Mindre plast i emballasje:

Erfaringer og læring fra prosjektet NxtBarr

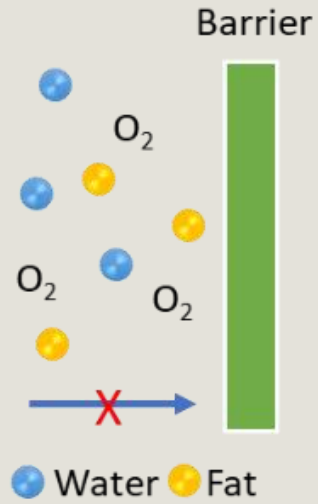
Kristin Syverud

18. november 2026

PFI

NxtBarr – Next generation food packaging materials

Wood fibre-based packaging with bio-based water and gas barriers









Bio-based barriers → Packaging prototypes → Food contact safety → Sustainability

Prosjektet er finansiert gjennom Forskningsmidlene for jordbruk og matindustri (FFL/JA)

Forskningsmidlene
for jordbruk og matindustri

Konsortium

NxtBarr er et kompetansebyggende prosjekt

Fra forskning:

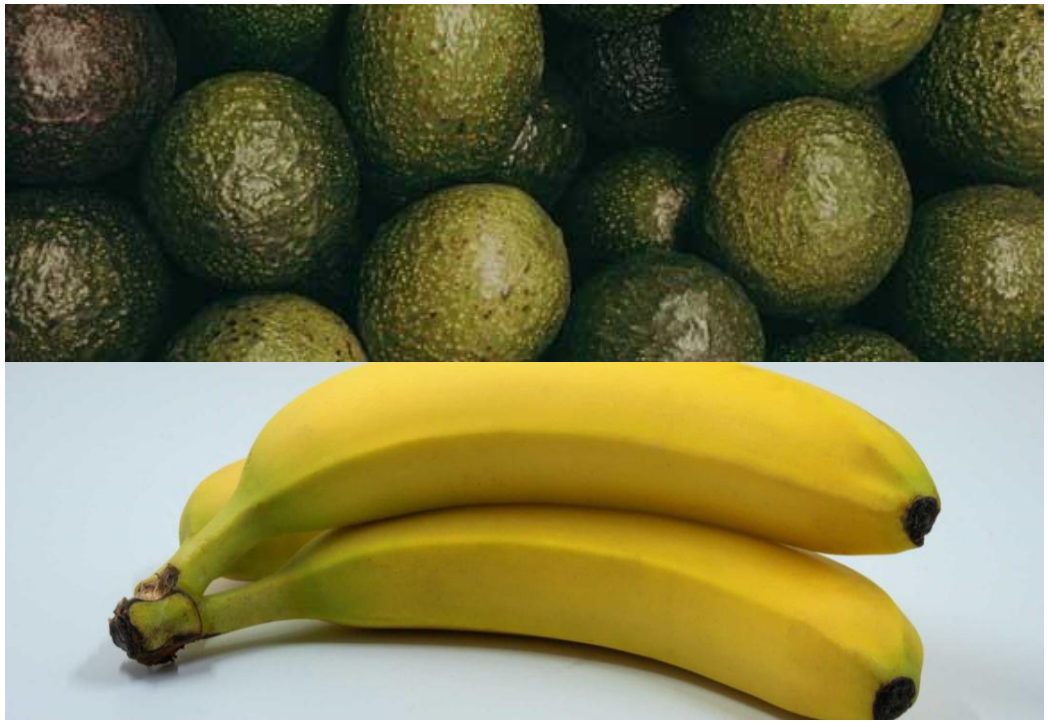
- **RISE PFI**: Marianne Øksnes Dalheim, Sandra Rodrigues Fabia, Ingebjørg Leirset, Marita Dørdal Helgheim, Kristin Syverud
- **NTNU**: Asle Hammer Berget (PhD), Kristin Syverud
- **Nofima**: Hanne Larsen, Ida-Helene Kågen Spydevold, Agnete Jodhøy Lindstad
- **Norsus**: Simon Saxegård

Fra Industri:

- **Borregaard**: Synnøve Holtan
- **Nordic Paper**: Henrik Kjellgren
- **Elopak**: Fredrik Skaug
- **Moltzau Packaging**: Eirik Faukland
- **Norilia**: Heidi Alvestrand
- **Bama**: Åse Øygarden
- **Nortura**: Per Berg
- **TINE**: Solenne Roudot
- **Norfersk**: Elisabeth Fjeld

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Barrierer på fiberbaserte substrater – vi henter inspirasjon fra naturen





Materialvalg og eksperimentelle metoder

Substrater:

- Greaseproof
- Kartong

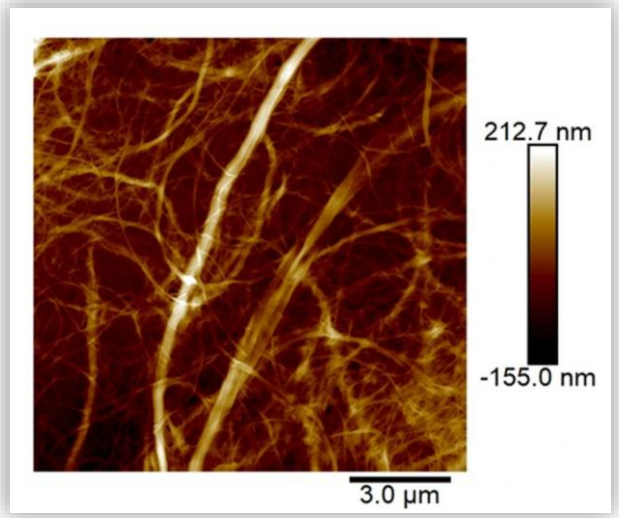
Barrierelag:

