Bio-based, Bio-degradable or Sustainable?

EC Technology Forum / Biobased Coatings

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CH POLYMERS

Agenda

- CH-Polymers Oy shortly
- Some definitions
- Sustainability at CH-Polymers
- Bio-degradable solutions
- Bio-based binders for paints
- Summary

Roots in Finnish chemical industry

1972 PVAc-binder production by Raisio Chemicals

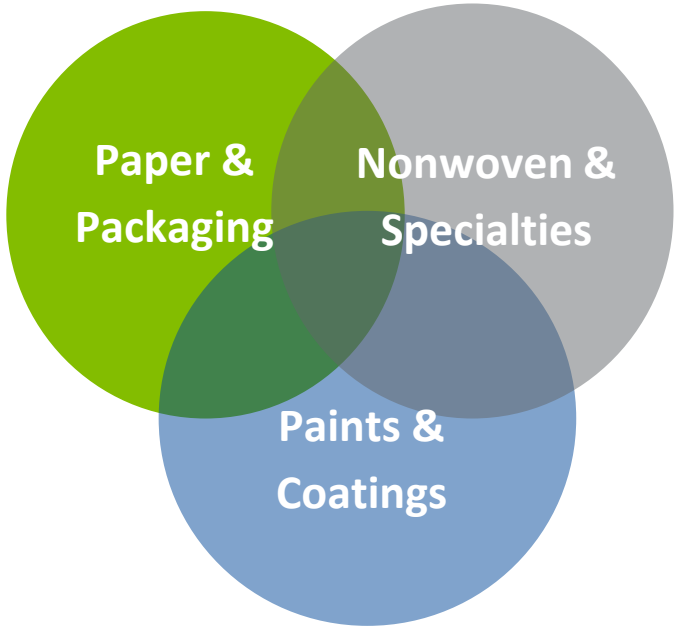
2004 Raisio Chemicals sold to CIBA

2009 Acquisition of acrylate business
as precondition to Ciba/BASF deal

