Biobased Materials
-
Rethinking the Status Quo
FKuR – plastics as passion

- Status quo, expectations & nature as guideline
- Advantages and product solutions via bioplastics
- Latest developments
- Summary
Medium-sized, private group of companies with the aim of developing, producing and distributing innovative plastics

Core business are the development and production of biodegradable and biobased plastics, as well as plastic specialties such as TPE

Customized plastic solutions

Distribution of biopolymers and specialties

Co-operation with Fraunhofer UMSICHT, Oberhausen, in the area of strategic material development
FKuR Portfolio and Distribution:

- **PLA-Blends** for extrusion and injection molding
- **Cellulose Compounds** for injection molding
- **Wood fibre Compounds** for extrusion and injection molding
- **Tailor-made Green PE Compounds**
- **Biobased TPE** for extrusion and injection molding

**I’m green**
- Authorized distribution partner in parts of Europe*, USA and Canada
- Compounding Cooperation for Luminy PLA
- Cooperation with FENC Corp. for their biobased PET

* Austria, Belgium, Denmark, Finland, Germany, Israel, Italy, Luxemburg, Netherlands, Norway, Sweden, Switzerland
How...?
...can I realize my ideas with biopolymers?
Why is FKuR dedicated to bioplastics?

Sustainability:
“Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

(World Commission of Environment and Development, 1987)
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Status quo, expectations & nature as guide line

Status quo – years ago?

Wilhelm II: „I believe in the horse. The automobile is a temporary appearance!“
Status quo, expectations & nature as guideline

Status quo – what’s next?
Status quo? – **Assumptions** as to biobased and biodegradable materials nowadays:

**Biobased:**
- By nature, renewable resources have a negative impact on land use, eutrophication and acidification
- Bioplastics must always prove their benefits in terms of environmental, social and economic aspects

**Fossil based:**
- Environmental pollution from leakages and incidents (platforms or ships) is not included in life cycle assessments (LCAs)
- For fossil raw materials hardly any comparable proofs are demanded, even the depletion of fossil raw materials is accepted
Status quo, expectations & nature as guideline

Status quo? Our expectations to exhaustible resources for years now?

Unlimited Availability

Always Cheap
Status quo since decades?

Source: Data from Bolin (University of Stockholm)
Status quo, expectations & nature as guideline

Plastics... are omnipresent:
A vision for Europe’s new plastics economy - Plastic Strategy agenda for 2030:

“A smart, innovative and sustainable plastics industry, where design and production fully respects the needs of reuse, repair, and recycling, brings growth and jobs to Europe and helps cut EU's greenhouse gas emissions and dependence on imported fossil fuels”.

Status quo, expectations & nature as guideline
Current status for plastics

- Image loss due to the littering problem in our oceans
- EU efforts to completely ban single-use products
- Substitution of plastic by paper, to the detriment of product safety and life cycle assessment
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Summary
Without an appropriate marketing strategy and analysis of valuable market segments, a biobased product will not be successful.
Opportunities by using Green PE for different market players

- New product line
- Diversification
- First Mover status
- No changes in machine equipment

- Awareness for more sustainable products
- Willing to pay the extra costs

- EU Strategy 2030
- New product line
- Diversification
- Brand image

- More heterogenous product portfolio
- Sustainable image

Sources: Pixabay
Closing natural cycles with …

**Biobased plastics**

- Plastics require a separate recycling stream for each type of material.
- Once a recycling stream has been established for a fossil plastic, biobased alternatives (e.g., Bio-PE, Bio-PET) can be recycled together with fossil counterparts in these streams.
- Targeted recycling in form of material utilization is established and saves valuable resources.
- Biobased and compostable plastics are potentially recyclable (e.g., PLA).
- Thermal utilization is an alternative (energy production).
Bioplastics in the context of the EU plastics strategy

Biobased – e. g. packaging

**Strengths**
- Meets the criteria of EU Strategy 2030
- Alternative biobased feedstock
- Post-consumer recycling
- Many options for communication

