COST Action FP1405

Active and intelligent fibre-based packaging – innovation and market introduction

Renewable active food packaging using potato chip industry byproducts

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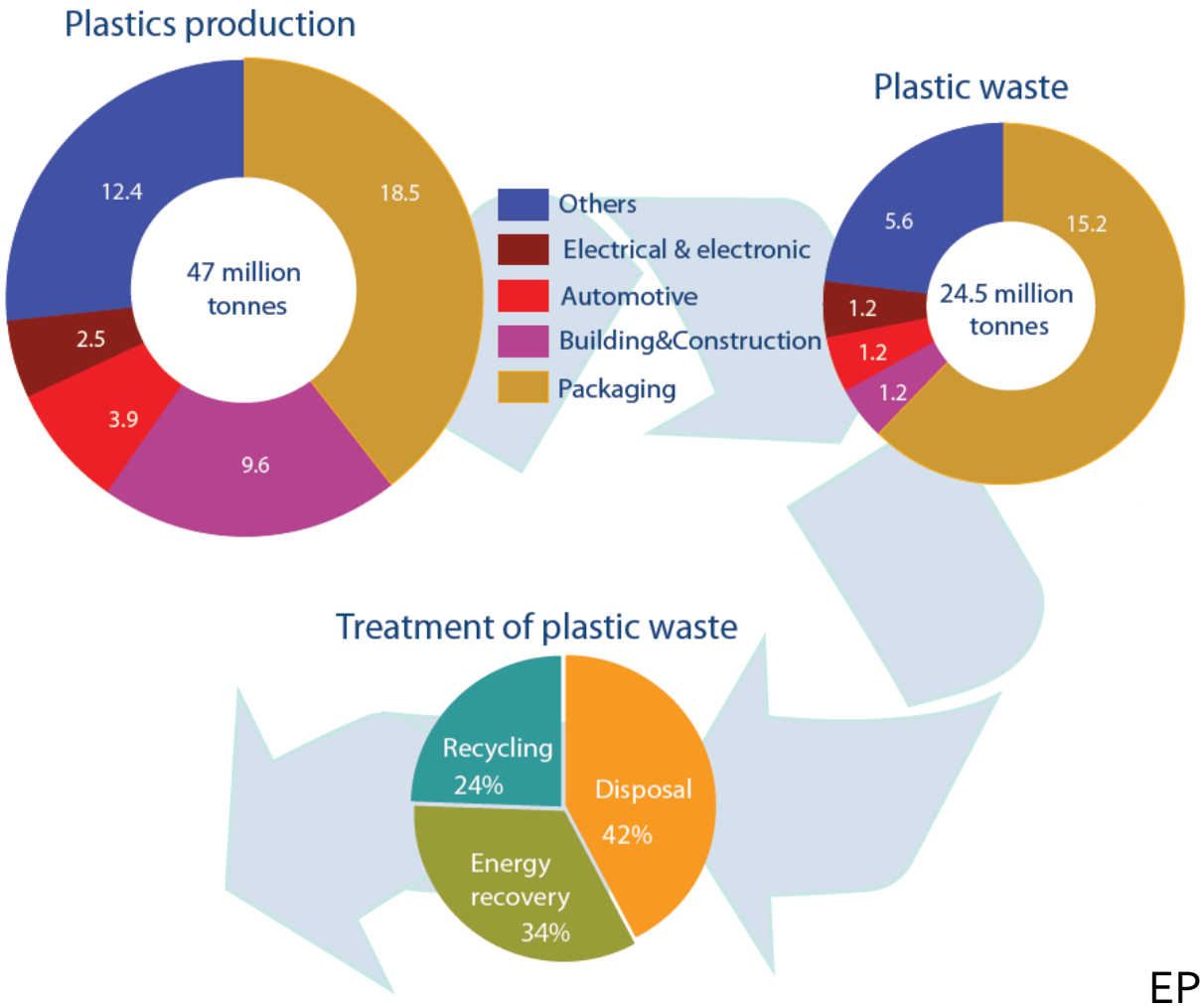
cost
EUROPEAN COOPERATION
IN SCIENCE AND TECHNOLOGY

