples

- As SciTech provides services for complex customer concepts; reliable analytics is a prerequisite.
- Excellent accredited pulp and paper traditional testing services.
- Constant development in advanced pulp characterization methods.
- Readiness to adapt requested modification of the testing methods.
- Possibility for open discussion with the hands-on analytical experts.
- Flexibility in lead time, fast-track result delivery possible with reasonable premiums.

# Barrier material for (food) packaging



- Fiber based material are replacing plastic in packaging
  - We test water, oil, grease, food simulant absorption, as well as water vapor and oxygen transmission
  - Microbial safety and shelf life
  - Some materials need to be heat sealable – we test if they are - and at what temperature and pressure
  - Most barrier coated materials can not be heat-sealed and are difficult to glue
    - Heat sealability
    - Hot melt glueing
    - Dispersion glueing
- We can measure – or help in optimizing the coating
- Finally - the package need to be recyclable!



Inquiries

✉ [eva.sandas@kcl.fi](mailto:eva.sandas@kcl.fi)  
☎ +358 40 738 7842



# OTR analysis – crucial for food packaging

**Walki Group Oy**

**Mats Käldeström**, [mats.kaldstrom@walki.com](mailto:mats.kaldstrom@walki.com)  
**30.10.2025**

Company Confidential

walki

**We help our clients create value  
in three distinctive areas**



**CONSUMER  
PACKAGING**



**PACKAGING  
MATERIALS**



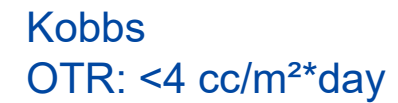
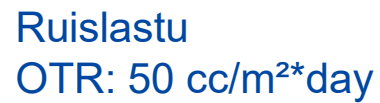
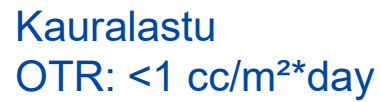
**ENGINEERED  
MATERIALS**



Operations  
with more than  
90 years of  
experience







OTR values measured at 23 ° C, 50 % RH

# Value from the BIOHUB for the KCL Laboratory Services

- We now have a **unique chemical analysis** lab
- We now offer a wide selection of **barrier tests**
- We test **heat sealability** and **glueability** of packaging materials
- We are one of a few labs **validated** to make **recyclability testing**
- We provide **microbiology** with culture-independent methods
- Our **Voith Labrefiner** now works more reliably, thanks to the new **control software**
- We support our coating customers with **crosscuts** and improved board and paper testing equipment, e.g. an updated **internal bonding** device.

# Thank you

Laboratory Services - KCL

eva.sandas@kcl.fi

+358 40 738 7842