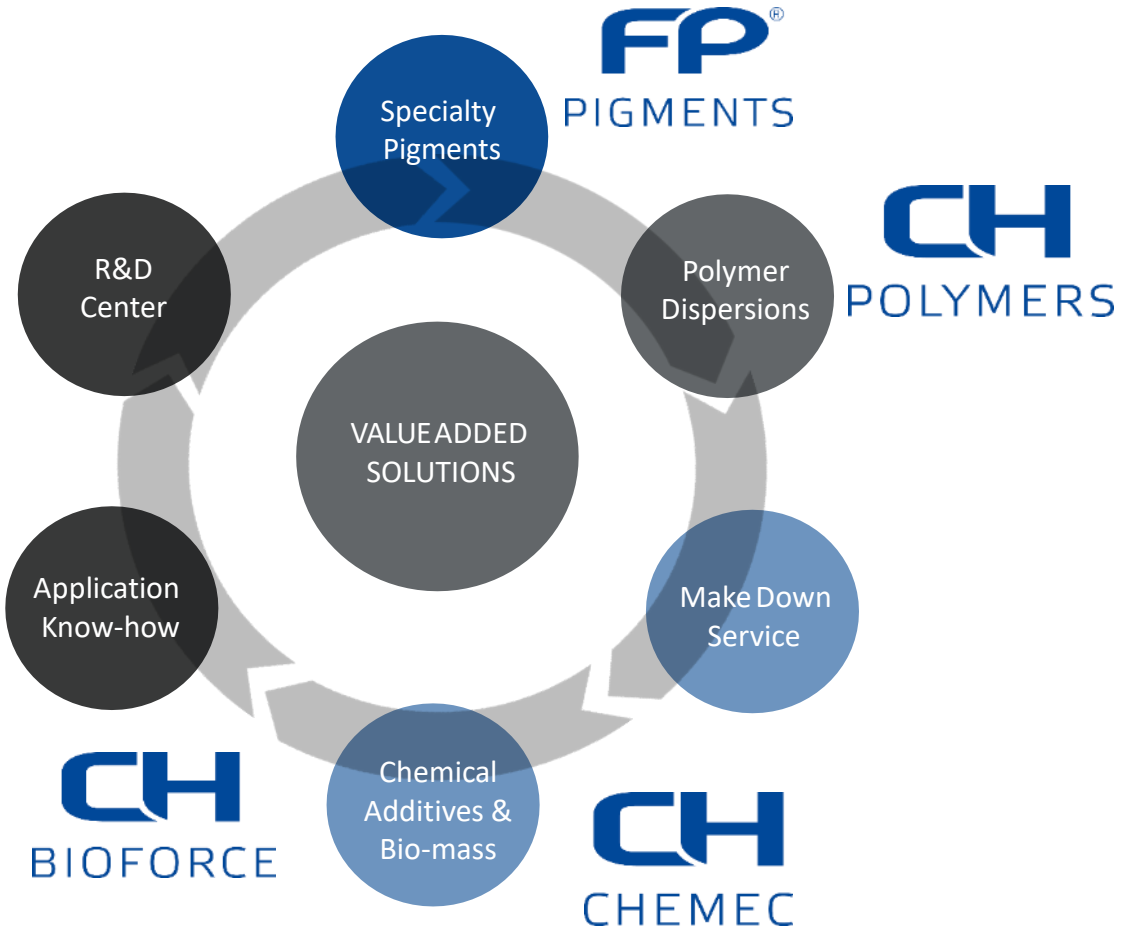
→ **CH-Polymers founded,**
Family owned

2010 Entering the paint binder business

2013 Start of the CHP BAR development work



Innovating together



CHP facilities

Raisio, Finland
- Research & Innovation
- Sales & Administration

Member of
Smart Chemistry Park

Kouvola, Finland
Manufacturing
& Logistics

Bio-based, Bio-degradable or Sustainable?

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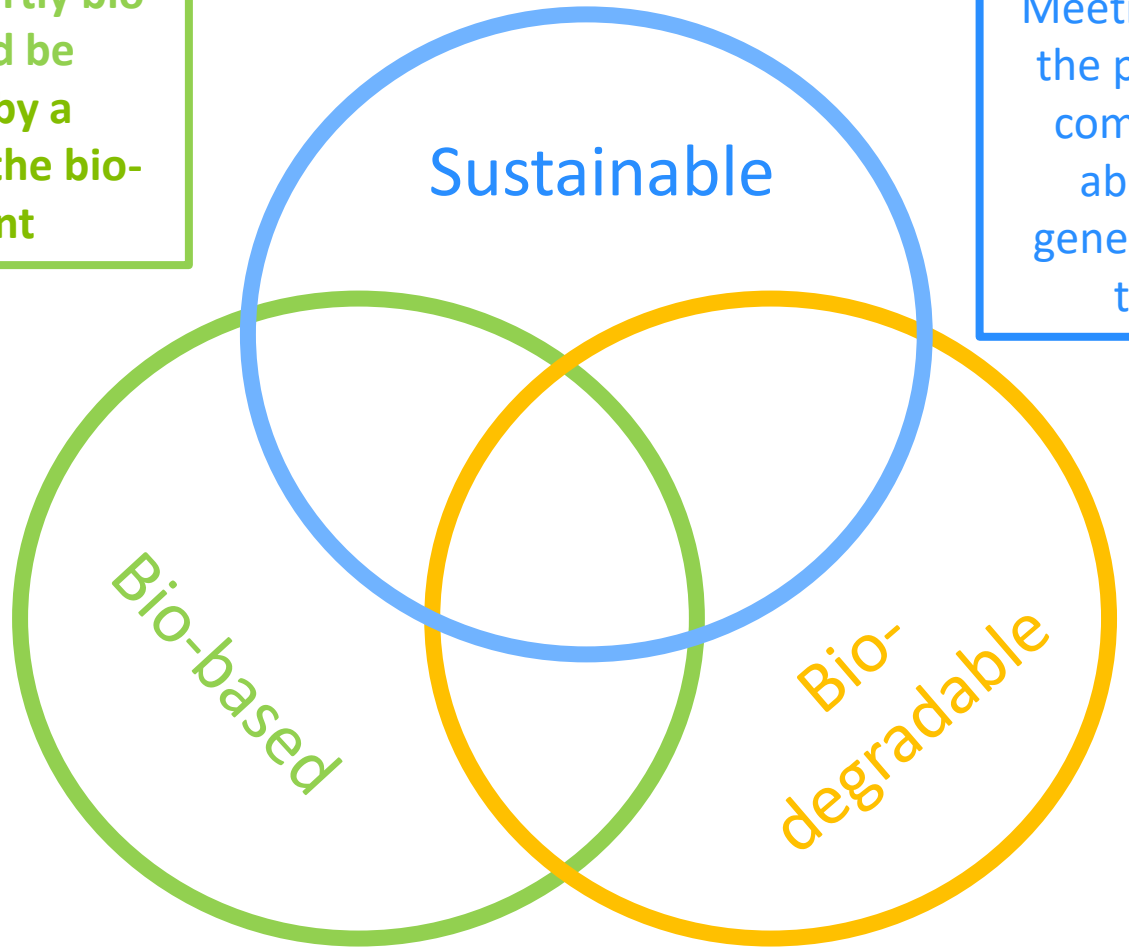
… or all of the three?