- Mikrofibrillert cellulose (Exilva)
- Cellulosederivater (CAB, CAP)
- Risklivoks

Karakterisering:

- Cobb
- WVTR
- O_2-barriere
- Kontaktvinkel
- Interaksjon med mat
- Bærekraftsvurderinger

Med mer…

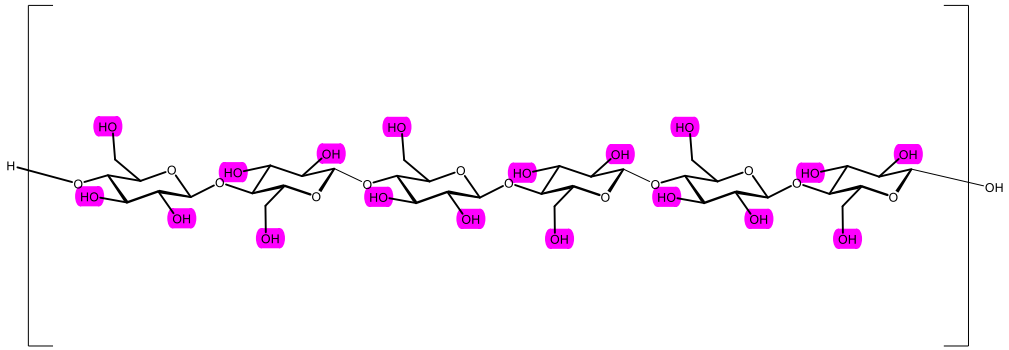


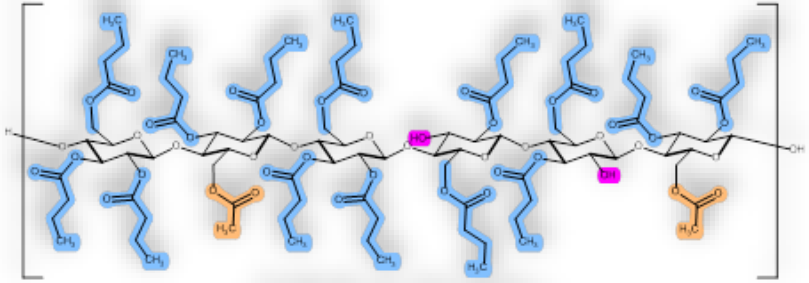


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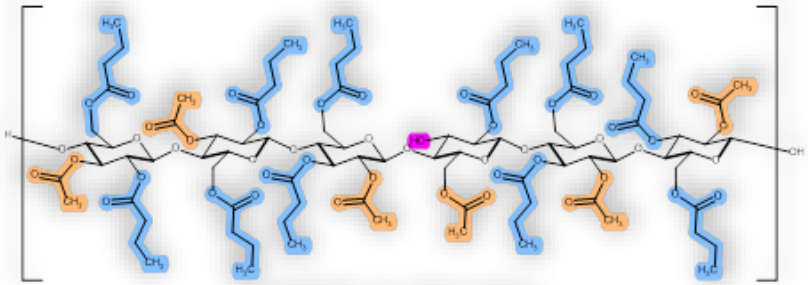
Cellulose og cellulosederivatene CAB og CAP

- Kommersielt tigjengelige
- Godkjent for matkontakt

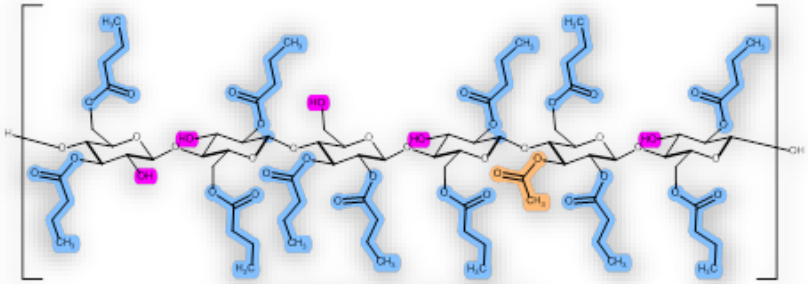




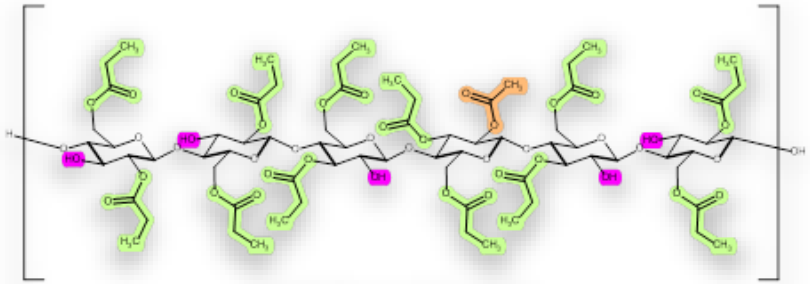
CAB-$B_H A_L OH_L MW_M$



CAB-$B_M A_H OH_L MW_X$



CAB-$B_H A_L OH_H MW_L$



CAP-$P_H A_L OH_H MW_L$

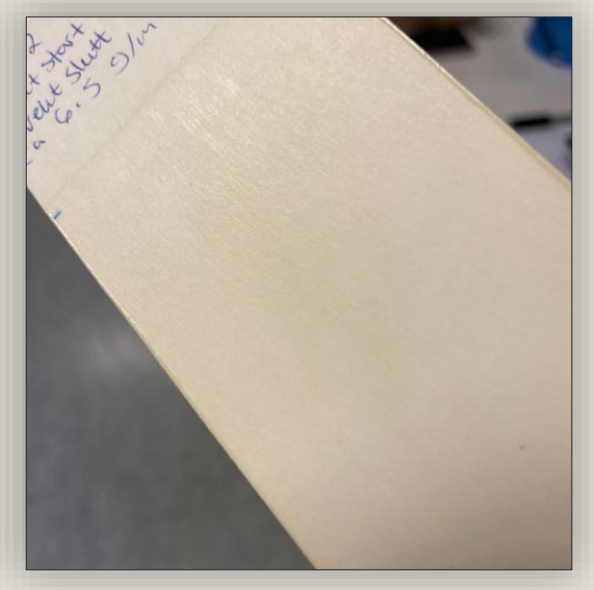
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Coating med voks og Exilva og cellulosederivater