**Weaknesses**
- Low customer perception due to:
  - No visual or haptical differences (e.g. compared to conventional PE packaging)

**Opportunities**
- Marketing of biobased products in terms of recyclability
- Willingness to pay the higher price

**Risks**
- General concerns from:
  - NGOs
  - Consumers
  - Politics
Product: design water bottle

Natural Bottle

- Biobased, reusable design water bottle
- Bottle: Green PE (Bio-PE)
- Cap: Bamboo (outside) and wood (inside)
- Potential for reduction of CO$_2$ emissions through a more favorable ecological footprint
- Fully recyclable
Speick Organic 3.0

- Holistic sustainable packaging concept (mono-material)
- ‘Perfect Product Fit’ (packaging and content complement each other optimally)
- Differentiation from competition
- Green PE (Bio-PE) replaces all materials
- No differences in production
Product: food packaging

La Granda, packing of meat

- Holistic sustainable packaging concept
- ‘Perfect Product Fit’ (packaging and content complement each other optimally)
- Pouch: combination of Green PE (Bio-PE) and paper
- Content of renewable resources in the packaging > 80%
- Printing and lamination possible with innovative solvent-free technology
Closing natural cycles with…

Biodegradable plastics

- Compostability is a clear advantage when plastic articles are mixed with biowaste
- Mechanical recycling is then impossible for either plastics or biowaste
- Mixed waste is suitable for organic recycling
- The result is valuable compost that serves as a fertilizer for crops in the circulation
- Products and materials must comply with the standard EN 13432 (industrial compostability)
Bioplastics in the context of the EU plastics strategy

Compostable – e.g. fruit and vegetable bags

**Strengths**
- Meet the criteria of Packaging and Biowaste Ordinance
- Biobased & compostable materials

**Opportunities**
- Cascade use: reuse bags as trash bags
- Added value, e.g. more organic waste is collected
- Natural cycles are closed

**Weaknesses**
- Heterogeneous acceptance and low knowledge about bio waste bags in
  - Municipalities,
  - Disposal companies
  - Politics and public

**Risks**
- Risk of ‘misthrowing’ due to insufficient labeling
- Risk of littering

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Mulch film made from Bio-Flex®

- Certified compostable and biodegradable according to EN 13432 and ASTM D 6400
- Excellent ratio between degradation & performance
- Cost-effective: no collection and disposal costs for film
- Excellent resistance to moisture
- Replacement of herbicides by high weed suppression
Product: organic waste bags

Organic waste bags made from Bio-Flex®

- Certified compostable and biodegradable according to EN 13432 and ASTM D 6400
- Certified home compostable “OK Compost HOME” by TÜV Austria
- Clean, dry and low-odor collection of organic household waste
- Increase in the quantity and quality of separated bio waste
Product: tree protection

Tree protection made from Bio-Flex®

- Characteristics comparable to fossil polymers used so far
- Product remains stable during the period of use
- Fragmented plastic particles biodegrade over time
- No contamination of the soil by durable plastics
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Latest Developments: biobased compounds

- Compounds from biobased PE and oil-based PP
- Ready-to-use on standard PP-equipment
- Early developments started with a biobased content < 35 %
- Latest developments with increased biobased content: > 50% - 80%
- Mechanical properties comparable to PP (homo, copo, random)
Latest Developments: biobased compounds

- Biobased TPE´s containing renewable resources
- Shore Hardness from A20 to D 40
- Individual solutions upon request
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- Plastics from renewable raw materials play an important role in view of EU Plastics Strategy 2030
- Biodegradable AND biobased solutions will determine future developments depending on the application and disposal route
- Biobased plastics (such as Bio-PE, Bio-PET) can already be fully integrated into the circular economy
- Whenever plastics remain in nature - for whatever reason - they should be biodegradable
Nature as Guide Line
Plastics as Passion
Customers as Partners

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