The weight fraction of the bio-based content or the bio-based carbon content. If the product is partly bio-based it should be accompanied by a quantification of the bio-based content



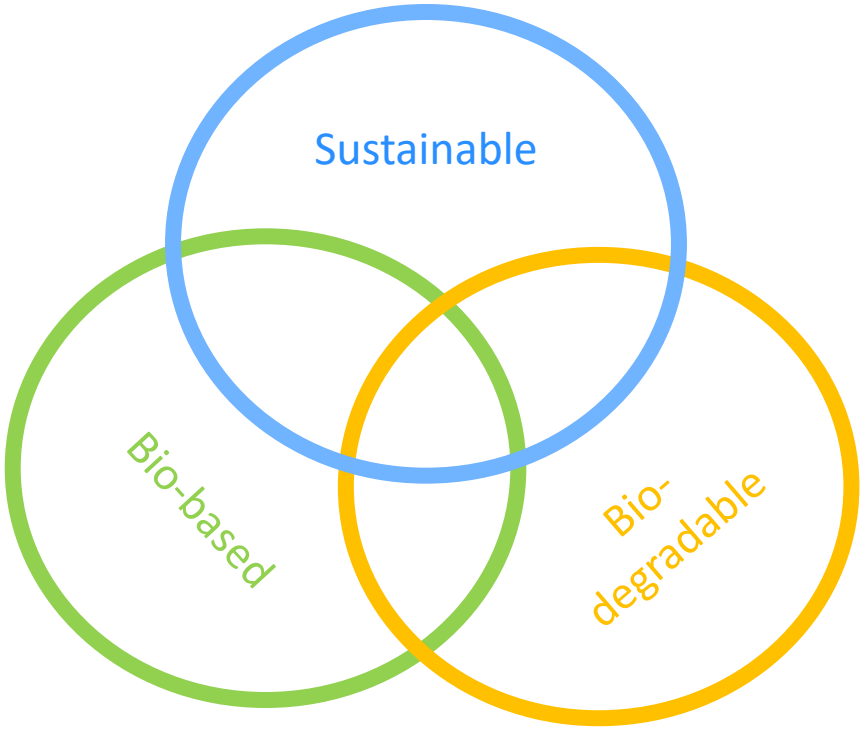
Meeting the needs of the present without compromising the ability of future generations to meet their needs.

Susceptibl… decompos…o CO_2, water… …omass by … organisms
C… …table: > 90% within six months

We have solutions for Paper and NW!

