

Bi·rex

A World where PAPER IS NOT MADE OUT OF TREES
and PLASTIC IS FULLY BIODEGRADABLE





310+M tons

produced in 2020

(vs 15M tons in 1964)

in 2025 there will be

1 ton of plastic every
3 tons of fishes

+150 M tons


of plastic in the oceans



It's crucial to find
an alternative
material to plastic!



**Cellulose and Chitin are
natural biopolymers**

A photograph of a dense forest with tall, thin trees and a mossy forest floor, partially obscured by a green circular graphic element.

CELLULOSE IS CURRENTLY MANUFACTURED FROM TREES

300 Mio tonnes annually
Worldwide



CHITIN IS MOSTLY MANUFACTURED FROM SHRIMPS AND CRABS

6-8 Mio tonnes of crustaceans
farmed annually Worldwide



BUT...

Biopolymers production



Trees



Bleached
cellulose



Shrimp
shells



Chitin

DRAWBACKS



Deforestation



Energy-intensive



Pollution



High plant cost



Low yield

Europe's strategic challenges – Bi-rex part of the solution

Cellulose

Europe is a key player in the cellulose market, but ...

- Worldwide demand is steadily growing
- Supply is inherently land-limited
- Lack of raw materials and steep price increases cannot be excluded in the future



Bi-rex can unlock an **alternative feedstock** for cellulose with the potential of **substituting up to 20% of tree-sourced cellulose**, with tree-free cellulose using local EU agri-food biomasses

Bi·rex

Europe's strategic challenges – Bi-rex part of the solution

Chitin

Chitin and chitosan are among the most interestingly biopolymers with a host of sustainable applications ranging from agriculture, food processing, water treatment, bioplastics.

Europe is way behind Asia (and even North America) in the production of chitin. The reason is that current manufacturing processes would not be considered acceptable for environmental and social reasons.

Future EU imports of chitin/chitosan from Asia are estimated in the billions Euros.



Bi·rex

Bi-rex, allowing for **sustainable large-scale extraction of chitin**, can unlock the possibility of making **EU independent from Asian imports**, sourcing basic raw materials from the **local EU nascent industries** (e.s. closed-loop shrimp farming in Germany and Spain, insect farming in France and other countries).



Any
alternative?

AGRI-FOOD BIOMASSES



Food industry



Biomass/Waste



Incinerator

DRAWBACKS



Not used source



Agri-Food industries pay to dispose of waste



Polluting

A Process for
**Biomasses
Recovery**



Bi·rex



Innovative technology: Bi·rex process



Starting
material



Product



Biomass



HIGH VALUE
products



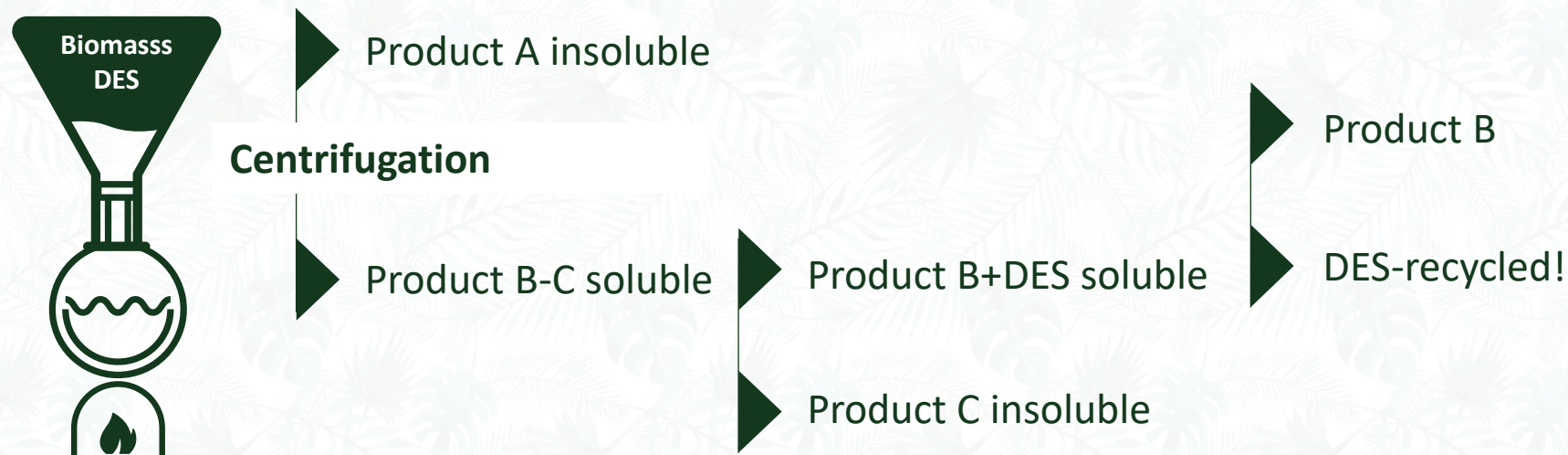
WHAT OUR RESEARCH HAS ACHIEVED



A process to obtain cellulose and chitin that is ***simple, scalable, sustainable,*** and ***promisingly cost-effective.***

We have designed a class of deep eutectic solvents (DESs) with the capability to dissolve agri-food biomasses to selectively extract cellulose and chitin.