COST is supported by
the EU Framework Programme
Horizon 2020

Plastic Waste



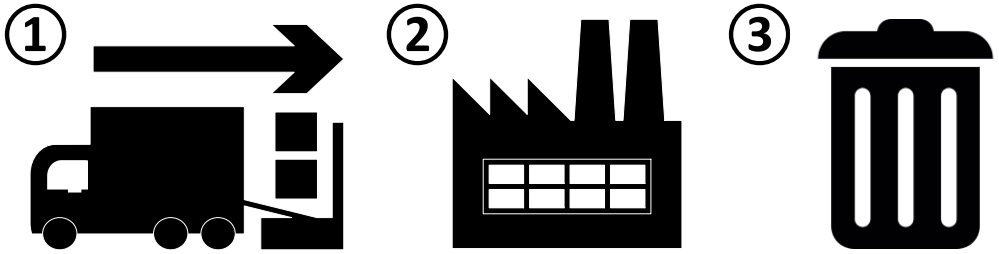
EPRS, 2011

Organic Waste

Global value **≈ 190 million tonnes/year**

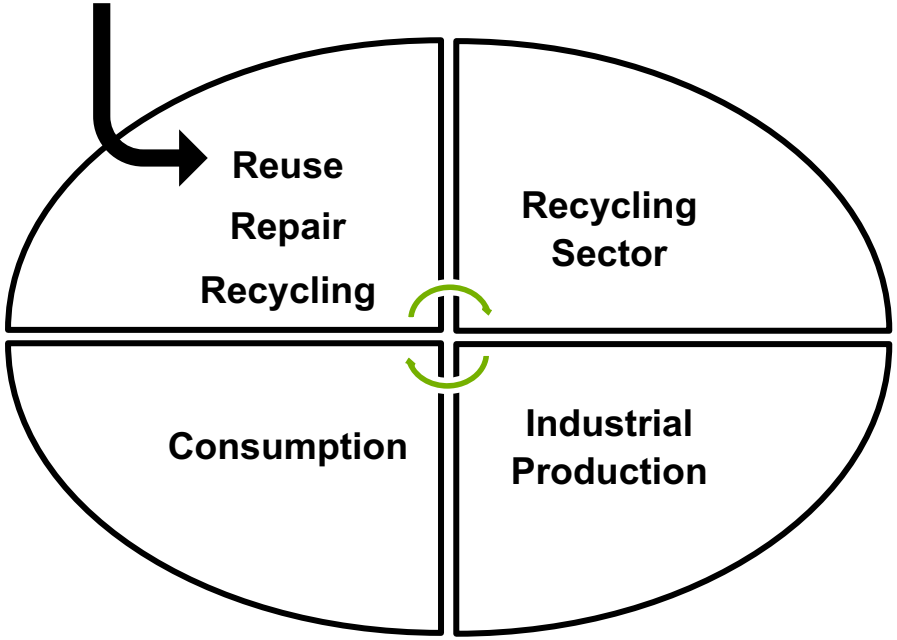
FAO - 2013

Research line



LINEAR ECONOMY

CIRCULAR ECONOMY



Goals

Agrofood Industry

Byproducts

Biopolymers' source

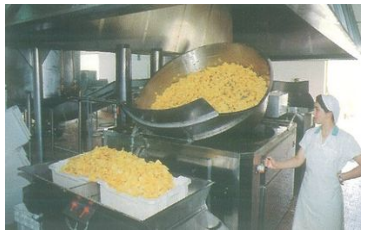
Industrial Waste ←

→ **Packaging Materials**

Sustainable

Biodegradable

Healthy Earth



Portuguese potato chip industry

Byproducts

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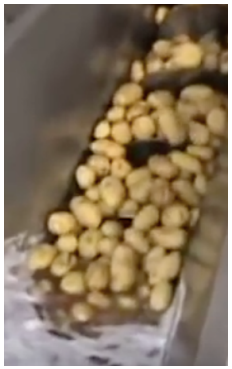
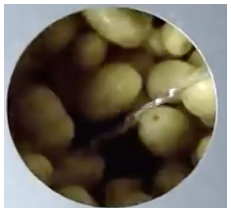
Industrial Byproducts