Please consider…

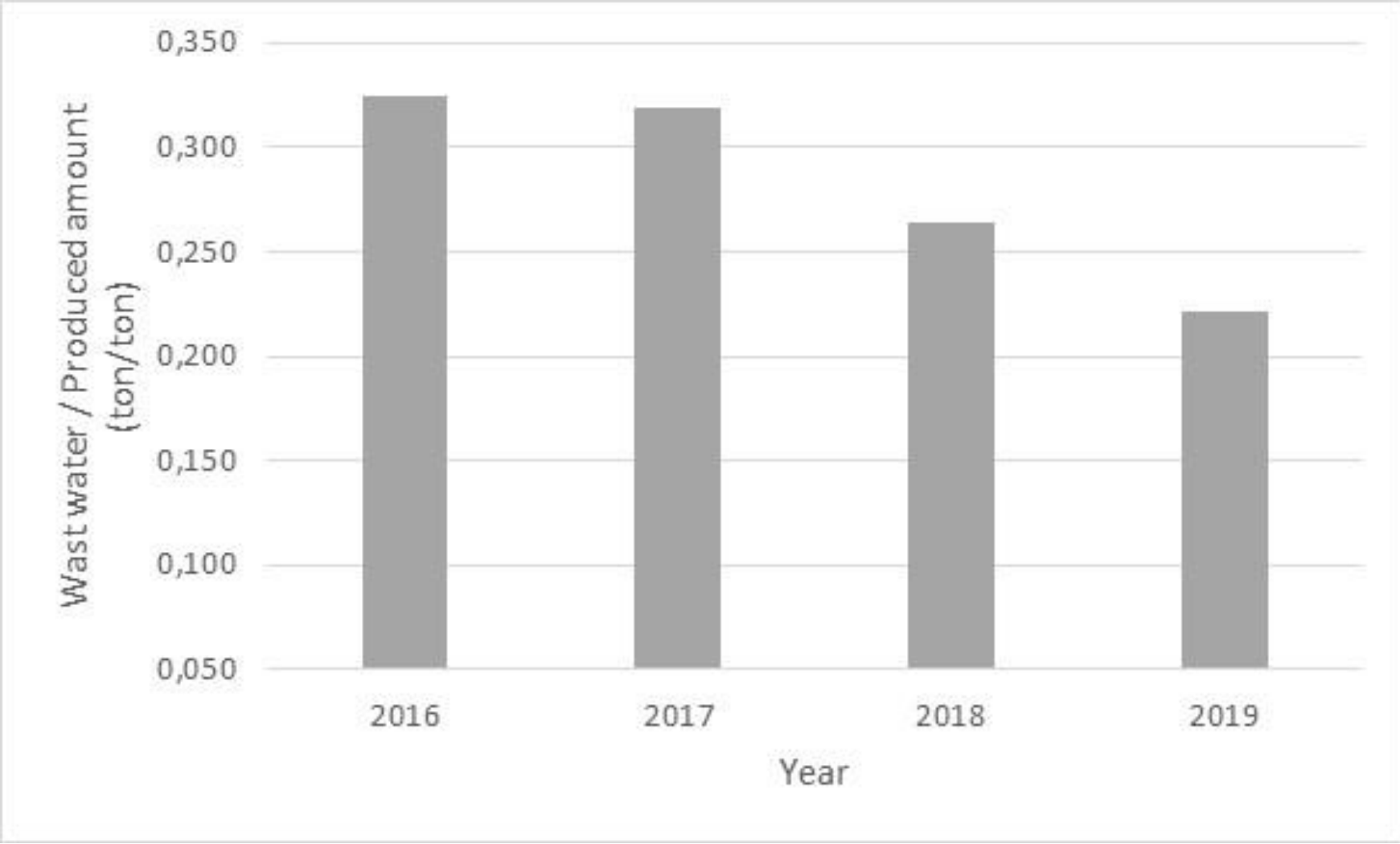
- Is a bio-based solution really sustainable?
- Bio-based doesn’t necessarily mean that the product is bio-degradable!
- A sustainable solution doesn’t have to be bio-based!
- A product can be all of the three!



