

The impact of microfibrillated cellulose on the performance of water-based barrier coatings

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Finished product and new formulations of varnishes, inks, adhesives and various types of coatings in response to the European directives on sustainable food packaging,

Paint & Coatings Italy

22 Ottobre 2024, Milano

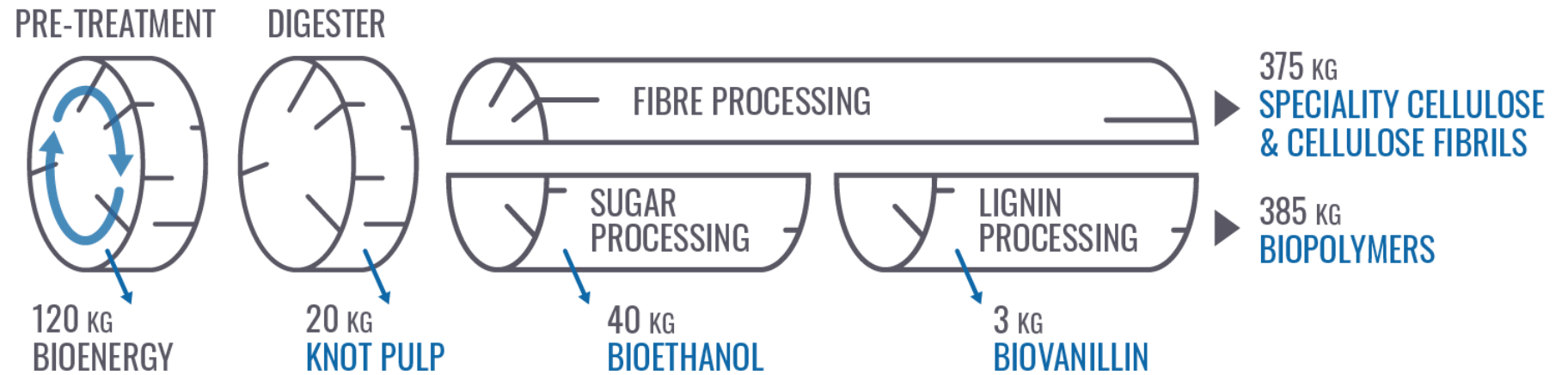


Borregaard: the world's most advanced biorefinery

1000 KG
WOOD

▼

94%
UTILISATION



BIOPOLYMERS

Concrete additives
Animal feed
Agrochemicals
Batteries
Briquetting
Soil conditioning

BIOVANILLIN

Food
Perfumes
Pharmaceuticals

SPECIALITY CELLULOSE

Construction materials
Filters
Inks and coatings
Casings
Food
Pharma
Personal care
Textiles

CELLULOSE FIBRILS

Adhesives
Coatings
Agricultural chemicals
Personal care
Home care
Construction

BIOETHANOL

Biofuel
Disinfectants
Pharmaceutical industry
Home care
Personal care
Paint/varnish
Car care

Climate change and the environment – targets and ratings

Science Based Targets for GHG emissions

- Approved by Science Based Targets initiative in 2022
- Targeted reductions in GHG emissions (scope 1 and 2):
 - 42% absolute reduction by 2030 (base year = 2020)
 - Net-zero target, 90% absolute reduction by 2050
- Targets in line with 1.5°C goal in Paris Agreement and Norwegian Climate Law

Highlighted as a global leader in corporate climate action by CDP

- Top 20 out of almost 15,000 companies scored

Gold status in EcoVadis Supply Chain

- Top 5% of 115,000 reporting companies



CLIMATE WATER



The mark of responsible forestry



Barrier coatings: current situation & drivers

EU Single Use Plastic Directive

A directive addressing 10 specific items to ban, to limit marine litter

PPWR

Requirements regarding packaging and packaging waste of materials, reusable packaging and waste management

PFAS bans

The European Commission proposes a ban on all PFAS due to their persistence, toxicity and bioaccumulation in organisms

EPS bans

Plan to ban food service products like containers, plates, trays, bowls, clam shells, and cups during 2024

Recyclability challenges

Challenges in the recyclability of PE/PP laminated fiber-based packaging

Consumer consensus

Increasing consumer consensus towards sustainability

Borregaard's solutions



Lightweighting

- Replace plastic packaging
- Reduction in CO₂
- Less wood needed
- Less waste created



Bio-barrier

- Replace plastic and PFAS
- Compostable
- Reduction in CO₂
- Reduction of dusting



Improved barrier

- Higher performance
- Faster process
- Less waste created
- Fulfil the current regulations

What is Exilva Cellulose Fibrils?



