



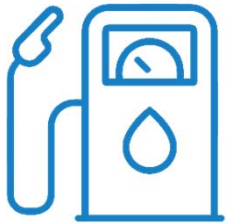
3rd EU-India conference on Advanced Biofuels

Didier Masy – March 2, 2020



Turning science into **industrial reality**

Leaf benefits from Lesaffre's expertise to develop fermentation solutions for industrial manufacturers looking to **reduce their environmental footprint**. Our focus is to offer **innovative fermentation solutions** to exceed the technical and economical expectations of our partners worldwide.



Industrial ethanol solutions

A **comprehensive range of yeasts and yeast products** complemented and supported by our team of technical experts in ethanol production (1G, 1.5G and 2G).

CelluX™ 4

Suitable for various 2G feedstocks

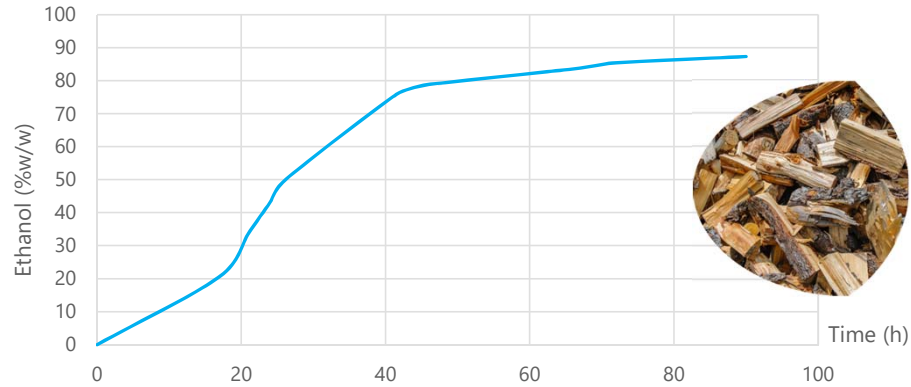
Commercially available under dry form since 2015

Reliability

Yield

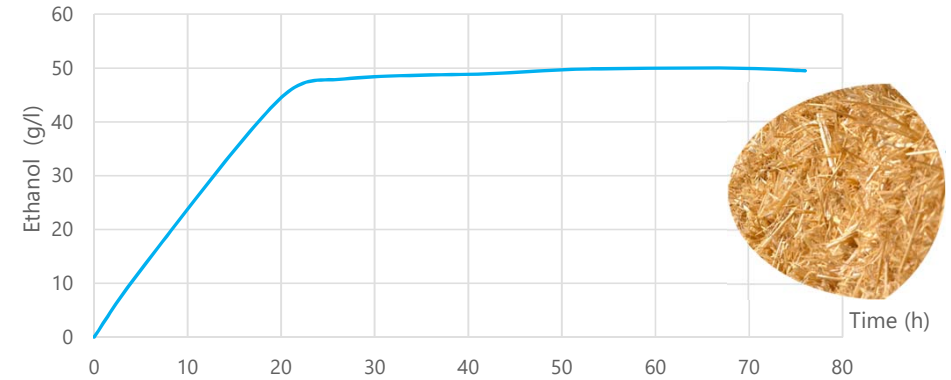
Performance

CelluX™4 fermentation trials



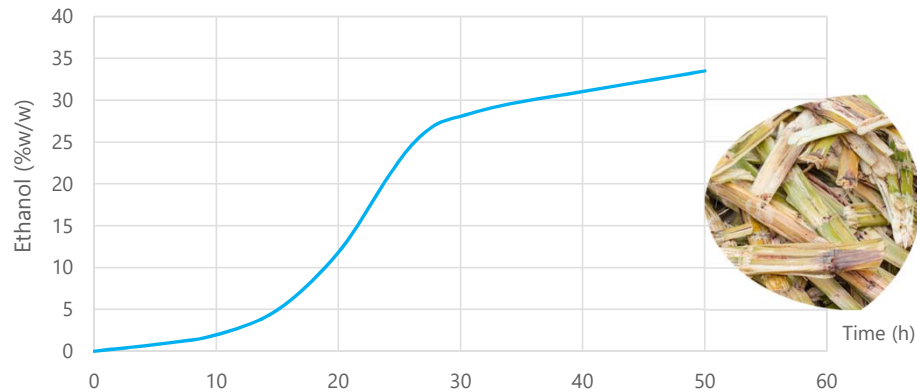
R&D trial conditions: Wood hydrolysate (144,5 g/kg glucose, 69,1 g/kg xylose, 2,5 g/kg lactic acid), pH = 5.2

Results: All glucose consumed in <40h ; Ethanol after 90h = 87,3 g/kg
 → Final ethanol above 10% (v/v) can be achieved