- Labcoating
- Pilotcoating
- Testing av mekaniske egenskaper og barrierer
- Matkontakttesting
- Testing av biodegraderbarhet
- Resirkulerbarhet



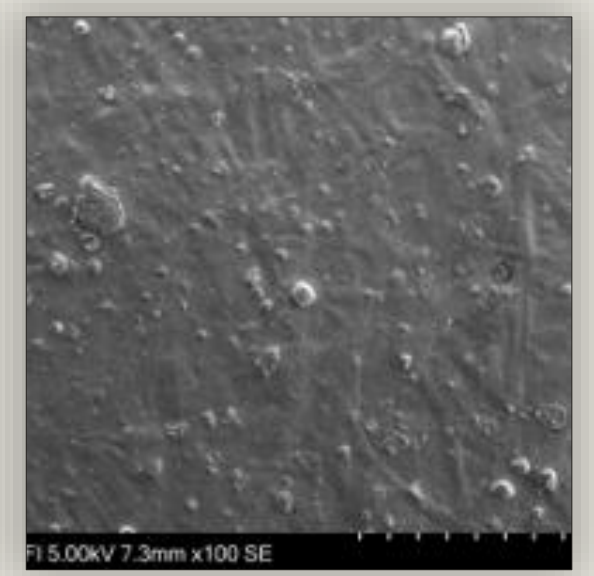
Labcoater



Vokscoated kartong

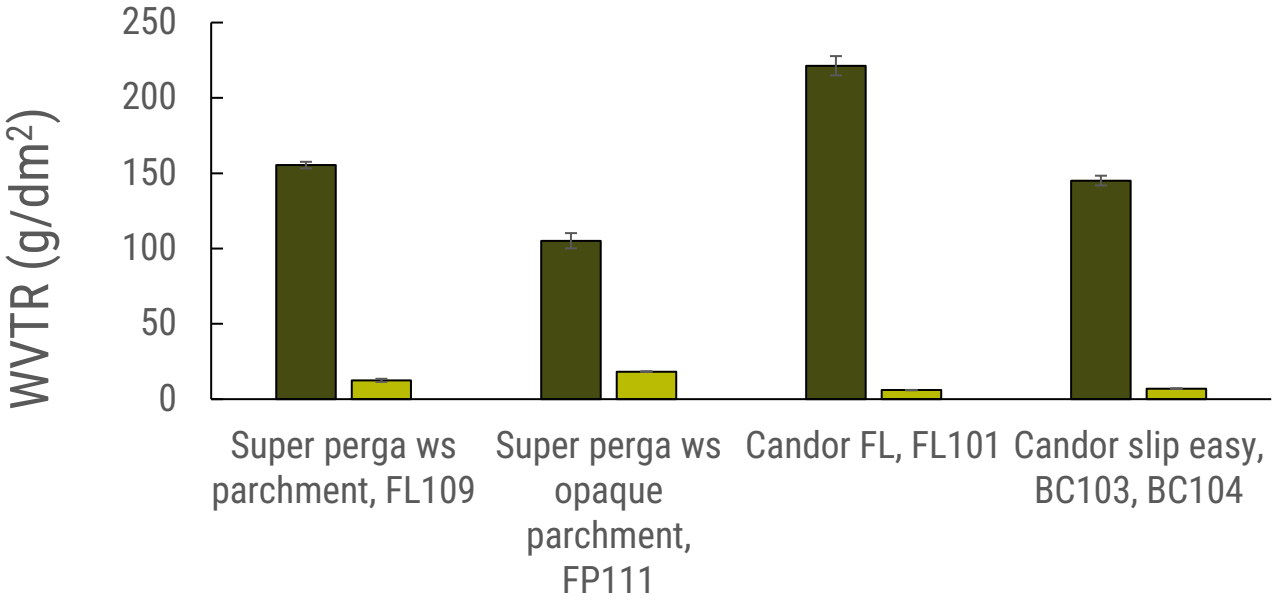


Pilotcoater



Voksbelegg på greaseproof

Greaseproof bestrøket med voks



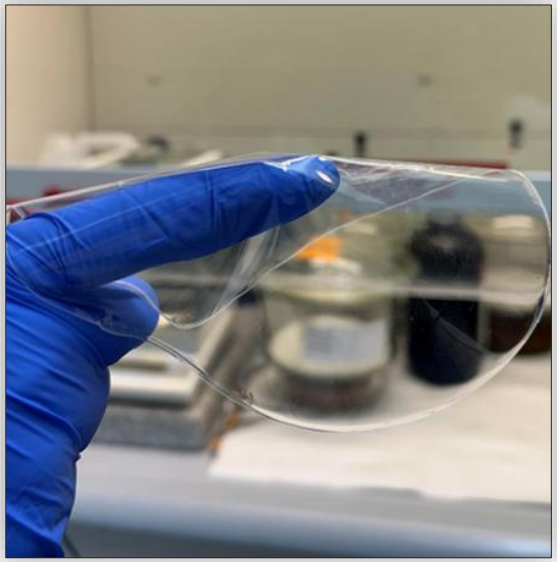


- Voks gir god barriere mot vann (WVTR i område 6-18 g/d m^2)
- Voks beskytter ikke like godt mot olje / fett

