



Commercialisation of Sustainable
Solutions through Strong Alliances:
Reverdia, Powered by Roquette + DSM

Christophe Rupp-Dahlem,
Director, Plant-based Chemistry, Roquette

Will van den Tweel,
General Manager, Reverdia



Key Messages

- Commercializing bio-based products is a challenge that requires strong alliances
- Roquette and DSM, as Reverdia, exemplify the complementary skills and experience necessary for commercial success
 - Technology: Unique low-pH technology position (yeast)
 - Business model: First mover in large scale manufacturing
 - Market development: Strong market development and customer partnerships
- Reverdia in a leadership position



Reverdia: Powered by DSM + Roquette



- Ranked among top global manufacturers of renewable raw materials (starch) for food ingredients & bio-based products
- Biorefinery experts
- €3 billion Euros turnover
- 7800 people in more than 100 countries worldwide
- Member of UN Global Compact



Complimentary
Competencies Create
a Single Force for
Market Success



- Life Science and Material Science company
- Biotechnology leader
- 22,000 employees in 200 locations across all continents
- Annual net sales of around €9 billion
- Top ranking Dow Jones Sustainability Index



Reverdia can benefit from developments by mother companies

POET-DSM JV to unlock cellulosic bio-ethanol

- Currently being constructed in Emmetsburg, Iowa
- DSM and POET 50% share
- Total investment \$250 million
- Designed to produce more than 20 million gallons
- Replicate technology throughout POET's existing network of 27 corn ethanol plants



The ROQUETTE Group

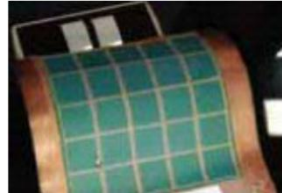
A Leading Global Producer of Starch Products

- Number 2 in Europe; Top 4 worldwide
- World leading producer of polyols and gluconates
- 21 factories around the world including the most important cereal-based biorefinery in Europe located in Lestrem, France



Roquette Forms Key Partnerships to Produce and Market Bio-based Products

Isosorbide-based polymers



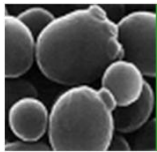
- **Mitsubishi Chemical** launched DURABIO®, a new isosorbide-based polycarbonate with high optical properties, and weather and impact resistance.
- Operations have started at Mitsubishi Chemical plant in Kurosaki, with a first output rate of 5000 t/y.
- Applications e.g. in films for light and energy services and optical films

- **SK Chemicals** launched ECOZEN®, a new range of copolyester resins containing isosorbide
- Broad applications are targeted thanks to its interesting properties
- Approval has been granted by FDA for Food contact, where it can replace bisphenol A