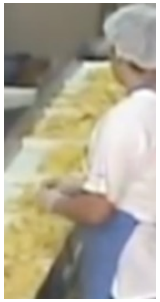


Potato peels

Washing waters

Industrial Byproducts

Frying residues + Rejected potato chip



Biopolymers' sources

Washing waters

Small crude potato slices

Starch

Phenolics

Potato peel

Waxes

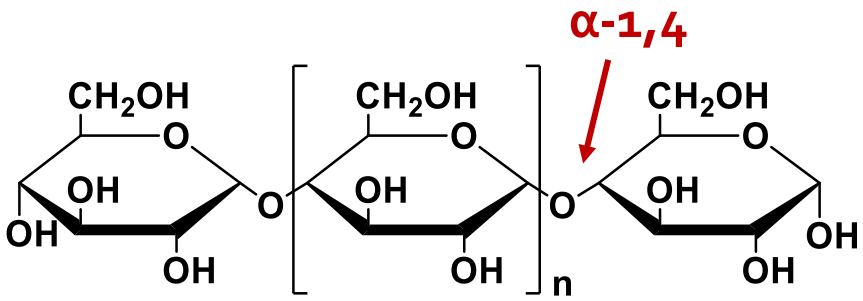
Frying residues

Rejected potatoes

Oils

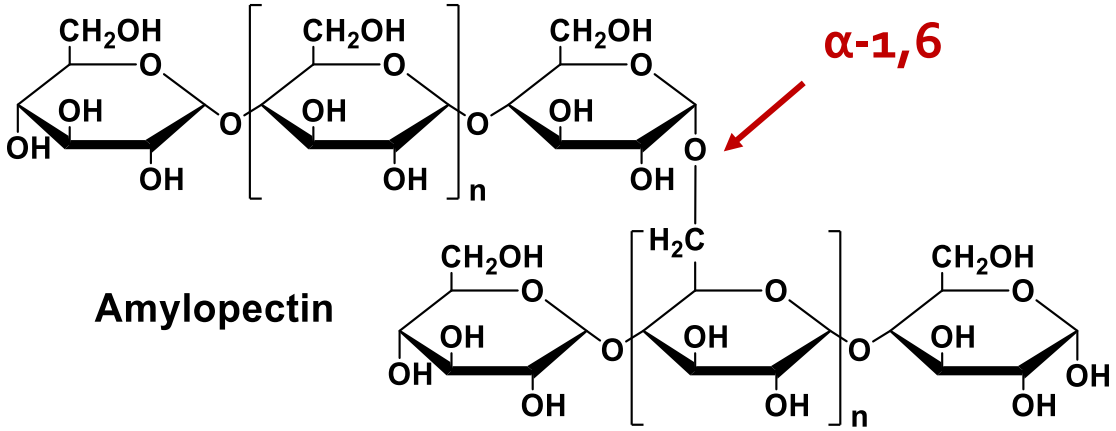
Biopolymers

Starch



Amylose

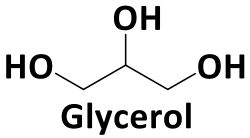
Gelling and Thickness Properties



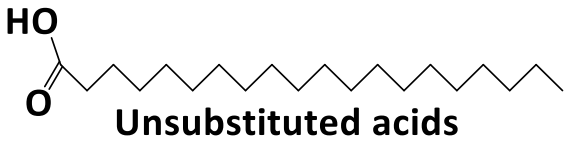
Amylopectin

Other compounds of interest

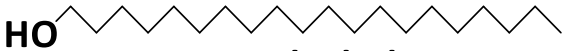
Waxes **Suberin** **Cutin**



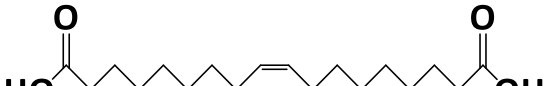
Glycerol



Unsubstituted acids



Fatty alcohols