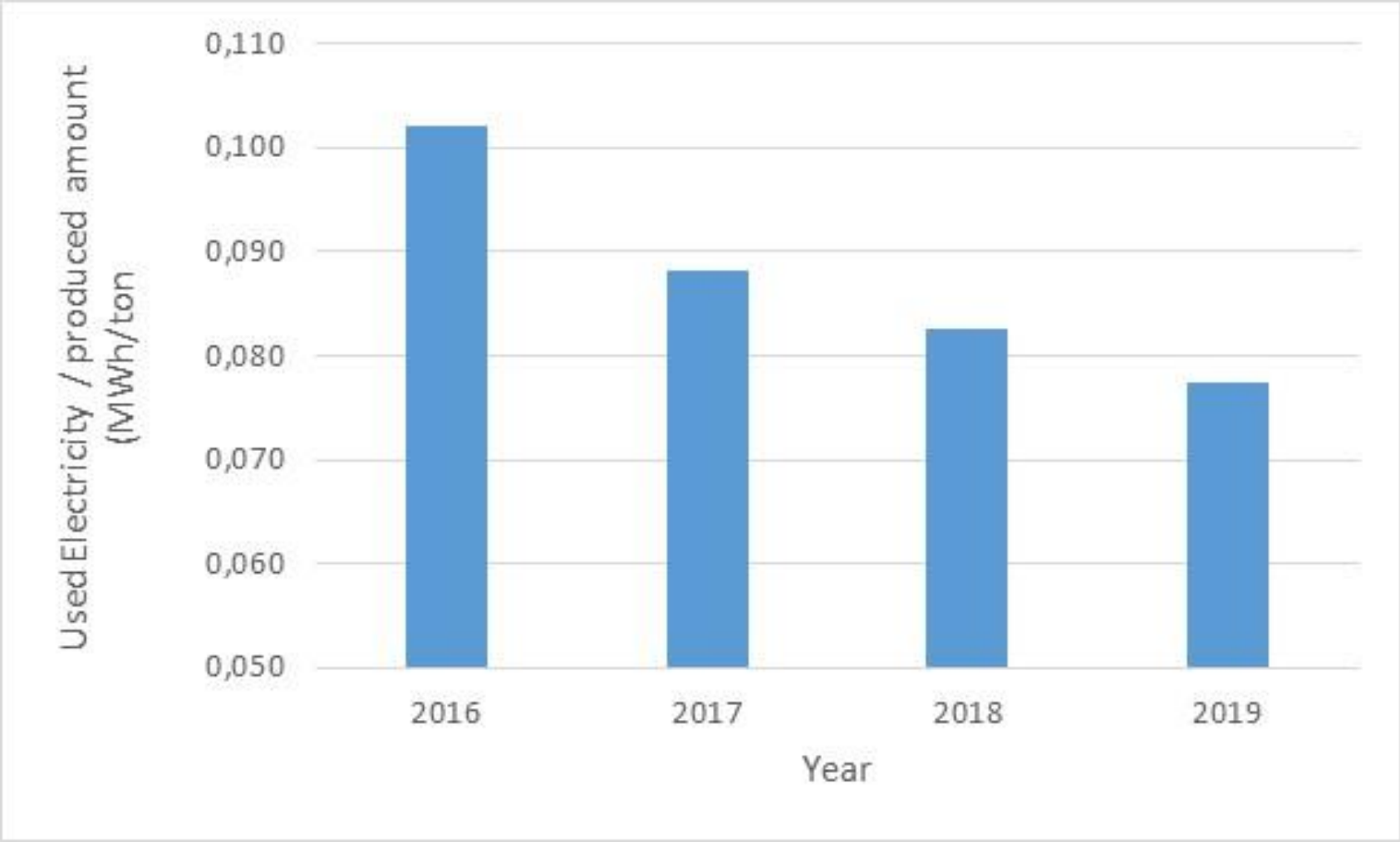
Sustainability focus at CHP

- Elimination of toxic/harmful ingredients
  - APEO-free since 20 years
  - Formaldehyde free since 10 years
- Reduction of VOC & S-VOC in the products
  - VOC < 100 ppm
  - S-VOC < 300 ppm
- Development of long lasting products
  - Easy-to-clean binders
  - Low dirt pick-up binders
  - Barrier-binders
- Optimizations in the production!

Waste Water per Produced Amount



Used Electricity per Produced Amount



Two Bio-based Concepts

1. Bio-based monomers
   - Mass fraction concept
   - ”Really” bio-based, bio fatty acid based
   - Usually not bio-degradable

