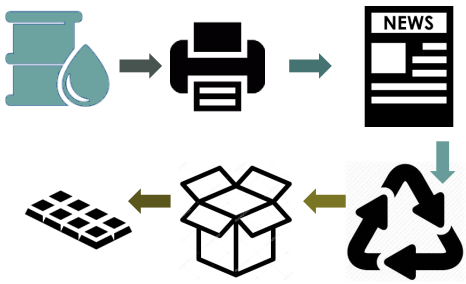
Poster 9-2

BioActiveMaterials: Bio-based mineral oil barrier coatings for paper

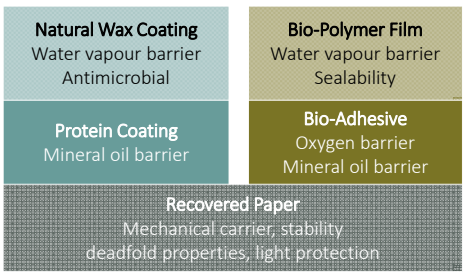
MOTIVATION

- ✓ Recovered paper often contains mineral oil
- ✓ Mineral oil migration into foods restricts its applicability as primary packaging material
- ✓ Synthetic polymers often fail as mineral oil barrier or reduce recyclability
- ✓ Additionally, gas barrier is an important feature



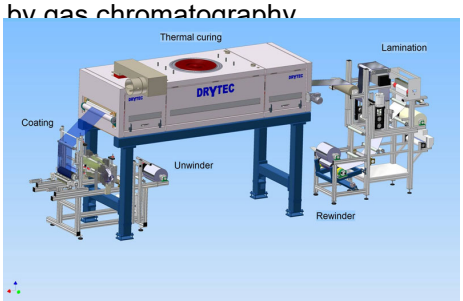
TARGET

- ✓ Create new, bio-based, recyclable packaging materials: food wrapper and pouch
- ✓ Usage of protein layers which can be solubilised in recycling plants
- ✓ Mineral oil barrier coating is developed



MATERIALS & METHODS

- ✓ Proteins from following sources were formulated: faba bean, whey, potato pulp, rapeseed
- ✓ As plasticizers, glycerol, sorbitol, ethylene glycol and PEG 400 were tested and their concentrations optimized
- ✓ Optimized coatings were applied on polymeric substrates to first exclude the influence of a substrate paper and possible defects on the gas barrier.
- ✓ Oxygen permeation measurement: DIN 53380-3 (23°C, 50% RH).
- ✓ Mineral oil migration: Model substances according to their physical and chemical properties: n-alkanes as representatives for MOSH, one to three aromatic ring compounds as representatives for MOAH; carton board is loaded with these substances; migration of these substances from the carton through the BioActiveMaterial is measured by gas chromatography

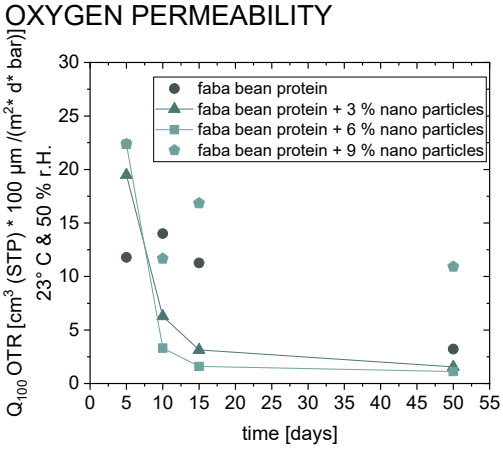


Fraunhofer coating unit

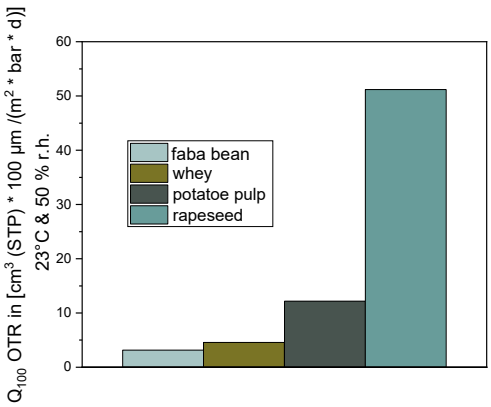
cornet
Fraunhofer IGB
KCPK Kennniscentrum Papier en Karton
Bundesministerium für Wirtschaft und Energie
AiF
iGF

RESULTS

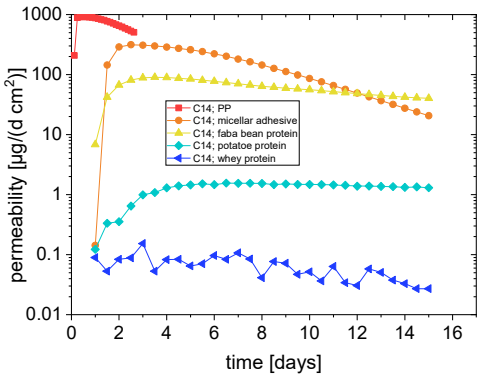
OXYGEN PERMEABILITY



Oxygen permeability decreases over storage time due to cross-linking of the proteins and formation of OH-bonds.



Oxygen permeability is lowest for faba bean and whey protein and comparable to EVOH.



Mineral oil migration (alkanes) through whey protein coatings is 10.000 times lower than through PP.

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