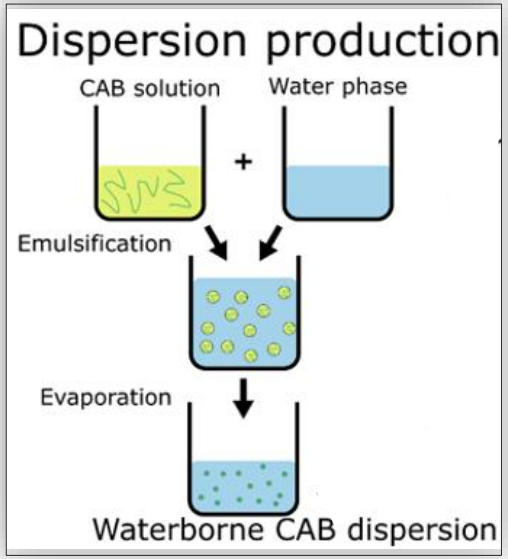
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Forsøk med cellulosederivater

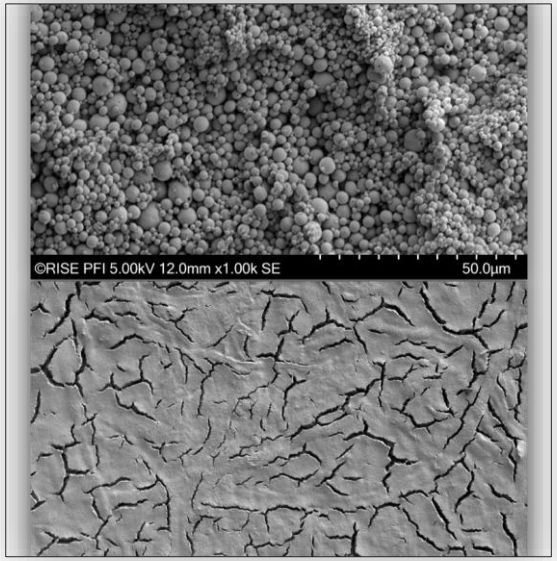
- Bruk av CAB som coating på fibersubstrater
- Fra CAB oppløst i løsemidler til dispergert i vann
- Coating med CAB-dispersjoner i labskala
- Pilotcoating med CAB-dispersjoner



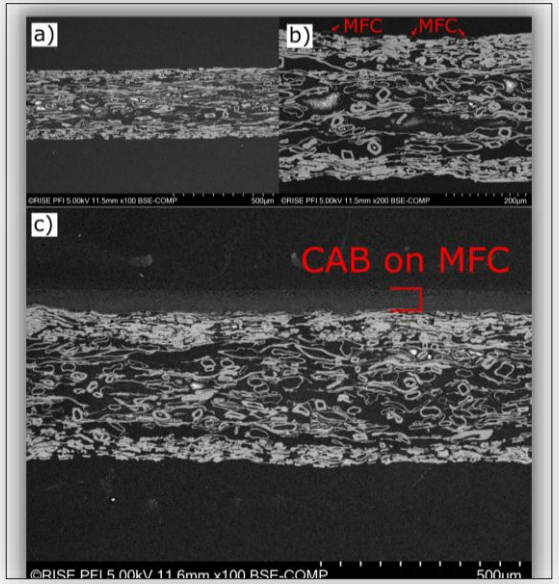
CAB mykgjort med trietylsitrat



Utvikling av vannbasert dispersjonsbestrykning



CAB-partikler på fibersubstrat før varmebehandling

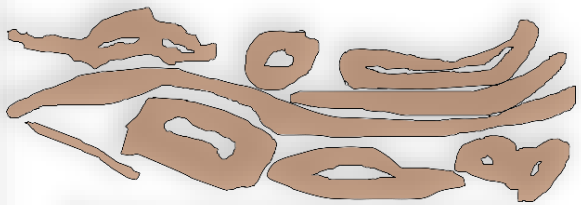


Tverrsnitt av kartong med CAB-bestrykning

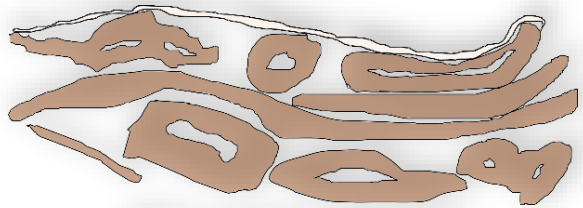
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Filmdannelse fra CAB-partikler på kartong

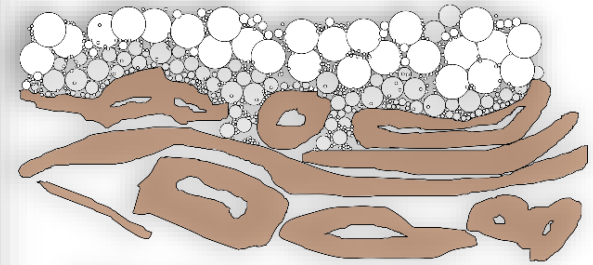
- Hull i overflaten fører til brudd i filmen
- Et tynt MFC-lag gjør overflaten glatt
- Dannelse av en sammenhengende CAB-film etter varmebehandling blir mulig