The solvents themselves are non-toxic and can be reused several times for the subsequent extraction process



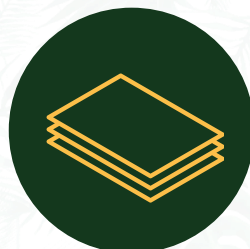
TRADITIONAL VS BI-REX



Traditional
process



OUR CHALLENGE



Cellulose tree-free
Tissue paper
Packaging

150 B€



Green Chitin
Organic Agriculture

194 Mn€



Green Chitin
*Water/
waste treatment*

251 Mn€



Green Chitin
Bio - plastic

TBD

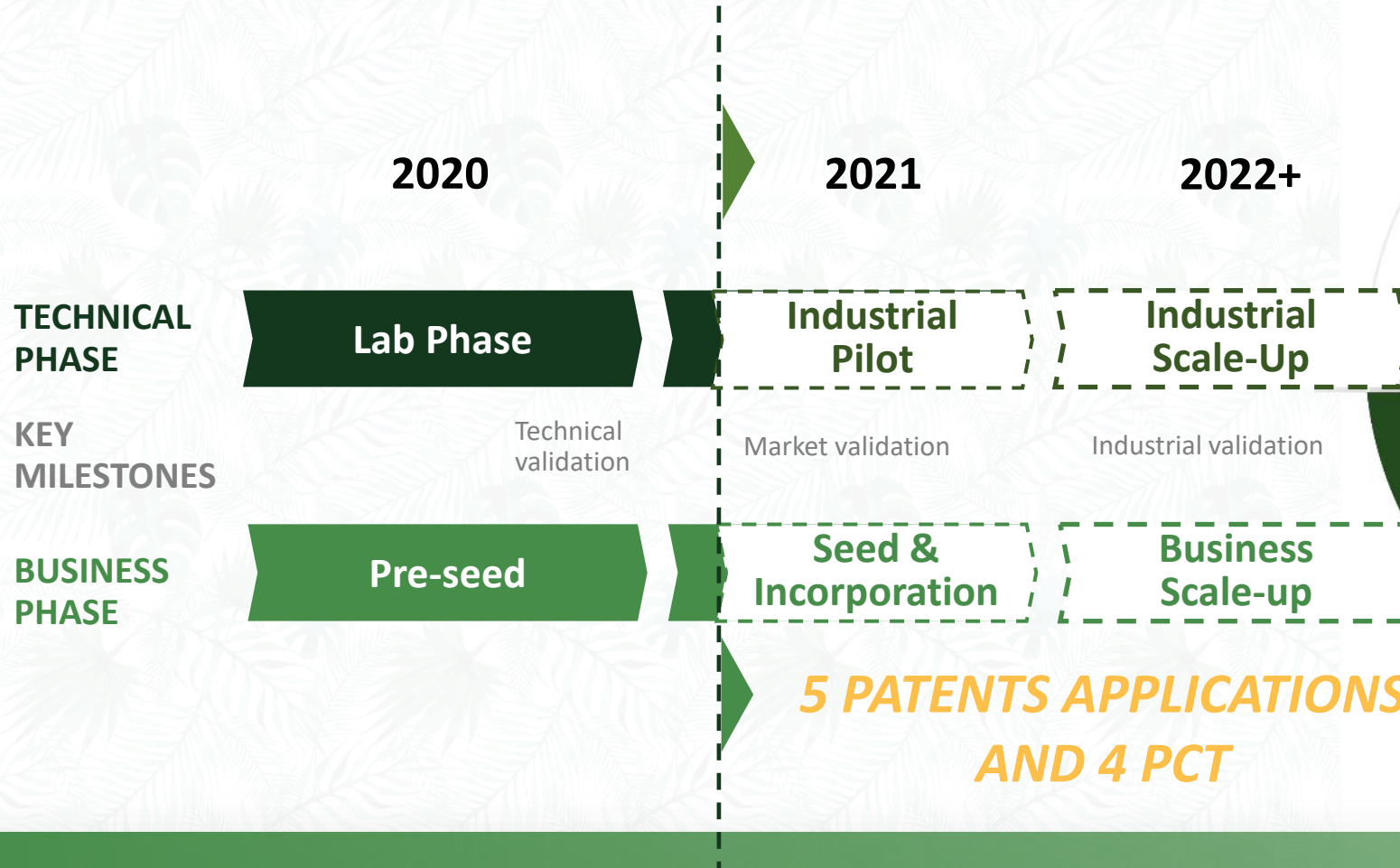


BUSINESS MODEL B2B

Bi·rex



TRACTION



We have just completed the first phase (lab/pre-seed) of our development and moving into the next one (industrial pilot, seed&incorporation)



BI-REX ALREADY VALIDATED BY SEVERAL ENTITIES AS POTENTIAL HIGH-VALUE PROJECT



*Acceleration
Grant 30k€*



Fondazione
Deutsche Bank Italia

*Acceleration
Grant 15k€*



*Special Mention
«Cleantech & Energy» section*



*Pre-seed Investment 160k €
Committed Seed Investor and
scale-up partner*



*Special Mention
«Circular Economy» section*



*Acceleration Grant
15k€*



Grant 5k €



Grant 2.5k€




Selected for EU TAF support



Roadmap and financing

Bi·rex





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