Requirements to Successfully Develop a Bio-based Succinic Acid Product

Leadership position based on combined expertise



Strengths in strain development & fermentation



Innovation in product recovery



Feedstock knowledge and global reach



Market knowledge expertise



Capital for development and implementation



Commercialization Strategy

TECHNOLOGY

World Class
Sustainable



BUSINESS MODEL

Manufacture and
Sales



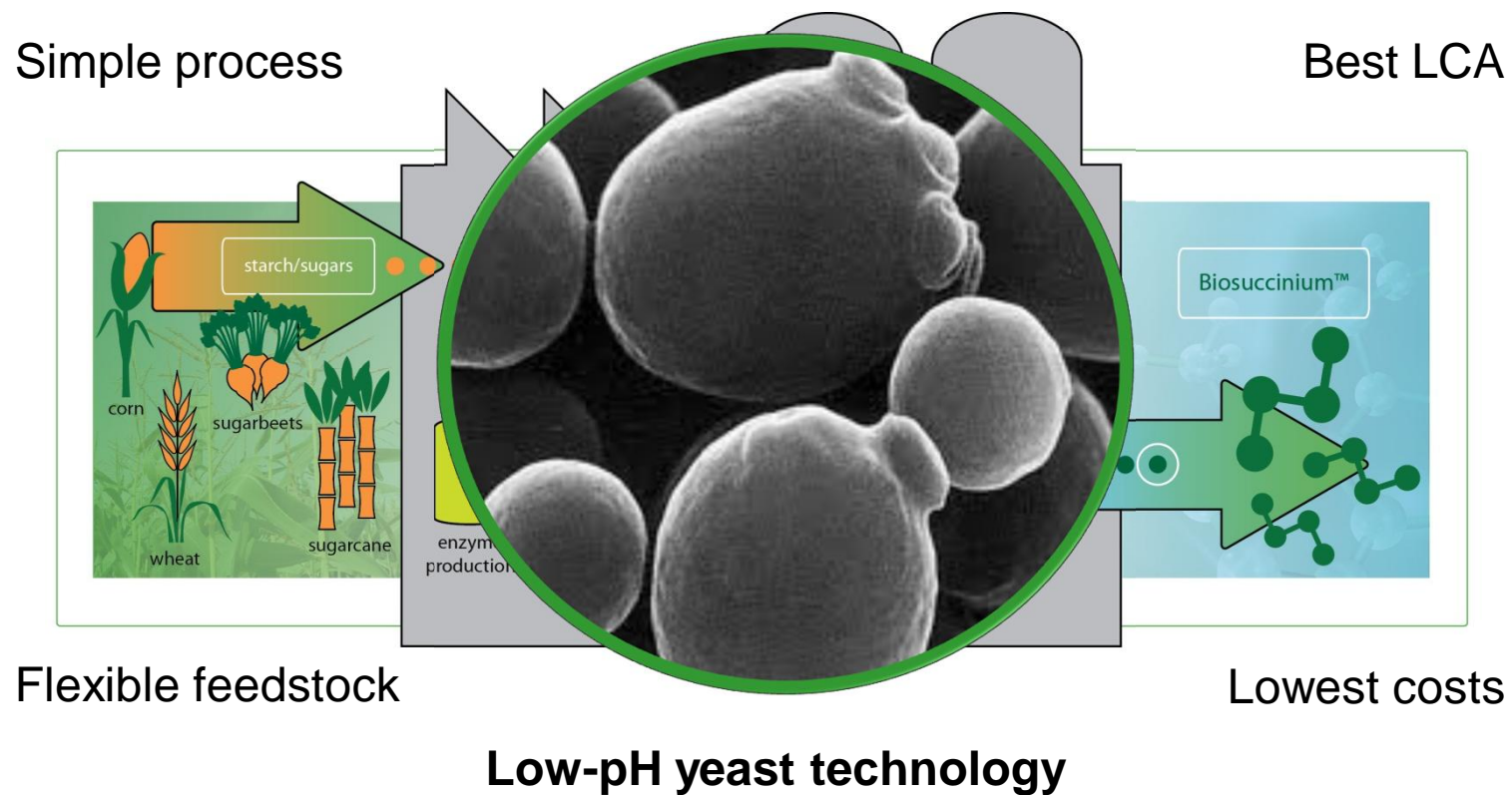
MARKET DEVELOPMENT

Customer
Partnerships

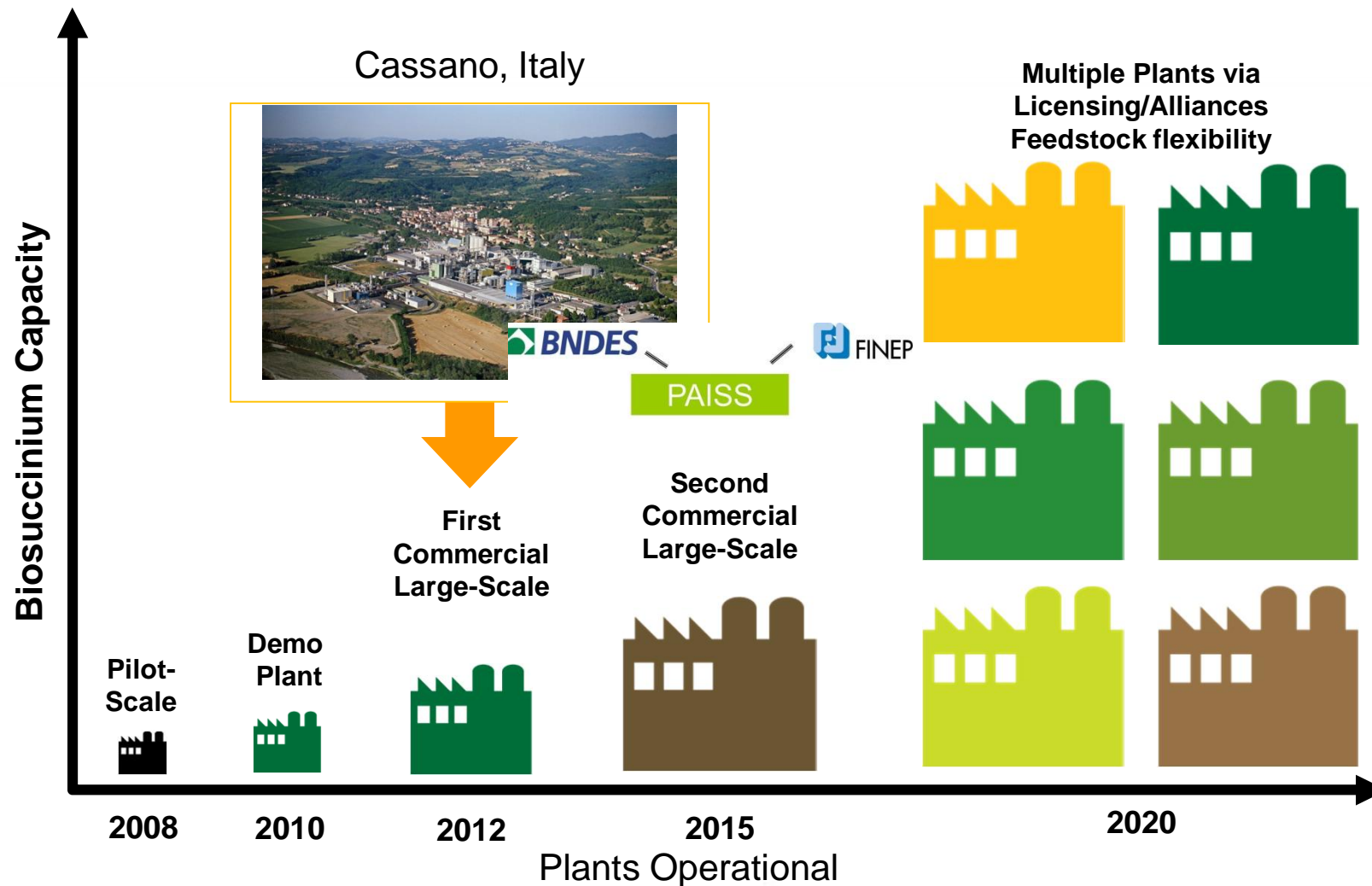


Reverdia's Biorefinery for Biosuccinium™

1st Pillar: low-pH yeast technology enables economic commercial production



2nd pillar: Executing our commercialization strategy according to plan



Biosuccinium™ qualified in multiple applications

Packaging	Industrial	Sports and Footwear
 <ul style="list-style-type: none"> ■ PBS <ul style="list-style-type: none"> – Food packaging – Cutlery and utensils – Disposable cups and lids – Shopping bags 	 <ul style="list-style-type: none"> ■ PU foams <ul style="list-style-type: none"> – Insulation ■ TPU <ul style="list-style-type: none"> – Building and construction – Mining equipment ■ Plasticizers ■ Pigments ■ Resins <ul style="list-style-type: none"> – Coatings – Composites 	 <ul style="list-style-type: none"> ■ TPU and PU <ul style="list-style-type: none"> – Footwear – Outdoor garment ■ Spandex / Elastane <ul style="list-style-type: none"> – Apparel ■ PBS <ul style="list-style-type: none"> – Packaging – Buttons – Plastic parts
Non-wovens and Fibers	Automotive	Agricultural