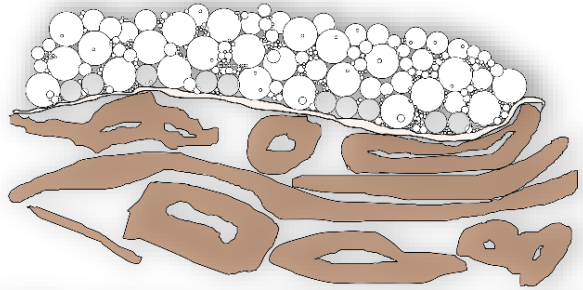
Porous paperboard substrate



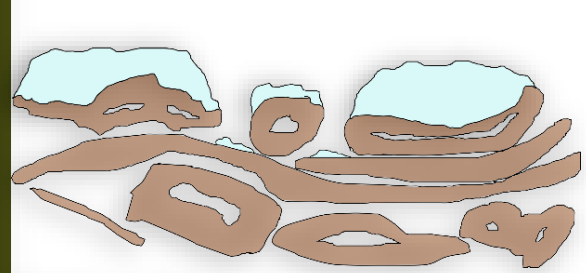
MFC-coated substrate



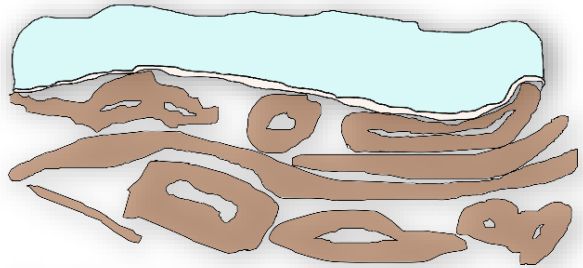
CAB particle-coated substrate



CAB particles on MFC-coated substrate



Fused particles on porous substrate

