Soil-biodegradable mulch film at BASF.

Ernst Vrancken,
Global Agronomist Biopolymers

Parma, Italy, 9/7/2020

BASF
We create chemistry

ecovio

Soil-Biodegradable Mulch Film Research at BASF

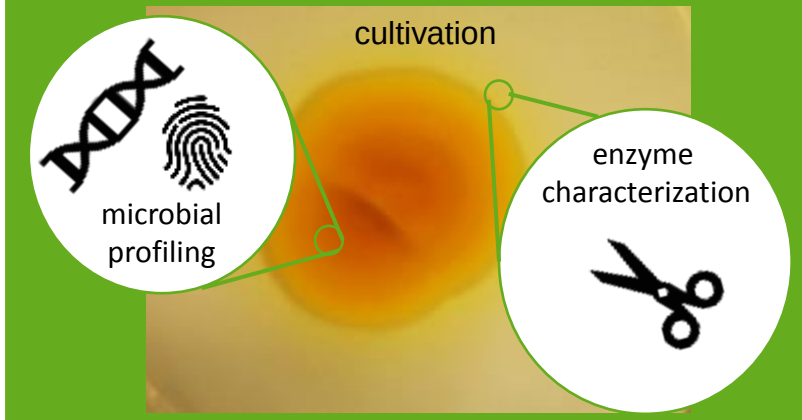
- More than 20 years of ongoing research on soil biodegradability
- Search of new applications, e.g. crops or cropping system
- Trying to understand why and how mulch film is biodegradable (in soil as well as water)
- Collaborate with renowned research labs

→ Not concentrating on a product only but a whole system.

Basic understanding and field evaluation are both needed to understand biodegradability