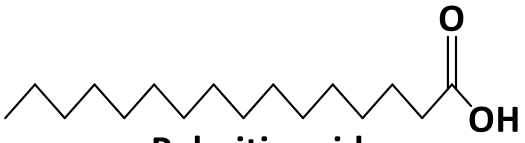


Diacids

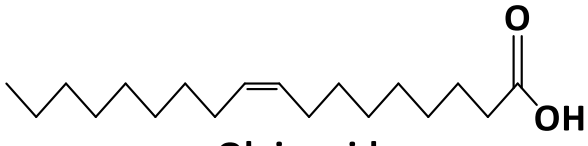
Hydroxy acids

Oils

Hydrophobic and Plasticizing Properties

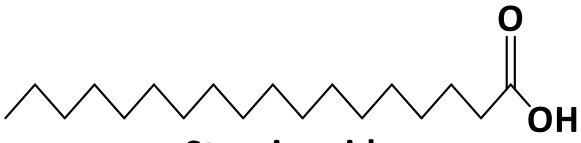


Palmitic acid



Oleic acid

Linoleic acid



Stearic acid

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Starch-based films

Potato starch

Experimental optimization

Biopolymers concentration

Plasticizer concentration

Gelatinization temperature

Casting time/temperature

Mechanical processing

Potato starch-based films

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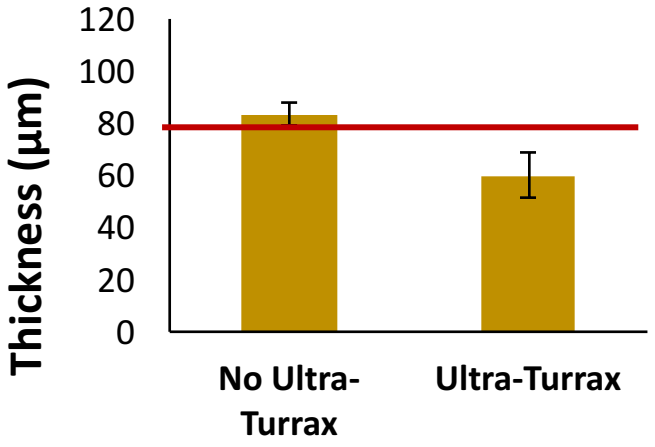
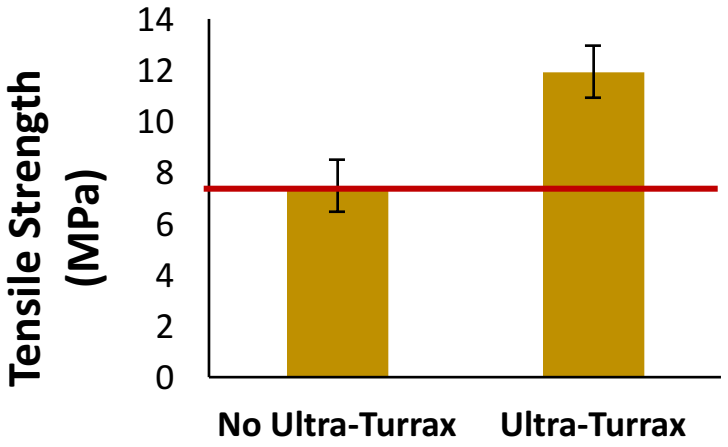
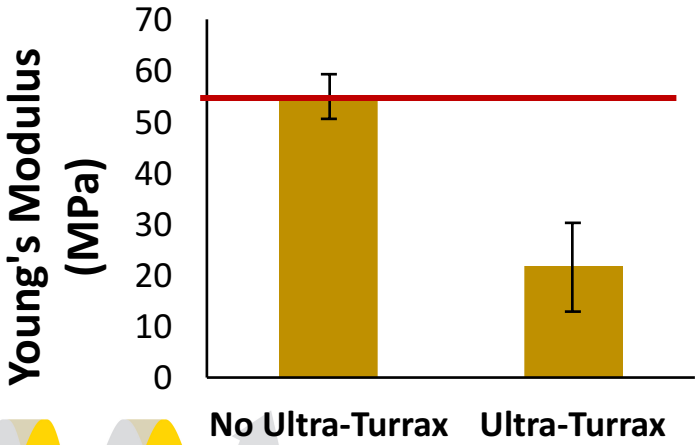
Mechanical Processing