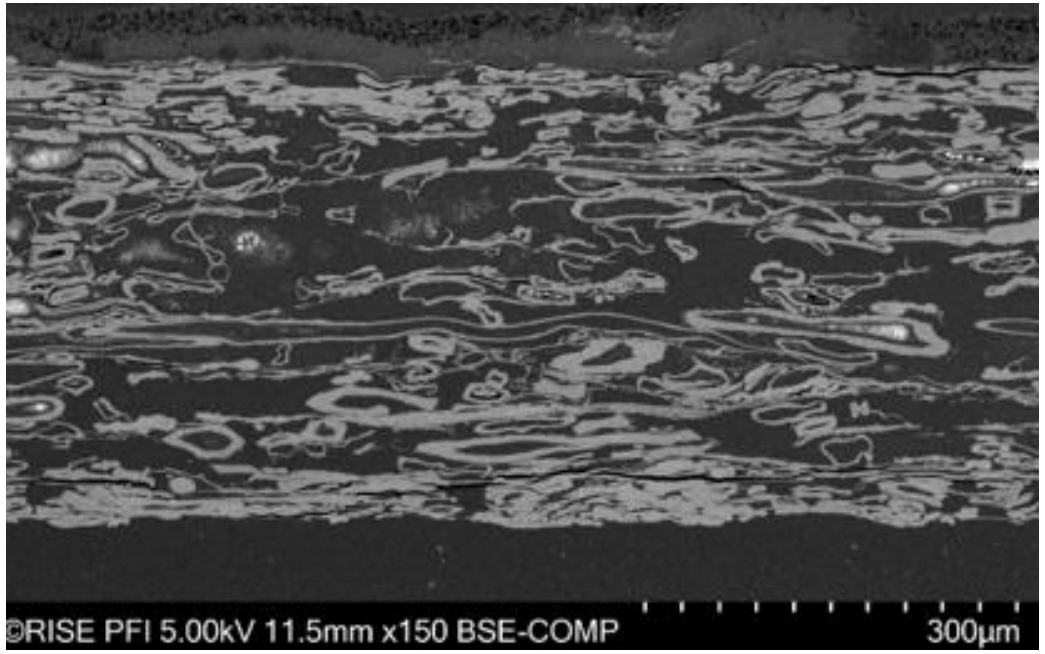


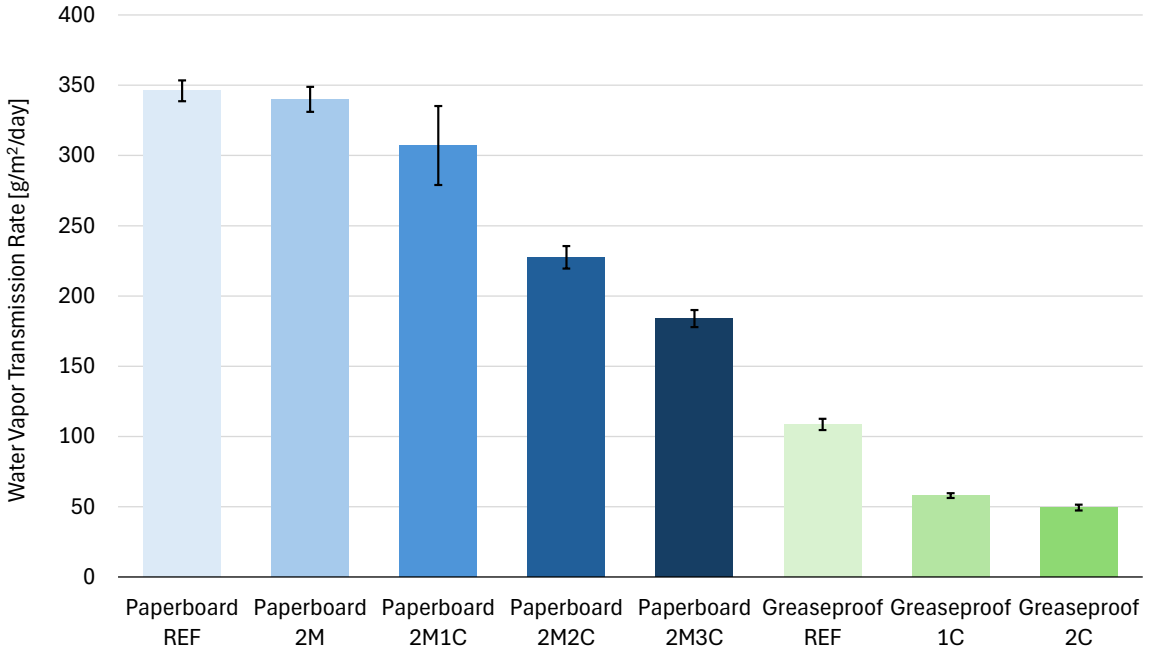
Fused particles on smooth substrate

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Pilotcoating med MFC og CAB

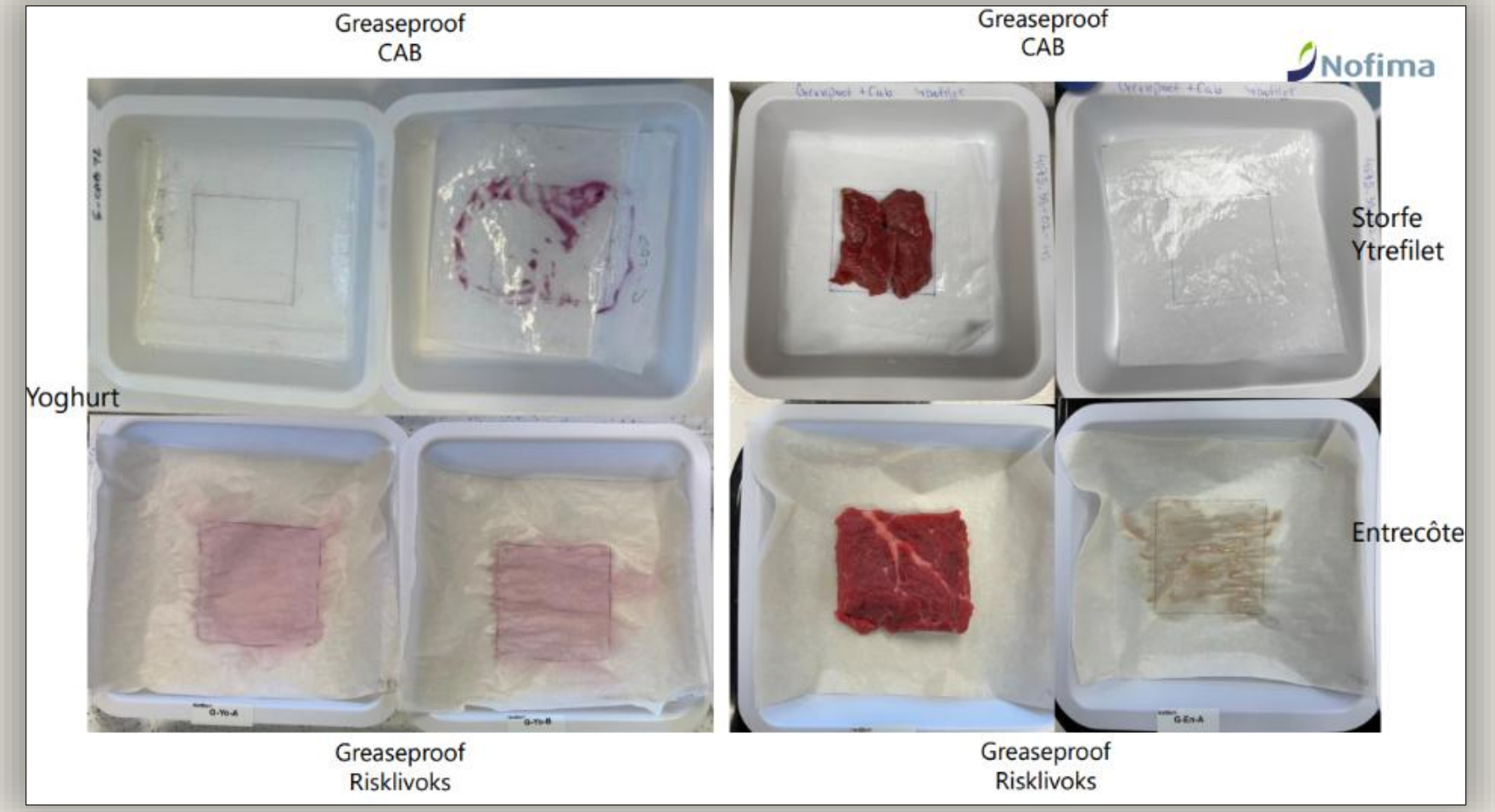
- Pilotcoating fungerte
- Vi får økt barriere
- Prosessen må optimaliseres