Fundamental understanding

Elucidating structure-biodegradability relationship



Polymer characteristics

Microorganisms and enzymes

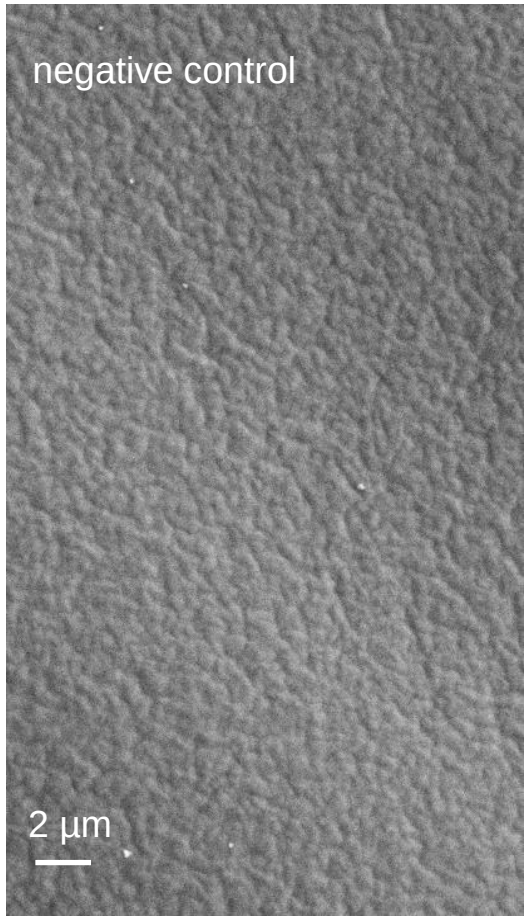
Physico-chemical factors

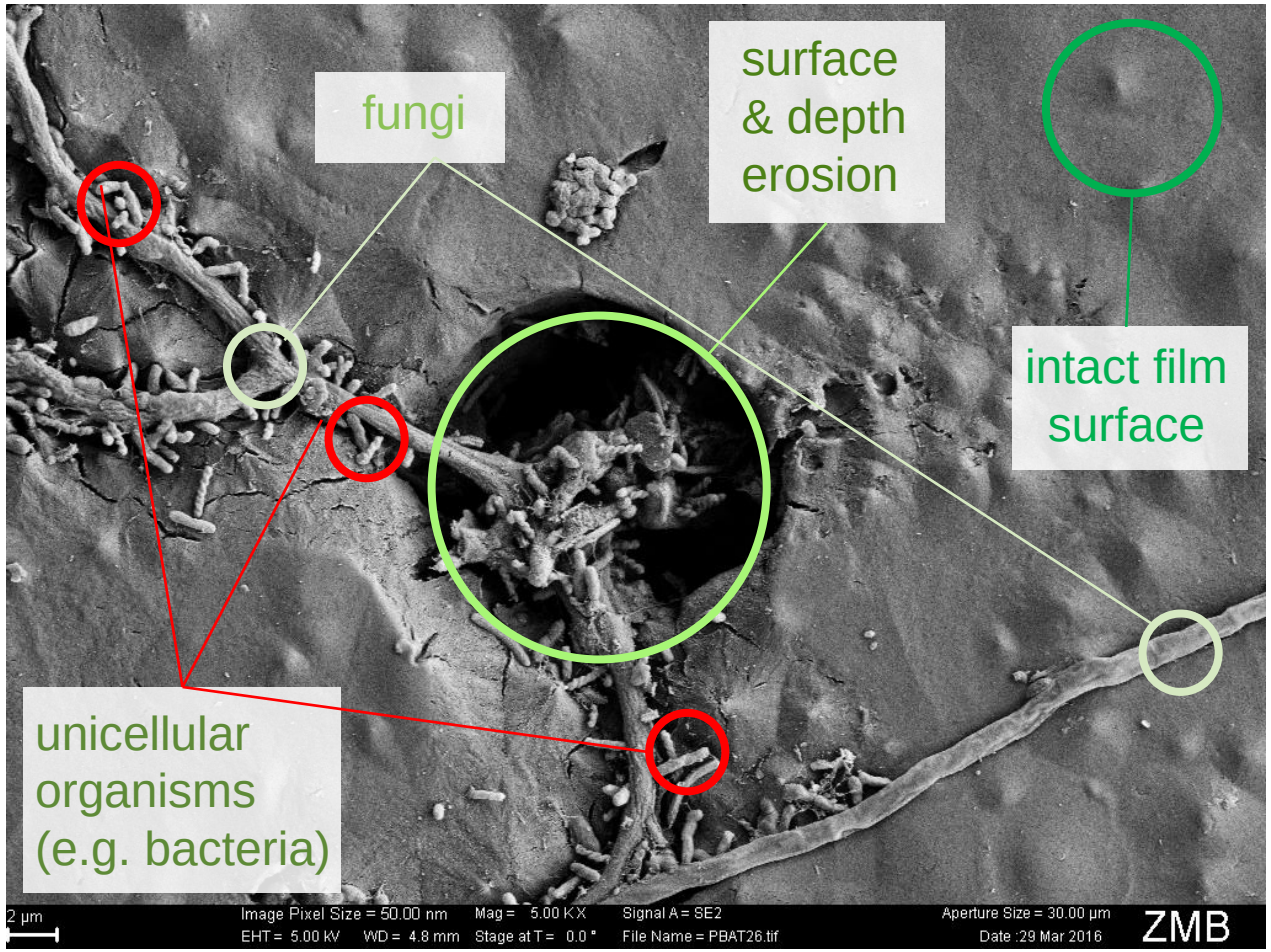
Field evaluation

Assessing product performance in field trials

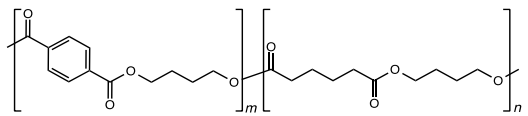
Collaboration with ETH Zürich

Demonstrating microbial colonization of mulch film in agricultural soil, resulting in increased biomass of colonizing microbes





Zumstein et al., 2018



Laboratory experiments
Incubations in agricultural soil
→ 6 weeks @ 25°C

Scanning electron microscopy images

Outlook: Factors Influencing Biodegradability

- Analyzing key factors that influence microbial activity in soil and polymer biodegradation
- Be able to predict soil biodegradability by soil parameters
- Understand how to control the speed of mulch film degradation in soils
- Biodegradation in aquatic environments

Importance of Working on Biodegradability

PolyEthylene (PE) Plastic Mulch Films

Non-biodegradable PE mulch film

(Photo by Yan Changrong, 2008)

Non-biodegradable PE mulch film

(Photo by Ernst Vrancken, 2019)

(Photo by Olivier de Beaurepaire, 2018)