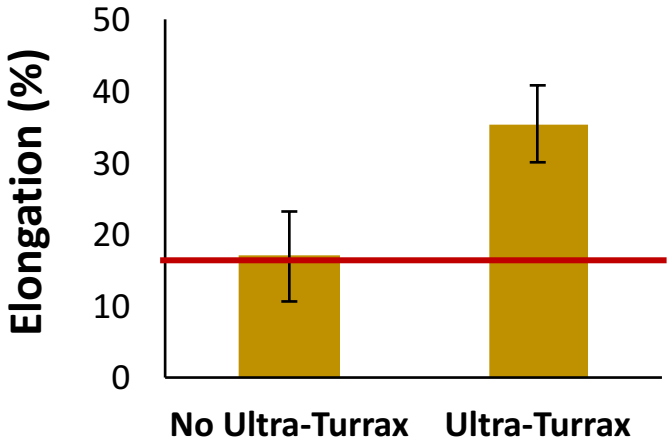
Ultra-Turrax application

Particle size reduction of the starch-granules









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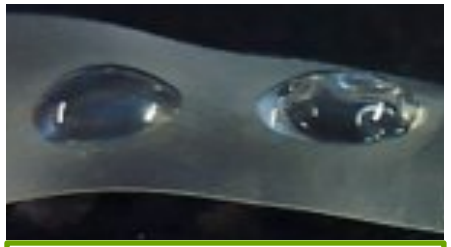
Starch-based films performance