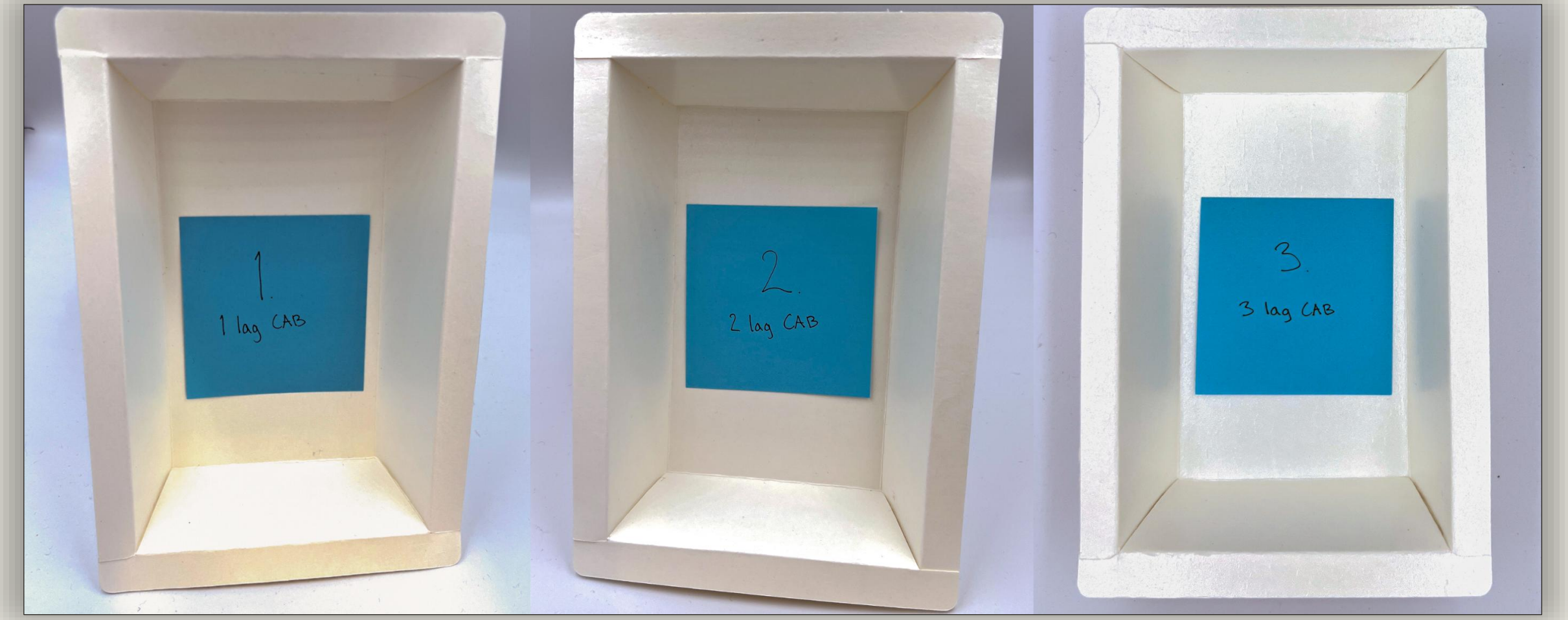
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Resultater fra matkontaktforsøk



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Kartongskåler med sveisbar CAB-coating

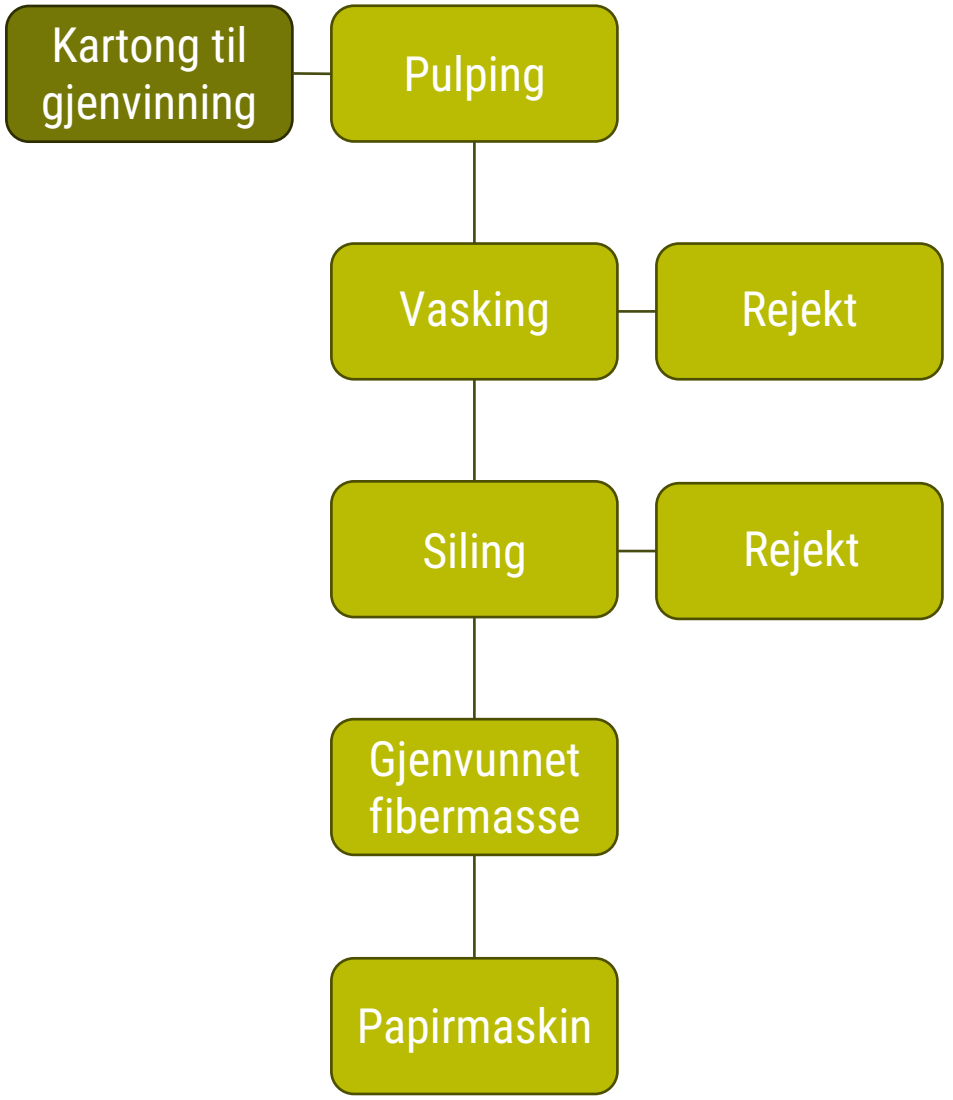


Resirkulerbarhetsanalyse

- Etterligner industrielle prosesser for å vurdere gjenvinnbarhet
- Metoden evaluerer:
    - Fiberutbyttet
    - Kvaliteten på returfibermassen
    - Kvaliteten på prosessvannet