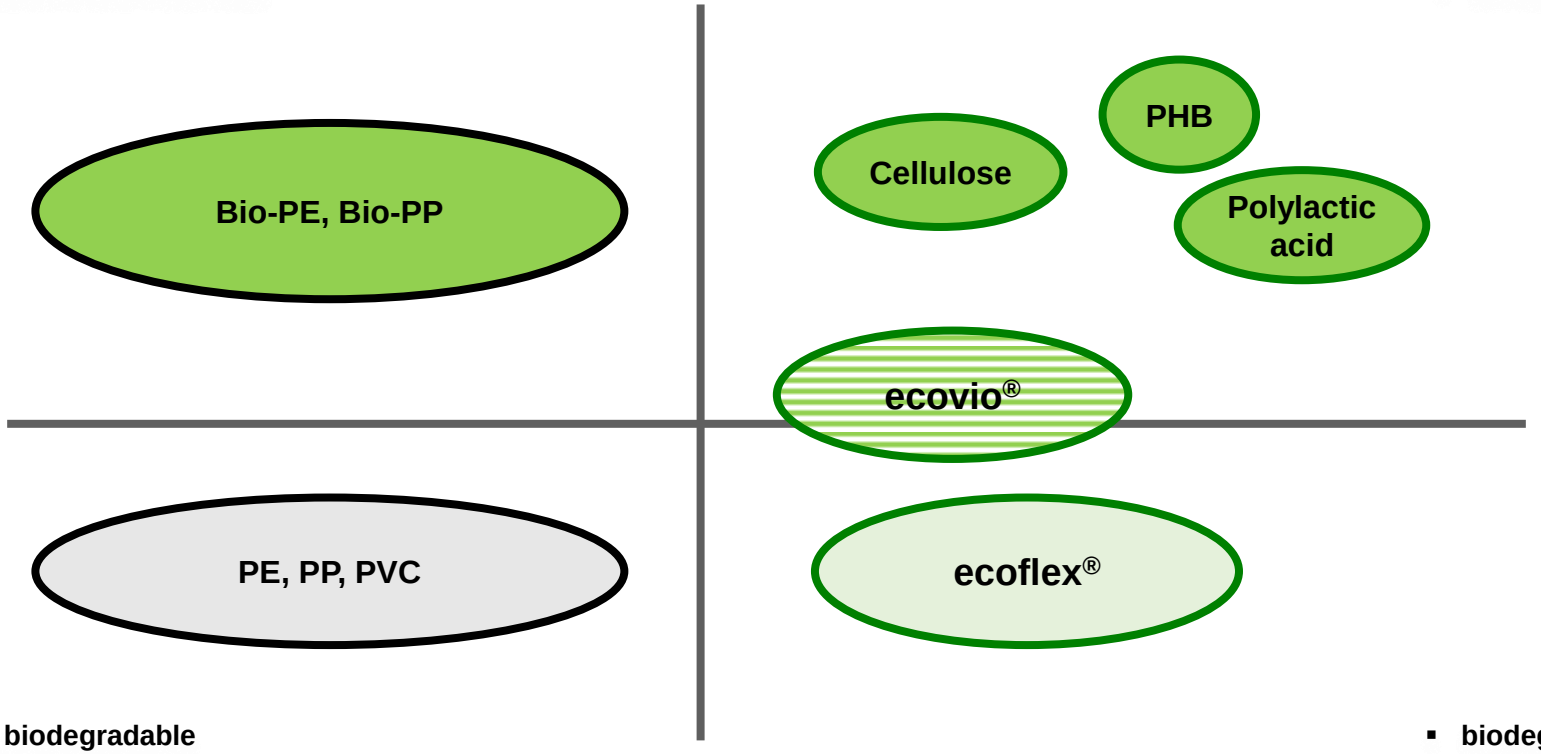
➢ Certified Soil-Biodegradable ecovio®: A Very Good Alternative!

We create chemistry

Biopolymers: Definition of Bio-based and Biodegradable Polymers

- not biodegradable
- renewable raw materials

- biodegradable
- renewable raw materials



- not biodegradable
- fossil raw materials

- biodegradable
- fossil raw materials

➢ Biodegradable polymers can be bio-based on fossil or renewable raw materials.