2. Use of bio-components
   - Can be bio-degradable

BIOFORCE

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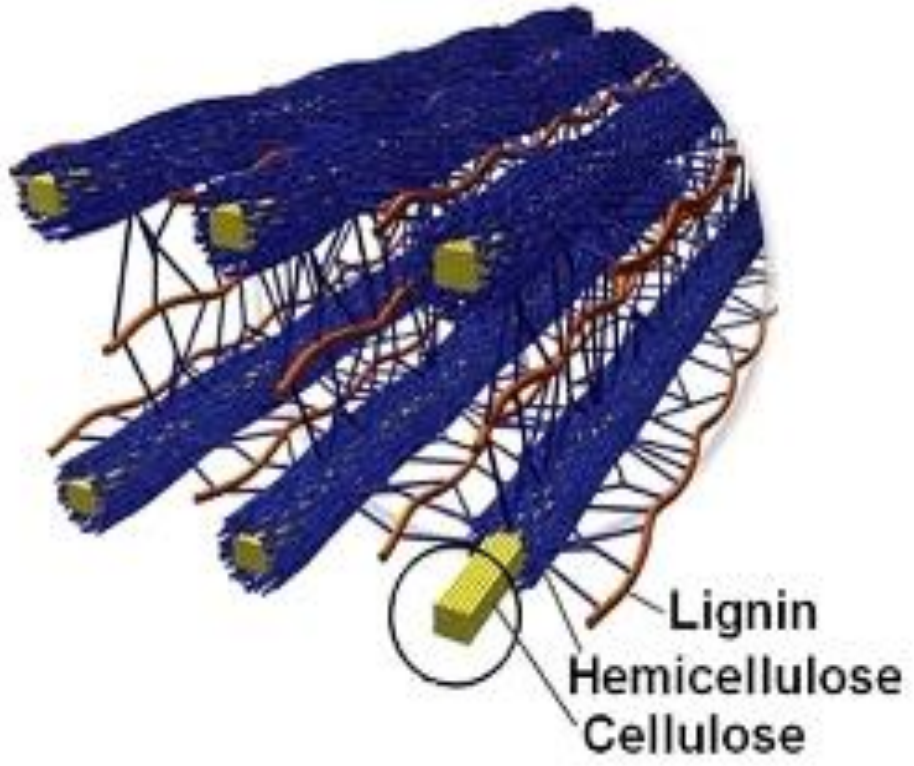
- Sister company of ours
- Has developed and patented an efficient method to extract clean components from side streams of wood industry
- Can be grafted onto acrylates



Bio-based CHP Barriers and Binders

CHP BAR series

Environmentally friendly and sustainable solutions

Replacing

- PE
- Wax
- Fluorochemicals

Bio-based CHP Barriers and Binders

continued…

Replacing binders in

- Shopping bags
- Agricultural bags
- Cleaning tissues

CHP BAR SERIES – Greener products

Our solutions are meeting the increasing environmental requirements:

- Suitable for **food contact** (BfR XXXVI, FDA §176.170, GB 9685)
- The indicative **migrations** at acceptable levels (European Standard EN 14338, RISE, Sweden)
- **Re-pulpable** and **recyclable** (PTS Method PTS-RH: 021/97, 2018)
- 100% **bio-degradation** in controlled composting test with up to 20 % barrier coating (ISO 14855-1 ; 45 days, OWS, Belgium)

