

Lactic Acid from Straw for PLA Applications - Lab to Pilot Scale

VISION & MISSION

Vision & Mission of BluCon



BluCon contributes significantly to combating climate change & plastics pollution



BluCon uses non-food feedstock to make precursors for biobased, biodegradable plastic



Biodegradable plastic protects the environment



Biobased plastic mitigates 3 million tons of CO₂ for every 1 million ton of crude oil used for producing fossil-based plastics

<https://www.energiezukunft.eu/wirtschaft/forschung-co2-koennte-rohoel-ersetzen/>

DO IT!



The company

- Founded in 2017 at the BioCampus in Cologne, Germany
- Managing Directors Markus Fehr & Dr. Albrecht Läufer, each with >30 years management experience
- 7 scientists/ engineers, 8 technicians + Strong network of professionals for full scale production
- 4 patents granted, 4 patent applications pending.
2 trademarks registered: Blucon®, Plastics from Nature for Nature®
- **Focus on further improvement of production strain, process and preparing for scale up & commercialization**



BluCon unique technology bases on two isolates



High-temperature
isolation sites



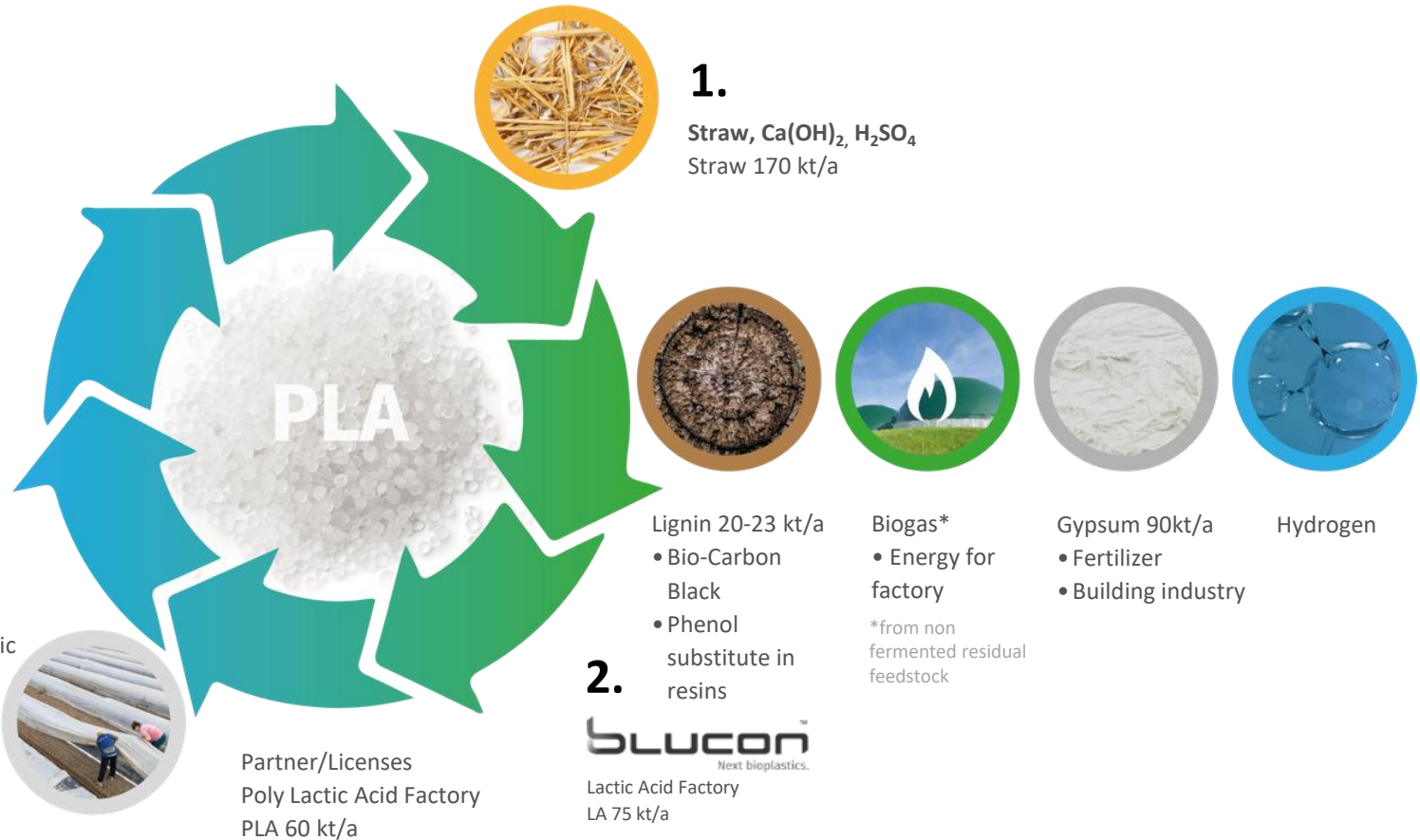
Feedstock agnostic, straw,
miscanthus, wood...