Starch films

Mechanical Properties



Resistance to water conditions

Starch-based films with lipids

Biopolymers extraction from potato industry byproducts

Potato washing waters

Frying residues

Potato peels

Potato starch

Oil

Waxes

Experimental optimization

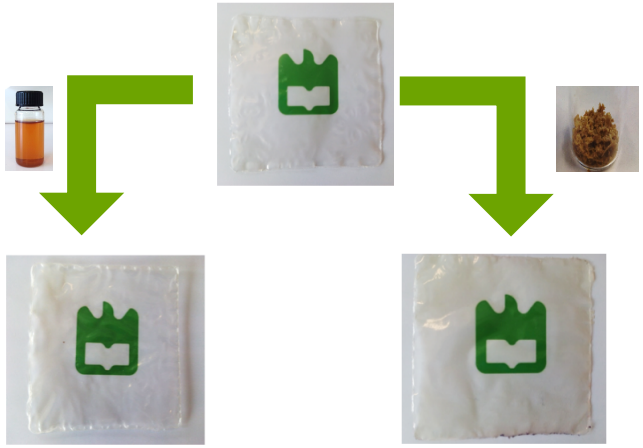
Biopolymers concentration

Plasticizer concentration

Gelatinization temperature

Casting time/temperature

Mechanical Processing



Potato starch-based films containing oil/waxes

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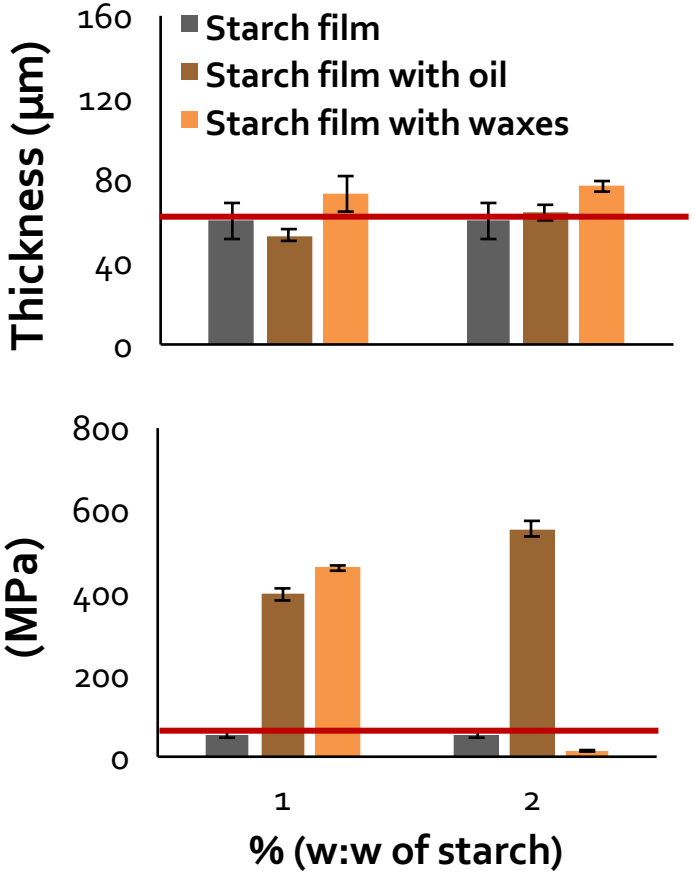
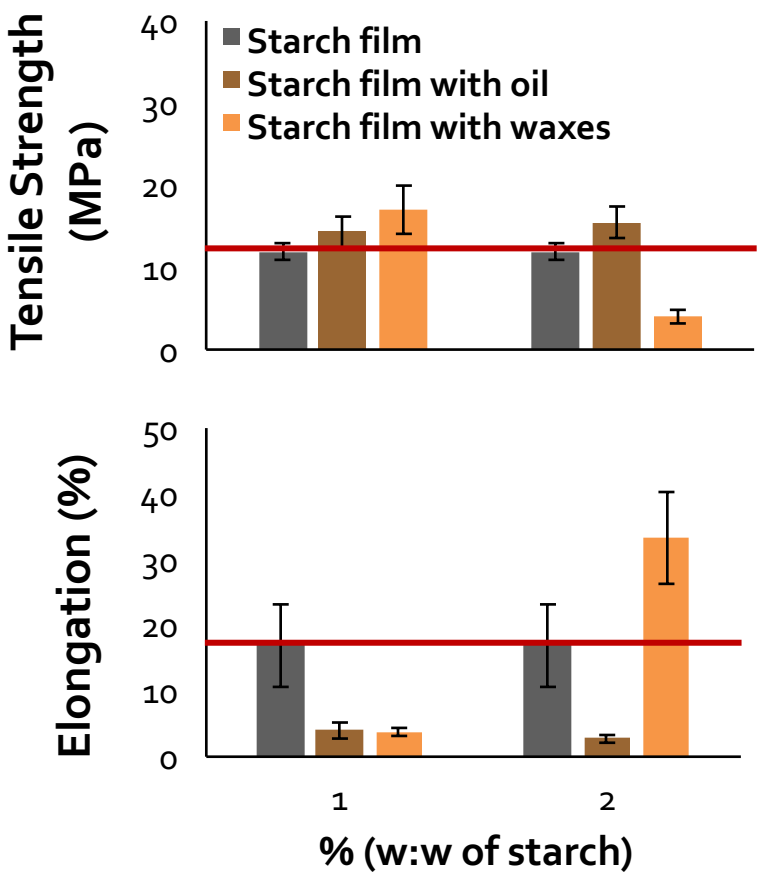
Mechanical Properties





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Starch-based films with lipids

Hydrophobicity and mechanical improvement

Starch-based films

Starch-based films containing oils

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Major Remarks

Potato chips industry byproducts



Biobased packaging materials


Biopolymers extraction



Enhancement of **hydrophic** and **mechanical** performance

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Future work

Active starch-based films containing lipidic compounds

Potato peel

Phenolics

- **Extraction**
- **Incorporation on starch-based formulation**
- **Enzymatic processing**
- **Encapsulation**
- **Validation tests**

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Acknowledgments

FCT financial support:

SFRH/BPD/104712/2014

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Thank you for your attention

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