Bio-based and contain pigments

Biodegration of CHP BAR 3000

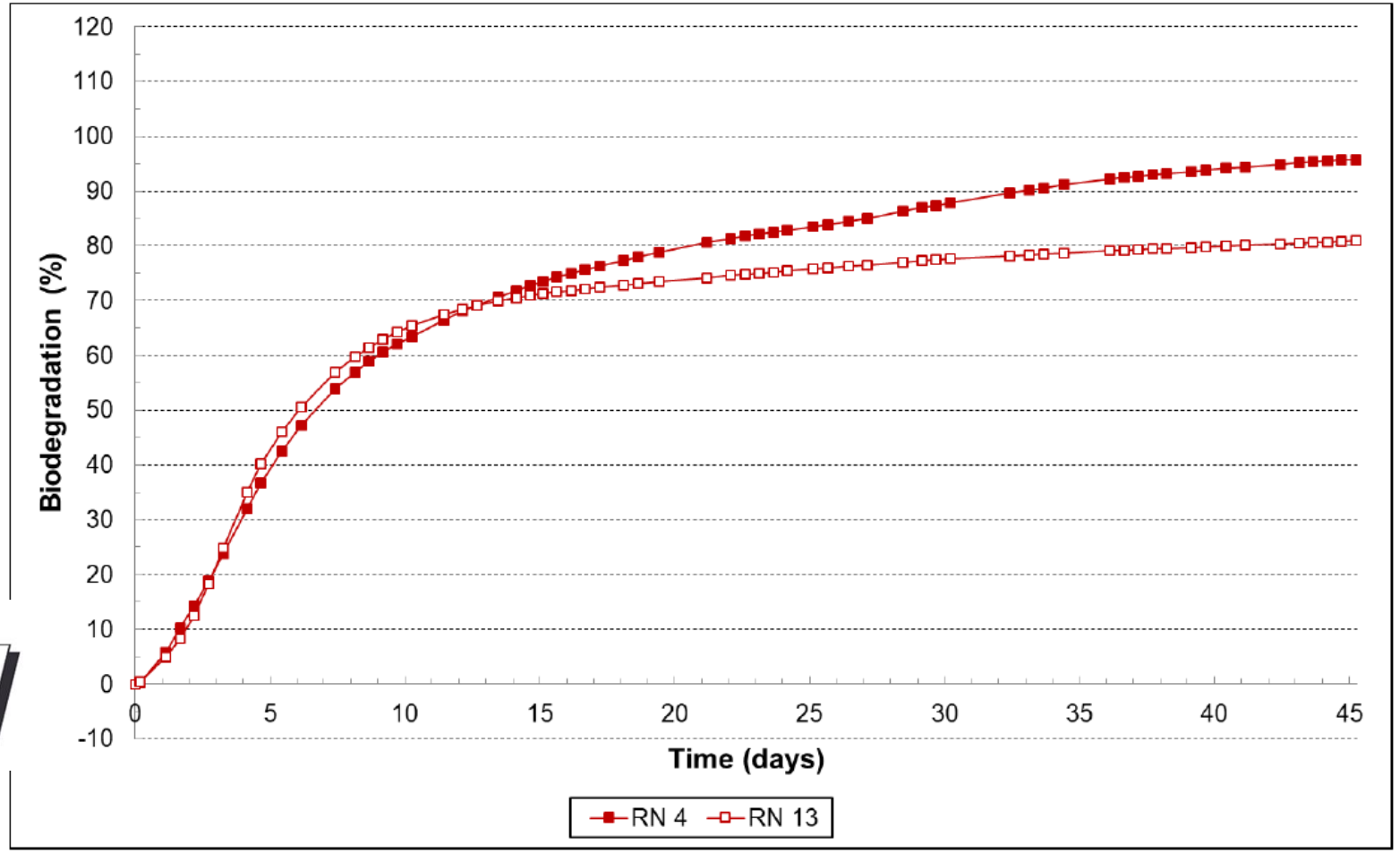


Figure 4. Evolution of biodegradation of replicates of CHP BAR 3000 LCW (until 45 days)

Bio-based binders for paints

- Color an issue in the beginning
- By optimizing the polymerization process no discoloration

- Scrub resistance of paints an issue in the beginning
- By optimizing the polymerization process scrub was improved

Bio-based binders for paints, continued…

- Tinting strength an issue in the beginning
- By optimizing the polymer composition tinting strength OK

Properies today

- Weight fraction of bio content 25% - 50%
- MIT-free
- pH ~ 3,5

PVC 50 paint

Raw Materials:	P351-	-28
Pigment grind:		
Water		36,0
Natrosol 250 HR		0,6
CHP 804		1,4
Dispex Ultra FA 4480 (ent. Hydropalat 1080)		0,3
BYK 022		0,3
Ammonia 25% (aq)		0,3
FP-460		24,0
Kronos 2190		36,0
Omyacarb 2 GU		45,0
Omyacarb 5 GU		24,0
Let down:		
Acticide MV 14 (1:10)		0,5
CHP 5128.4 EP	0,39	123,0
Ammonia 25% (aq)		1,6
BYK 022		0,3
Acrysol RM-2020		2,1
Acrysol TT-935: Water 1:2		1,8
Water		4,5
Total		**301,6**
Solid Content	weight-%	59,4
PVC	%	**49,7**
pH		7,7
Opacity	%	96,4
Gloss 20°/ 60°/ 85°	GU	1/3/7
MFFT	°C	< 0
Scrub Resistance		
ISO 11998	µm	13
EN 13300	Class	2

Summary

- We have today
  - Binders with 25% - 50% bio-based content
  - Binders not yellowing over time
  - Bio-degradable solutions for paper and non-woven applications
  - Bio-based binders meeting requirements of IWP
- In the future
  - Increase of bio-based content in the paint binders
  - Guide-line formulations with bio-based raw materials


Thank You!