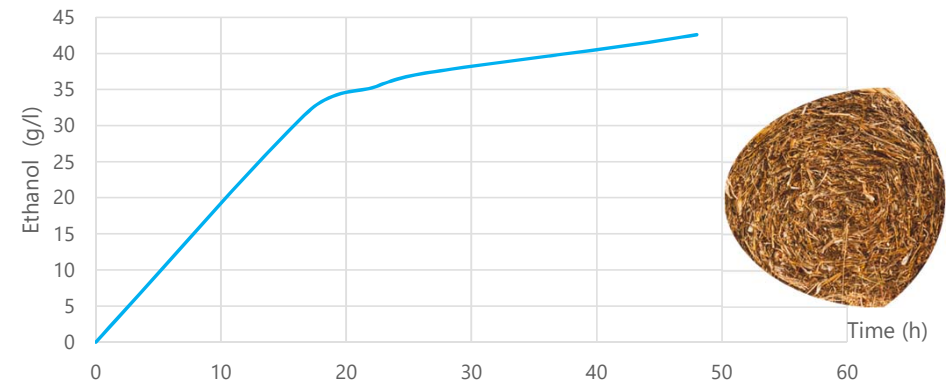
R&D trial condition: Wheat straw hydrolysate (65 g/L glucose & 35 g/L xylose, 5 g/L acetic acid), pH = 5.2

Results: All glucose consumed in <20h – All xylose consumed in <70h
 → CelluX™4 can ferment all of the xylose



R&D trial conditions: bagasse hydrolysate (60 g/kg glucose, 40 g/kg xylose, 1,8 g/kg lactic acid, 6,3 g/kg acetic acid), pH = 5,2

Results: All glucose consumed in <30h
 → CelluX™4 can ferment despite high acetic acid concentration



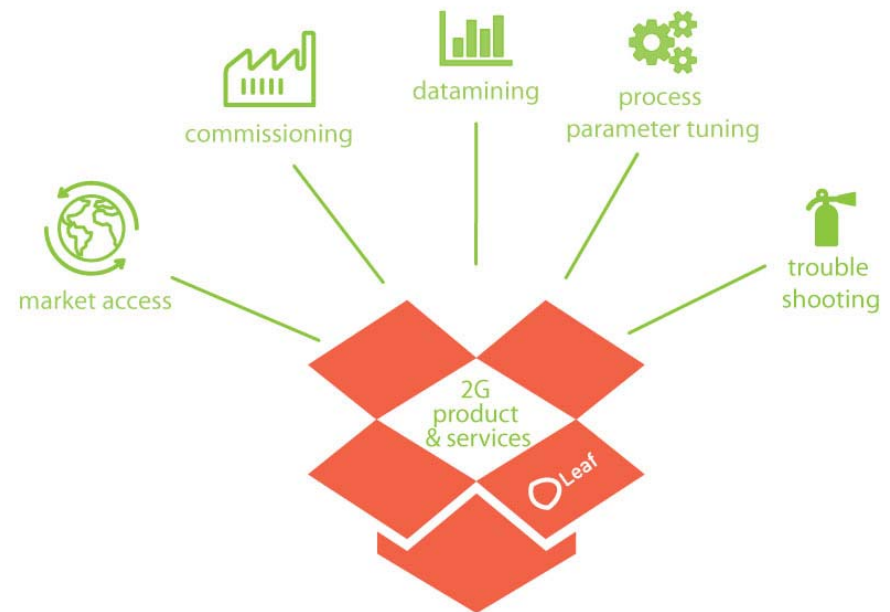
R&D trial conditions: Corn stover hydrolysate (48,5 g/kg glucose, 38,8 g/kg xylose, 0,0 g/kg glycerol), pH = 5.2

Results: All glucose consumed in <20h – 3,3 g/kg glycerol and 33,5 g/kg ethanol after 50h

→ Ratio Glycerol/Ethanol <10%

Leaf 2G solution

- A strong product with a proven track record.
Depending on the conditions, CelluX™4 can:
 - Achieve high ethanol titers
 - Leave negligible residual xylose amounts
 - Tolerate high acetic acid concentration
 - Keep the ratio glycerol/ethanol under control
- A dedicated team, expert in their field:
 - Fermentation know how
 - Industrial ethanol production process
 - Regulatory



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**Advanced
fermentation
services**

Development of **economically viable fermentation solutions** for deployment within the bio-economy.

Bring **distinctive competencies and capabilities** to our partners at each step of their projects from yeast strain engineering, fermentation process scale-up and optimization through to industrial scale manufacturing of yeast biomass.



Dothan, Alabama, USA
GMO dry yeast facility operating since 2017



Turning science into industrial reality

www.leaf-lesaffre.com