1. Two types of anaerobic bacteria, isolated from high-temperature sites
 - *Caldicellulosiruptor sp.* & *Thermoanaerobacter sp.*
 - Both strains convert C6 and C5 sugars into L-lactic acid
 - *Caldicellulosiruptor sp.*, producing enzymes for degradation of cellulose and hemicellulose
2. Anaerobic, at 70°C, i.e. not sensitive to contaminations, less need to cool the feedstock after pretreatment
3. High enantiomeric purity of above 99.5% L-lactic acid

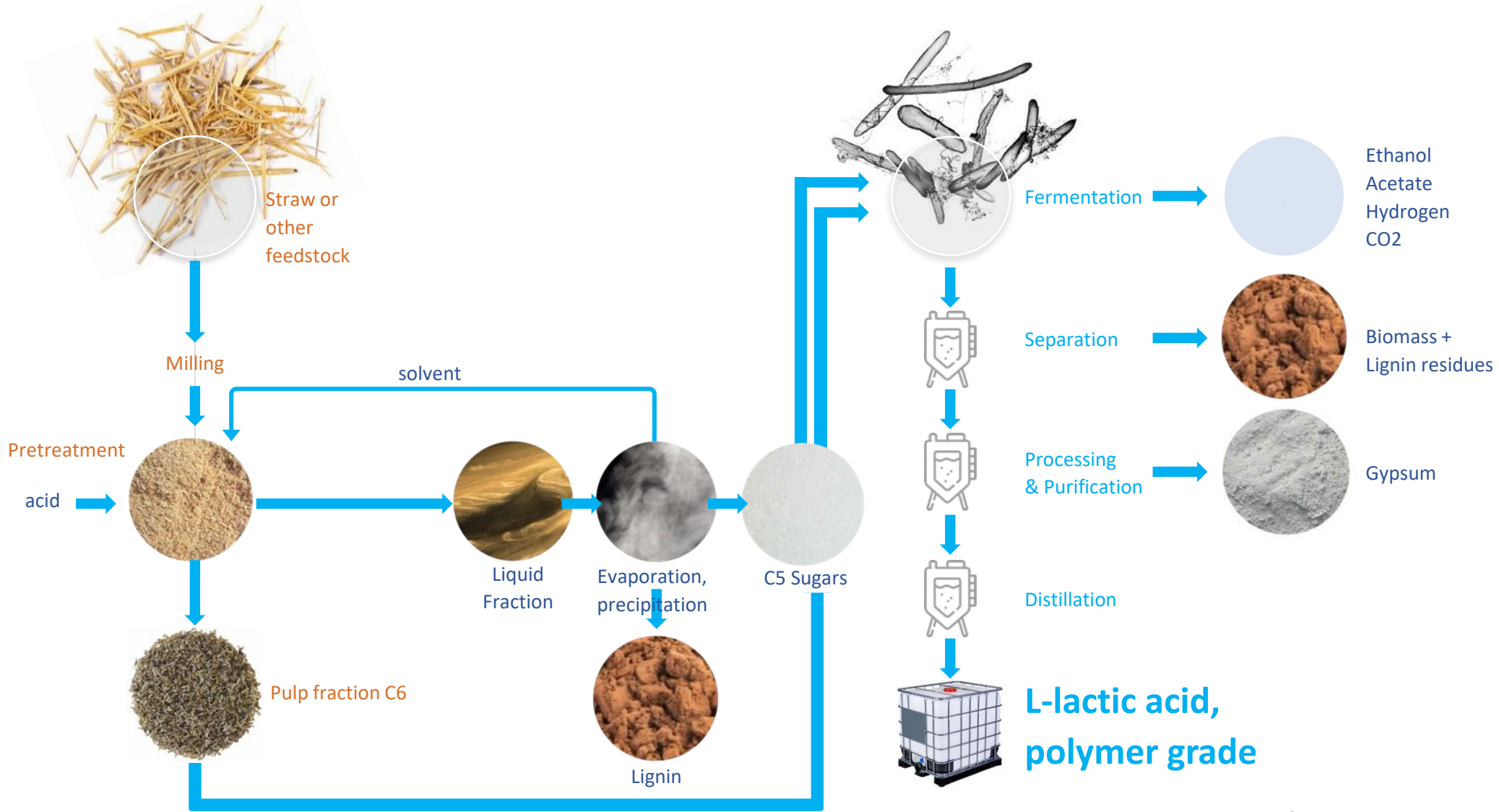
Carbon-neutral, degradable, recyclable Bioplastic (PLA) from non-food feedstocks