Industrially available

Produced since 2016 in industrial scale (1000 MTDS)



Certified bio-based raw material

Fully bio-based, sustainable and plastic-free.
Made of wood, USDA BioPreferred®, biocide free.



Food contact approved

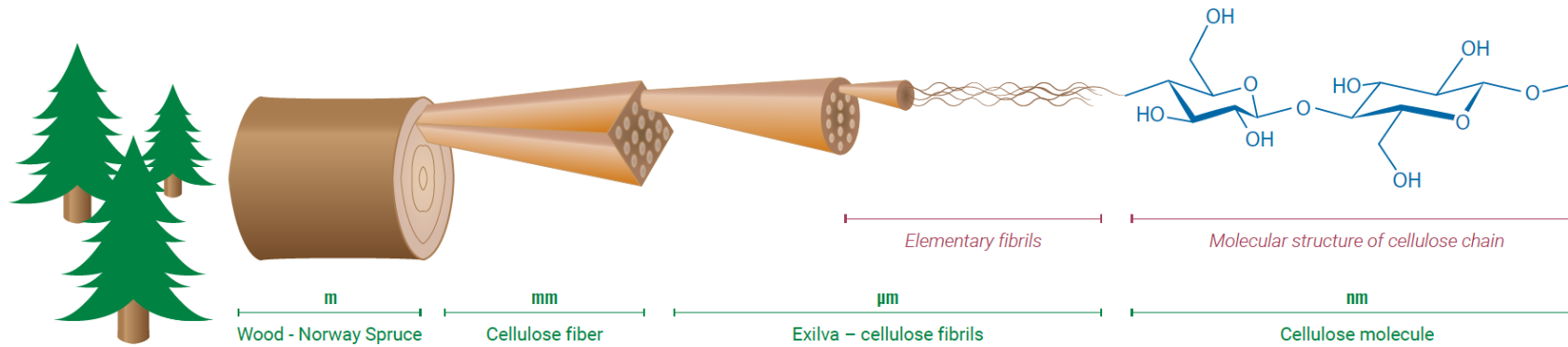
BfR approved, FDA opinion letter



No CAPEX needed

Easy to add to existing barrier coatings formulations

Cellulose fibrils



- **Film forming properties:**

- Thin, translucent, strong films
- No “skin” formation during drying
- Non tacky surface during drying
- Exilva enables increased film thickness
- Exilva provides film reinforcement through the fiber structure

Technical benefits of Exilva in barrier coatings

1 STABILITY & APPLICABILITY

- Improved stability
- Improved applicability
- Improves control of penetration
- Allows spraying of 3D shapes
- Improved water retention

2 DRYING

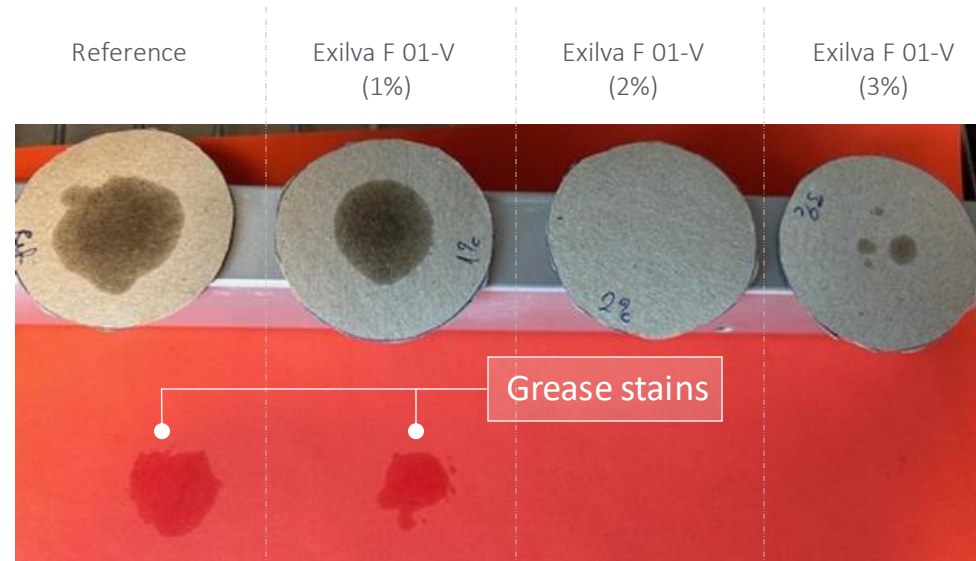
- Prevents skinning of the wet film
- Prevents cracking and mud cracking

