

High barrier recyclable flexible cellulosic paper for wet and greased cooking dough packaging

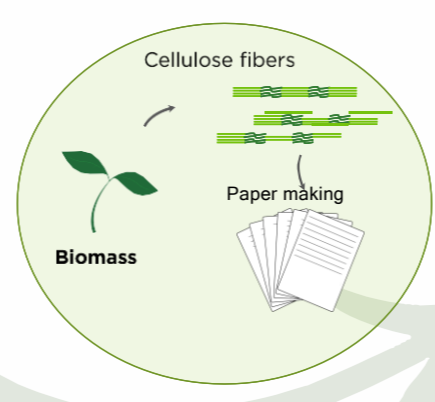
HEDHILI Emna - End of study project
INSA Tunis (Tunisie)



Context

Replacing plastic packaging with cellulose based paper

The law of February 10, 2020 on the **fight against waste** and the circular economy (AGEC law) provides for the banning of single-use plastics for 2040.



Cellulose paper
Made of

- Abundant,
- Renewable,
- Biodegradable cellulose fibers.

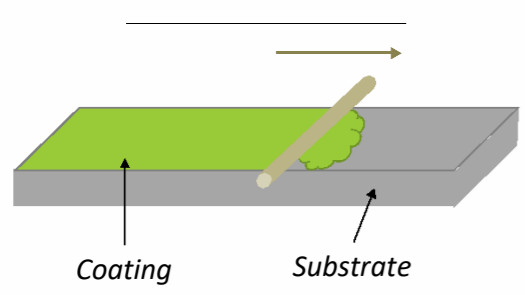
Sustainable / Cheap
Environmentally friendly material
Low weight,
Degradable/Recyclable
 \neq
Porous structure
Hydrophilic nature,

Cellulose paper as a material can hardly compete with conventional plastics in some key properties; waterproof, wet strength, durability, and gas (water vapor and oxygen) barrier capability.

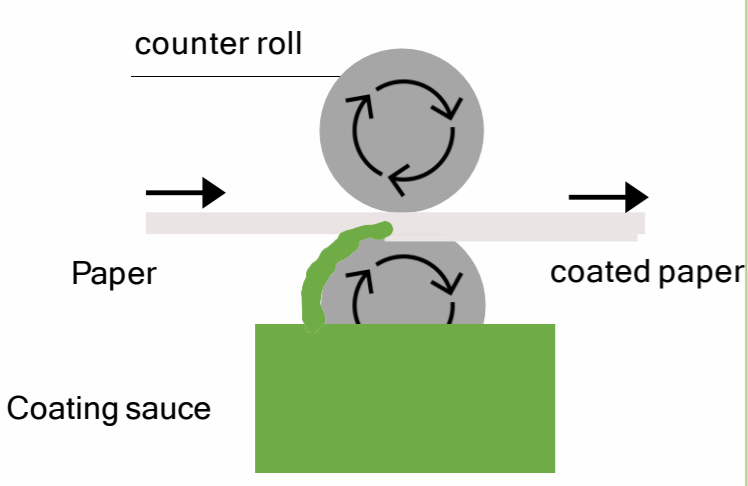
Materials and methods

Possible processes

Bar coating



Size press coating



Coating the paper with sauces to enhance the packaging proprieties

Application

Innovative packaging solution with **high barrier proprieties** for cooking dough

Requirements

PAPER

- **paper 1**
Coating base
High-strength Natural white (no OBA)
- **paper 2**
Coating base
High smoothness
Lower basis weight Facilitates the sealing process
Optimum rigidity

Coating sauces

Innovative

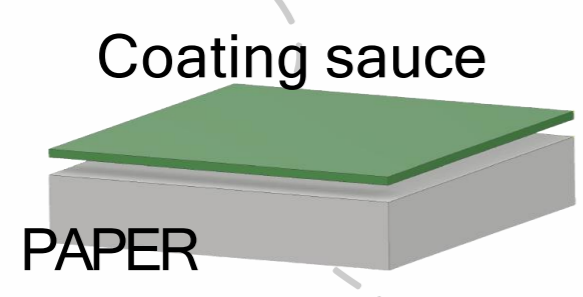
- Cellulose derivatives
- Cellulose derivatives + polymers

Commercial

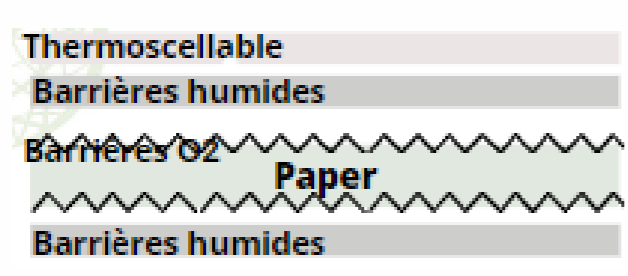
- **Latex1**
Recyclability
Oil and grease barrier
Low water vapor transmission
Heat seal
- **Latex 2**
Heat seal capability
Moisture barrier
Oil and grease resistance
Water resistance
- **Silicone**
Moisture resistance
Oil barrier
Water barrier
- **PLA**

Methodology

1. One layer only



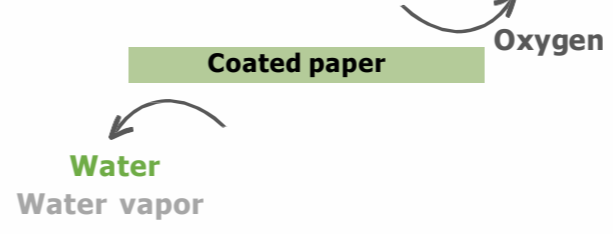
2. Multilayers (max 6)



Investigated proprieties

Barrier proprieties

- Absorption (Cobb oil and water)
- Permeation and Air permeability (Bensten and Mariotte's flask)
- Contact angle (with water).
- Rugosity
- Water vapor transmission (WVTR)
- Oxygen transmission (OTR)



Other tests:

- Recyclability
- Biodegradability
- Mechanical resistance(traction tests)

Perspectives

- **Good barrier to oil and water.**
- **Low air and gas permeability.**
- **Flexible**
- **Heat sealable**