Existing PLA applications

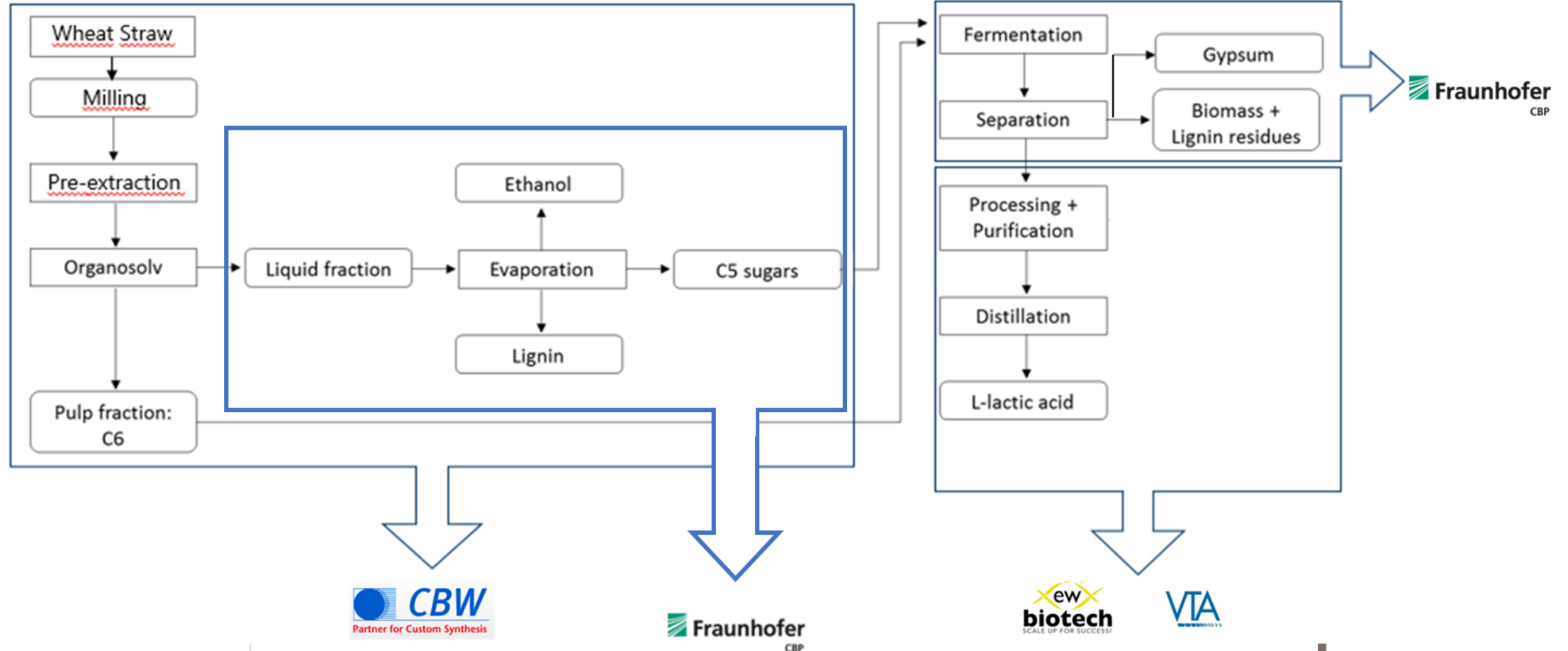


BluCon's technology: From lignocellulosic feedstock to Lactic Acid

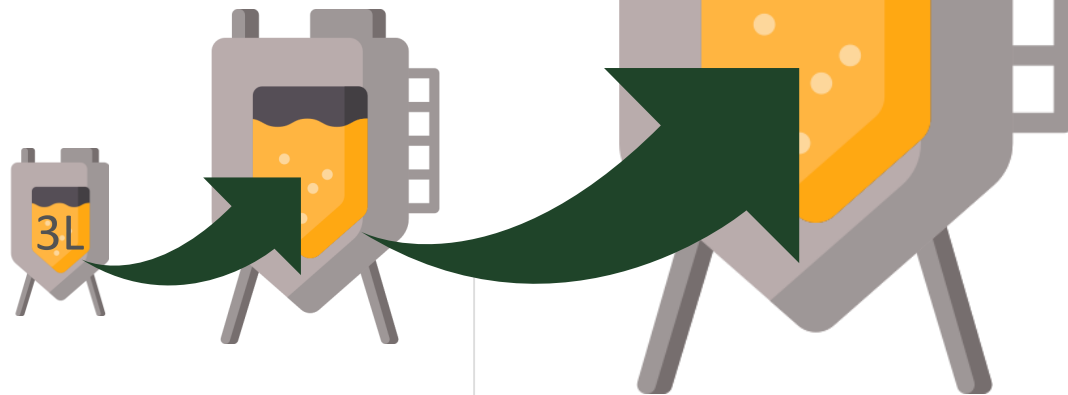


Scale-up of Lactic Acid production (Project STROLA)

The STROLA project was **very important to gain further information for the scale-up of the Lactic Acid (LA) production process** from lab to pilot, and subsequently to commercial scale



TRL5 Accomplished: BluCon technology is scalable from laboratory to pilot scale



- **First LA process in 10m³ scale on wheat straw pulp in the world!**
- Entire production process covered (Pretreatment -> Fermentation -> DSP)
- 94-98% of cellulosic sugar from wheat straw recovered in pulp, 79% of which has been transformed to LA
- About 46 g/L final LA titer

BluCon Process Yields High Quality Lactic Acid Ideal For PLA Production



BluCon® Lactic Acid

*“The polymer grade lactic acid derived from the BluCon® process is of **very good quality**. In particular the quality of the raw lactide, as underlined by a very low racemization