

# AaltoCell™ as a part of forest industry - New green material for design



*Prof. Olli Dahl*

# Clean technologies group

3 post docs, 8 PhD students (4 in industry)

**Excellence status 2018 at Aalto**

## Research Strategy

- Plan and create new processes and products which promotes bio- and circular economy.
- Reduce environmental impacts of existing industry
- Including the sustainability in our research where LCA calculations are connected to economical and social aspects

## Focus areas

- Develop novel products from AaltoCell™
- Value added products from lignocellulosic materials before or instead of combustion
- Water use and recycling in industry (mining, pulp and paper and semiconductor



Olli Dahl



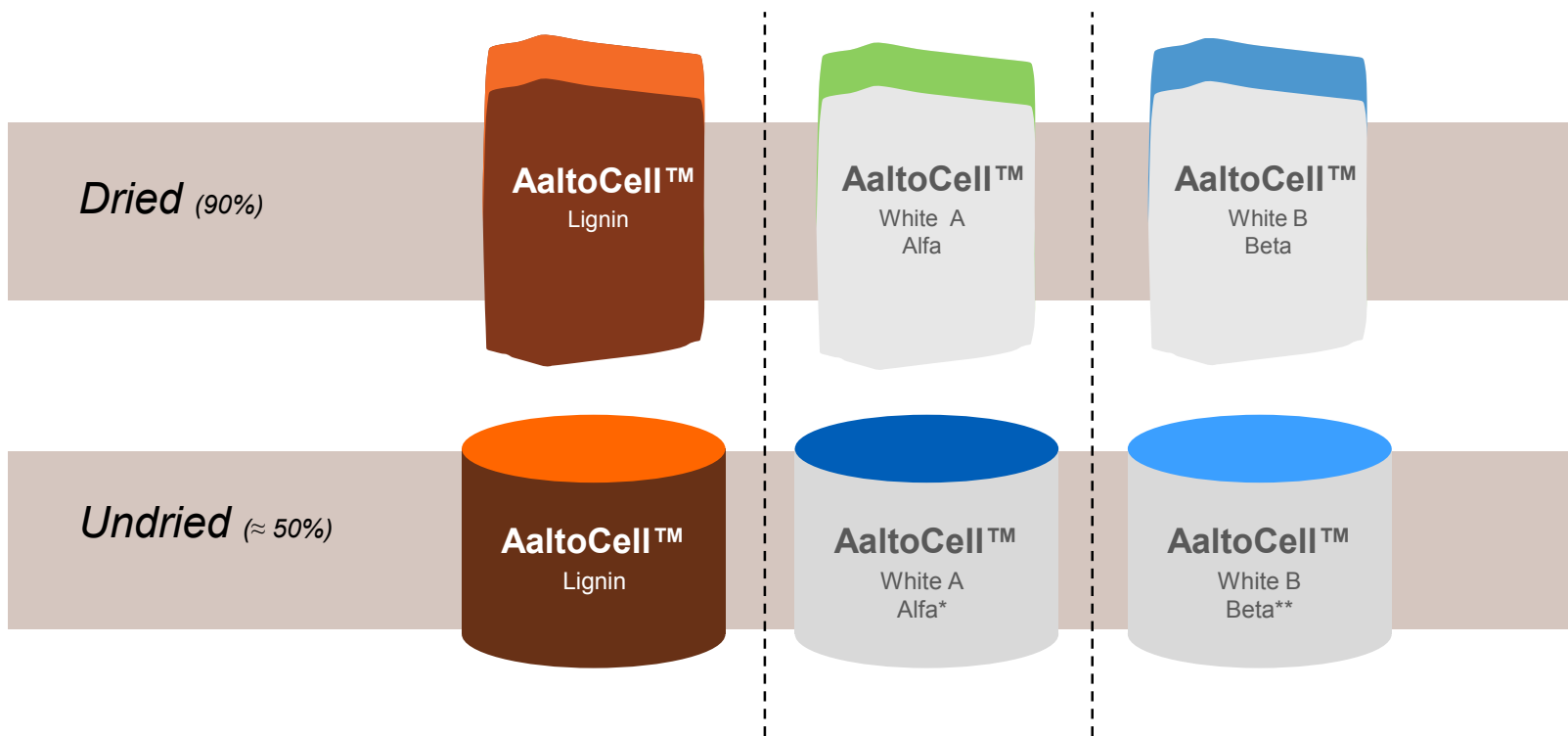
"White (pure cellulose) and Brown (cellulose + lignin) based AaltoCell™ MCC"

# AaltoCell™ - process and new products

- AaltoCell™ is a process which allows sustainable production of MCC
- MCC is microcrystalline cellulose with microsize and it's properties
- AaltoCell™ process based on scientific research where the results are scaled up to full production with co-operation of industry
- First mill installation 2020 to Kemijärvi by Boreal Bioeref Ltd. Finland. Process will be delivered by Andritz Ltd.
- Cheap and simply raw material allows totally new applications