Alle dataene er samlet i en teknisk resirkulerbarhetsscore

Kartong med CAB: Fiber og coating er lett å separere



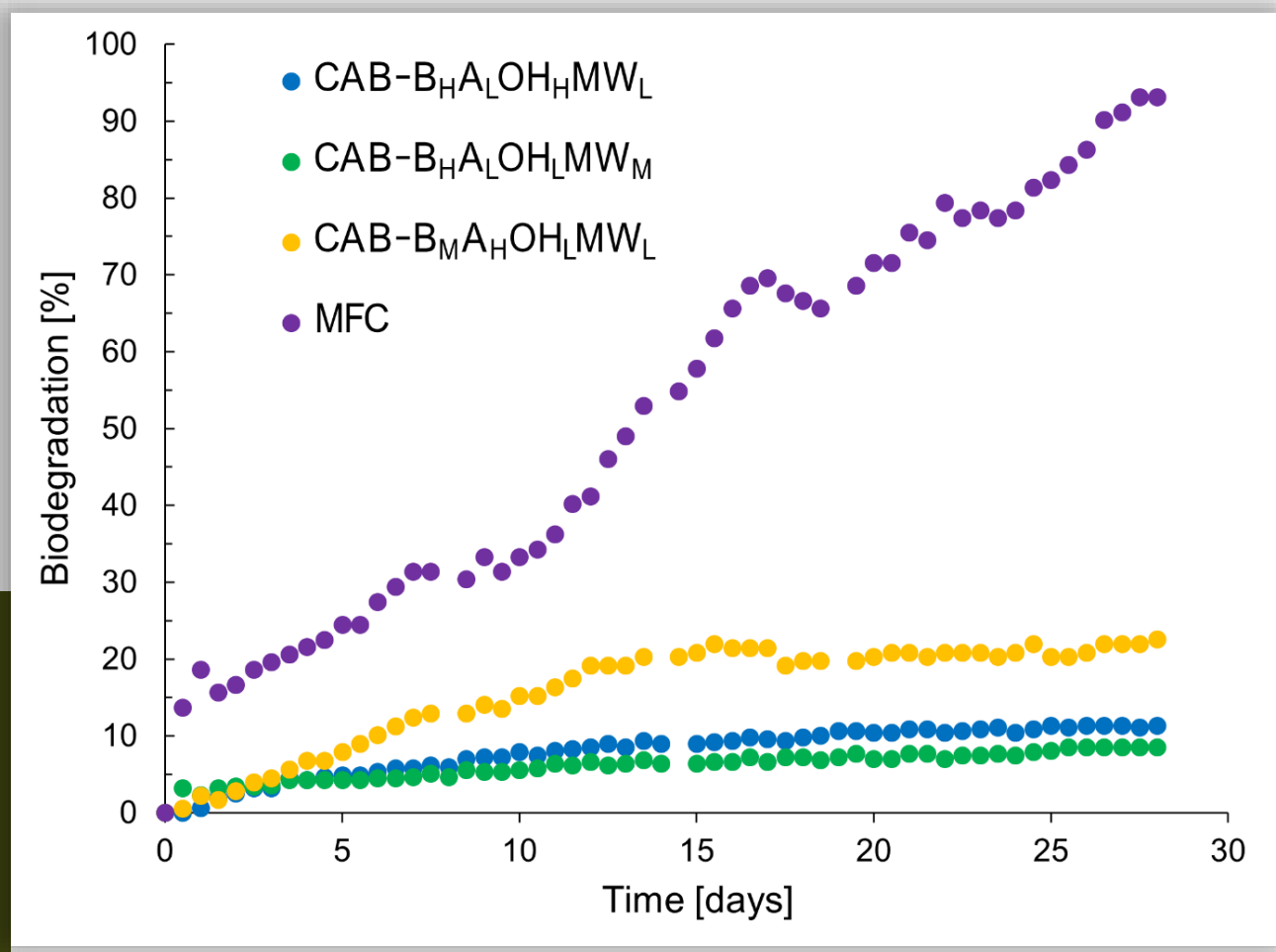
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Biodegraderbarhet for noen cellulosederivater sammenlignet med cellulose (MFC)

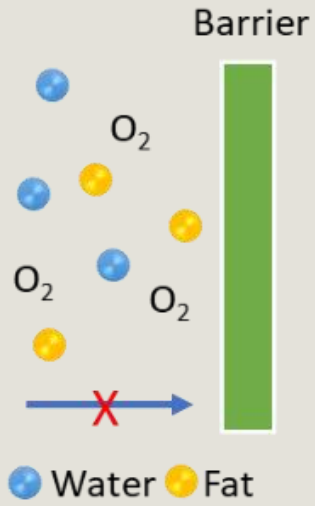
- Nedbrytning i jord (OECD 301F standard)
- Høy butyryl mindre nedbrutt
- Cellulose acetat: 80% i havet på 12 mnd (Eronen-Rasimus et al. 2022)
- Først må substituentene fjernes, enzymer virker på overflaten
- Så cellulolytiske enzymer (kan virke veldig raskt)

Minimal nedbrytning før matvaren går ut på dato



NxtBarr – Next generation food packaging materials

Wood fibre-based packaging with bio-based water and gas barriers









Bio-based barriers → Packaging prototypes → Food contact safety → Sustainability

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Takk for oppmerksomheten

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+47 959 03 740



Forskningsmidlene
for jordbruk og matindustri

PFI