3 FINAL PROPERTIES

- Improved barrier performance
- Improved strength

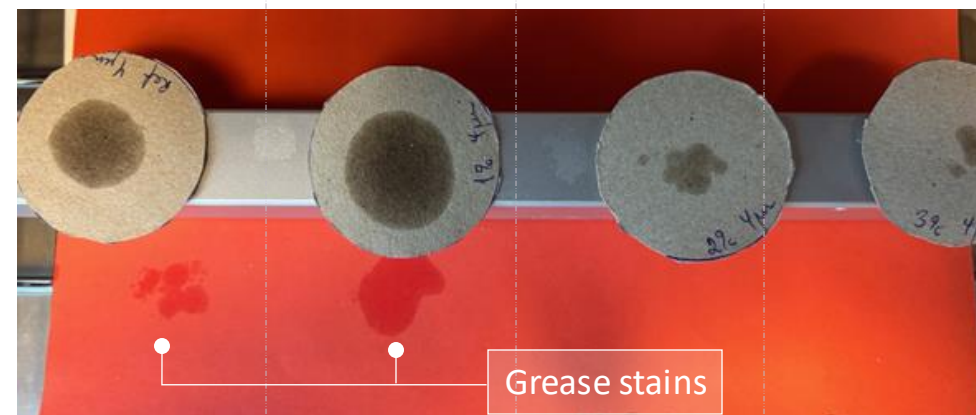
STUDY: Improved grease barrier with Exilva

Rapeseed-oil 50 °C after 60 min,
6 μm wet coating



With > 2% Exilva F 01-V the oil will not penetrate through the paper

Rapeseed-oil 50 °C after 60 min,
4 μm wet coating



**Same performance with
30% lower coat weight**

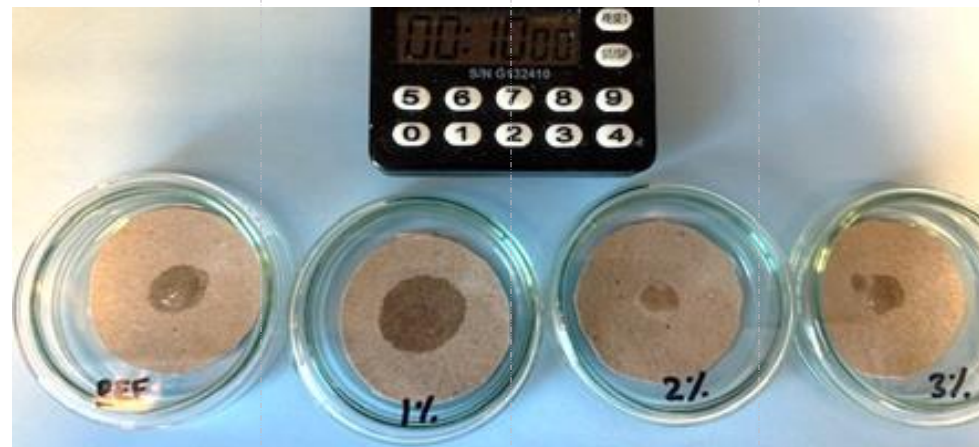
STUDY: Improved water barrier with Exilva

Hot water at 50 °C after 20 min,
6 μm wet coating



With > 2% Exilva F 01-V the water will not penetrate through the coating

Hot water at 50 °C after 10 min,
4 μm wet coating



**Good performance with
30% lower coat weight after
10 mins**

Improved Sustainability and Environmental Impact



Reduction in consumption

Less coating needed and higher recycling rate of fibres



Recyclable

No negative impact on recyclability of the packaging



Reduction in CO₂

by reducing a fossil-based binder with Exilva

Coat weight reduction	30%	30%
Amount of Exilva as is	2%	3%
Reduction in GWP	30.2%	30.2%

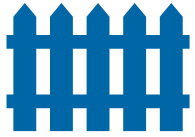


Reduction in waste

as less coating weight means less waste

Coat weight reduction	30%	30%
Amount of Exilva as is	2%	3%
Reduction in waste	30%	30%

Value of Exilva in barrier coatings



**HIGHER BARRIER
PERFORMANCE**



**REDUCE
COAT WEIGHT**



**MEET TIGHTENING
REGULATIONS**



**ALLOWS
SPRAYING**



**FASTER
DRYING**



**STRONGER
FILMS**

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<https://www.borregaard.com/markets/paper-packaging>

*The perfect solution for the development of **more sustainable and higher performing barrier coatings for paper and molded fiber products.***