as well as low acid numbers, suggests a **very high purity** of the lactic acid. All in all, the lactic acid from the BluCon® process is **ideally suited for our PLA synthesis process.**”*

Udo Mühlbauer

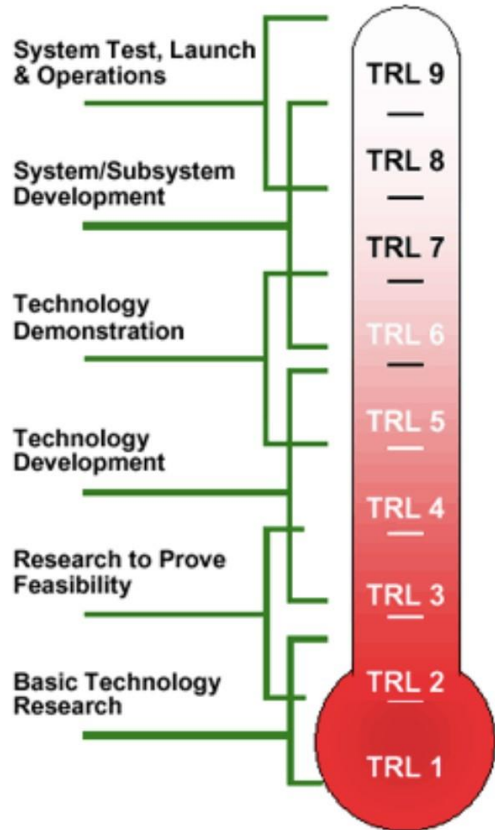
Senior Vice President Research & Development

Product Manager PLA

Uhde Inventa-Fischer GmbH

On the way to commercialization:

Demonstration of BluCon technology as integrated process (TRL 6)



- STROLA (funded by BMWK) included the **pretreatment of wheat straw, fermentation and downstream processing** to produce concentrated lactic acid
- All single process steps were done by **different partners**
- Next step aims to demonstrate BluCon's technology for the production of lactic acid at **one site in an integrated process**
- Currently the whole **process chain is demonstrated in cooperation with Fraunhofer CBP** in Leuna

Thanks to...



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Plastics from nature for nature[®]

Thank you.



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