 <ul style="list-style-type: none"> ■ PBS <ul style="list-style-type: none"> – Diapers – Hygiene products – Fishing lines and nets 	 <ul style="list-style-type: none"> ■ PU foams <ul style="list-style-type: none"> – Seats ■ TPU <ul style="list-style-type: none"> – Interior and sealing ■ PBS <ul style="list-style-type: none"> – Interior 	 <ul style="list-style-type: none"> ■ PBS <ul style="list-style-type: none"> – Mulch films – Plant pots

TPU = thermoplastic polyurethane; PU = polyurethanes; PBS = polybutylene succinate: new biopolymer; Spandex / Elastane = elastic fibers

3rd Pillar: Market Development & Partnerships

Alliances are the key to market success

Strong experience



Strong commercial team



Application work



Strong partnerships



Proviron and Reverdia Collaboration

Biosuccinium™ based Di-Methyl-Succinate

**Reverdia enables Provichem® 2511 ECO,
the first commercially available
bio-based Di-Methyl-Succinate (DMS)**

Proviron®

- Bio-based solvent, miscible with alcohols, ethers, ketones and most hydrocarbons
- Raw material for quinacridone and DPP pigments and UV stabilizers
- Produced with Biosuccinium™, sustainable succinic acid
- Totally biodegradable and non toxic for aquatic organisms
- Used as a coalescing agent for emulsion paints in low VOC coating applications

reverdia

Unique Value Proposition

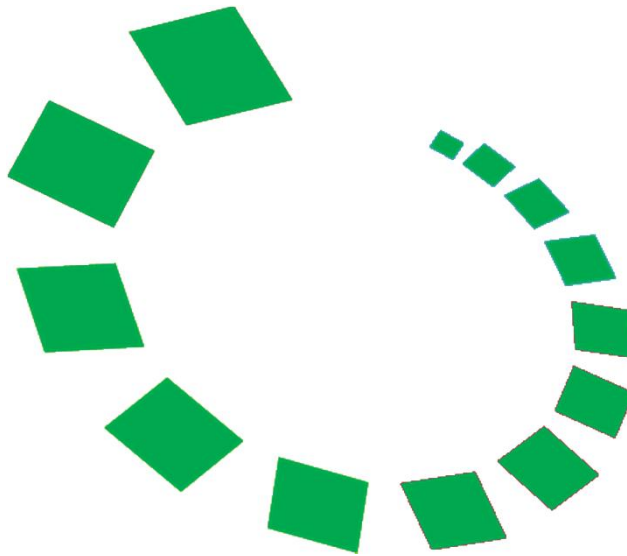
Leading to strong market interest

Reliable supply

- Experienced
- Track record with integrated biorefinery

Sustainable

- Renewable
- Best carbon footprint



Proprietary Low pH Technology

- Stable performance
- Best costs efficiency

High Quality Product

- Consistency
- Purity critical for various applications

Reverdia - Biosuccinium™ Enabling a Brighter Future

In conclusion

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