



# Market potential for products from green biorefining

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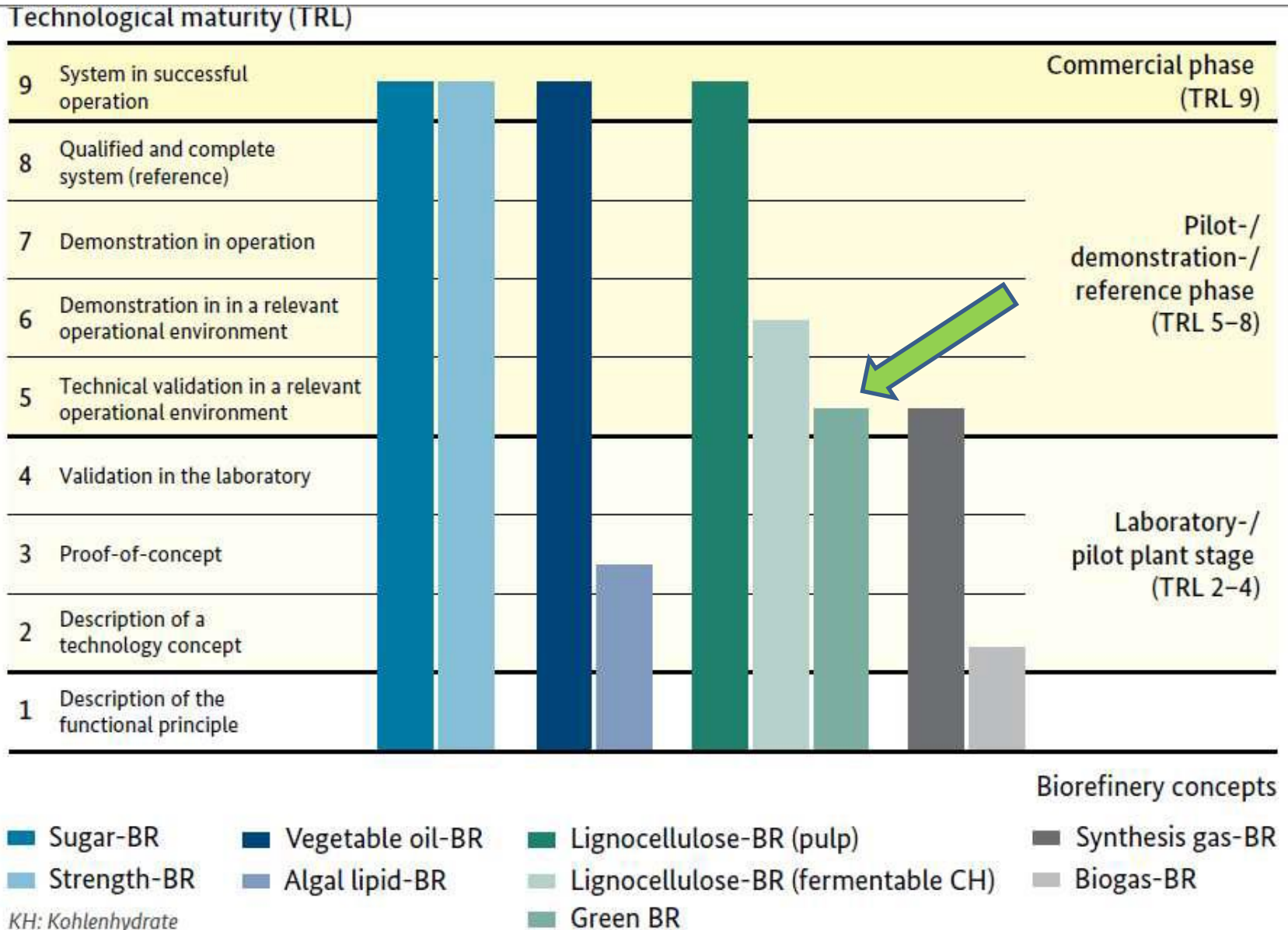
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# Challenges for green bio-refineries – from a market perspective

- Availability of feedstocks (some only in limited volumes);
- The supply chain from feedstock production to bio-refinery, and to the market;
- Market size and readiness

# Status of biorefinery concepts



# Processing of grass juice and potential applications and markets

Product	Application	Market size
Protein recovery	Animal feed	XXX
Amino acids mixtures	High-grade nutritional supplements, body care.	X
Lactic acid	Bulk chemicals	XXX
Lactic acid, organic acids	Chemical, food, feed sectors	XX
Bio-methane	biofuel	XXX

# GrasPap from Germany

- Pellets made from hay and used as alternative fiber source in the paper and cardboard industries
- Grass fibers: 30-50 % of the final product, eg.:
  - Cardboard
  - Paper
  - Wall paper
- Added value:  
Environmental sustainable, approved for food packaging material, natural and renewable raw material, and organic.

[www.graspapier.de](http://www.graspapier.de)

# Grasrap fibers from grass





# Increasing demand for feed for organic layer hens

- 2018: EU requirements for 100 % organic feed;
- Market demand for organic protein increasing;
- Organic soya is cultivated in EU, but insufficient to cover demand;
- Alternative protein feeds such as starfish, algae, hemp, insects or grass protein?



# Estimated demand for organic protein for layer hens in EU

- EU feed industry use 34.1 million T soya/year;
- Hereof 22 % is for layer hens = 7.5 million T soya;
- Organic hens make up 1 % of the inventory, and only 1% of the feed consumed = 75.000 T protein,
- If organic hens = 2 % of inventory = 150,000 T protein
- Estimated market for organic protein for organic layer hens: 100,000 T
- **How much of this could be made from grass protein?**



# Examples of grass protein products for human nutrition – USA and Canada



# Outlook for the market for green biorefinery-products

- Market demand for organic food products will increase further;
- The need for alternative solutions for organic protein feed is becoming more demanding;
- The applications for products from green biorefineries are developing – the step into a commercial set-up proves challenging
- Setting up a supply chain is a core element in the route from biorefinery to market

Thank you for your attention

Questions, please



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