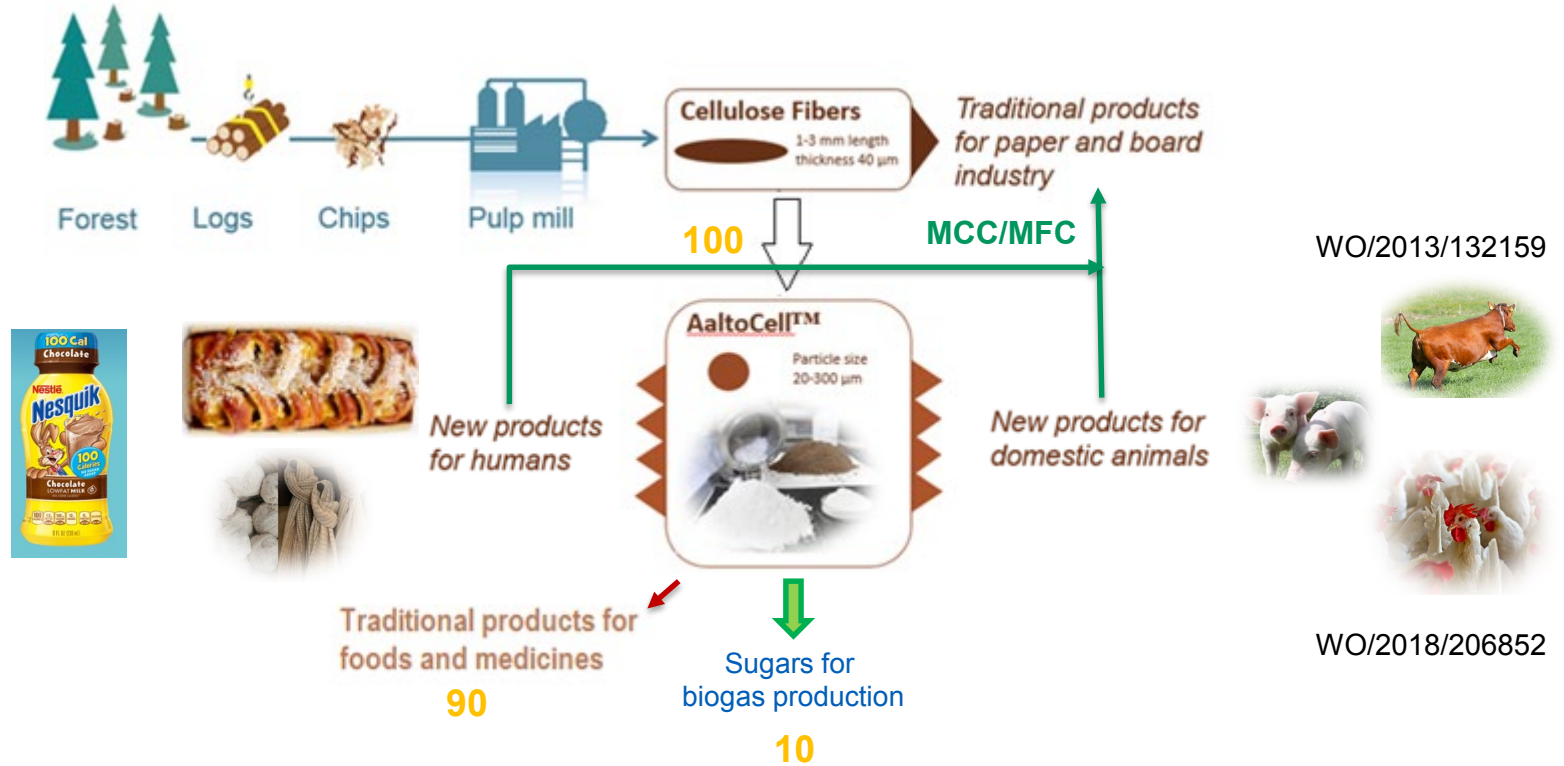


# AaltoCell™ product family



\* Alfa grade from dissolving pulp \*\* Beta grade from paper pulp

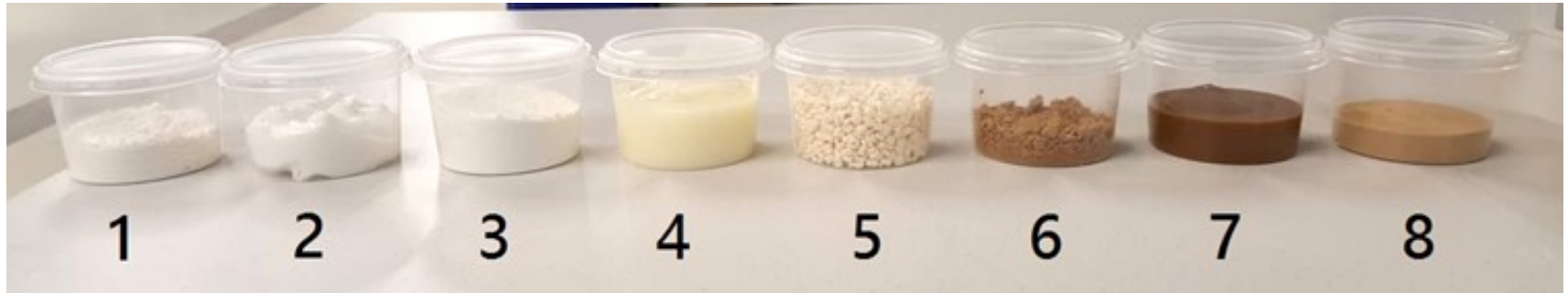
# Simplified AaltoCell™ ecosystem



# MCC/MFC applications and products

- AaltoCell™ (MCC) by simple mechanical treatment forms stable and pure MFC gels (cellulose or cellulose/lignin) about 10% consistency
- Intermediate of gels can be water or (plant) oils
- These AaltoCell™ gels opens totally new applications like:
  - Paper and board industry: decrease amount of kraft pulp fibers and improve surface smoothness as a coating etc.
  - Food / pharma industry: salad dressings and mayonnaise / chocolate / oral medicines
- AaltoCell™ (MCC) as such can be utilized as a filler in plastic products. Replacement % can be  $> 25$

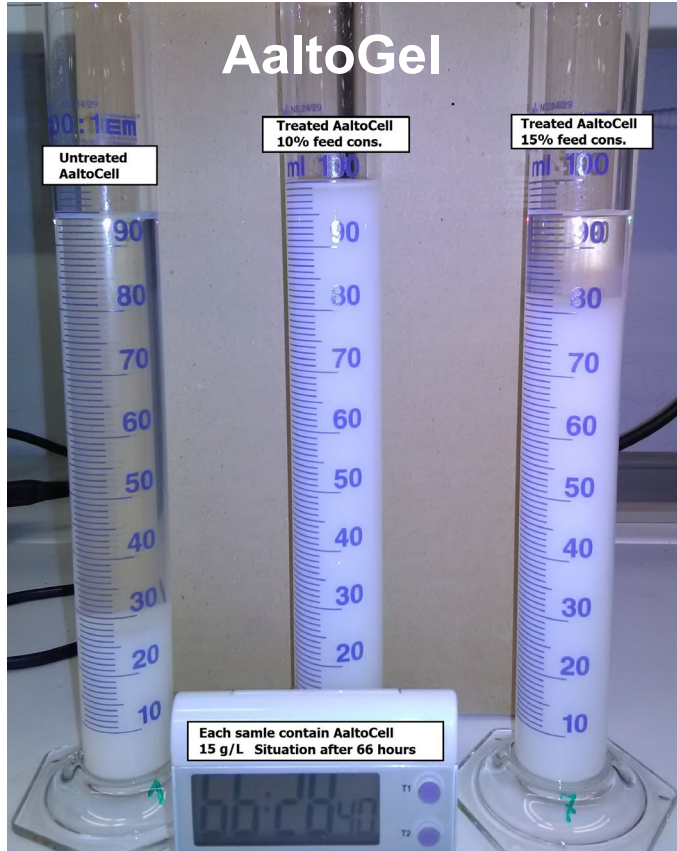
# MCC/MFC applications and products



1	is undried MCC with consistency of 45%	Food, Pharmacy, Paints, Baking
2	is undried MCC gel (mechanically treated) with consistency of 10%	Food, Pharmacy, Paints, Paper and Board making, Baking
3	is spray dried MCC with consistency of 95%	Food, Pharmacy, Paints, Plastics
4	is undried MCC with rapeseed oil with consistency of 8%	Food (salad dressings, mayonnaise, chocolate), Baking
5	is spray dried MCC combined with PP	Packaging
6	is undried lignin containing MCC with consistency of 45%	Feed and animal Pharmacy
7	is undried lignin containing MCC gel (mechanically treated) with consistency of 7%	Feed and animal Pharmacy, Board making
8	is spray dried lignin containing MCC with consistency of 95%	Paints, Plastics

# MCC/MFC products

> 90% dry



1.5% in water



8% in oil

10% in water



# MCC/MFC products



Can be used as  
a raw material for  
yarn where it replace  
dissolving pulp

Member of Parliament  
Marisanna Jarvan's  
independence day  
costume 2018

# A!

Aalto University

# Novel ecosystem for future biorefinery – case ForestIn

<http://forestin.fi/en/> Video

**AaltoCell™** and side products



# A

Aalto University  
School of Chemical  
Engineering

# Towards a better world

*aalto.fi*

Video made by  
Forest In - project



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