



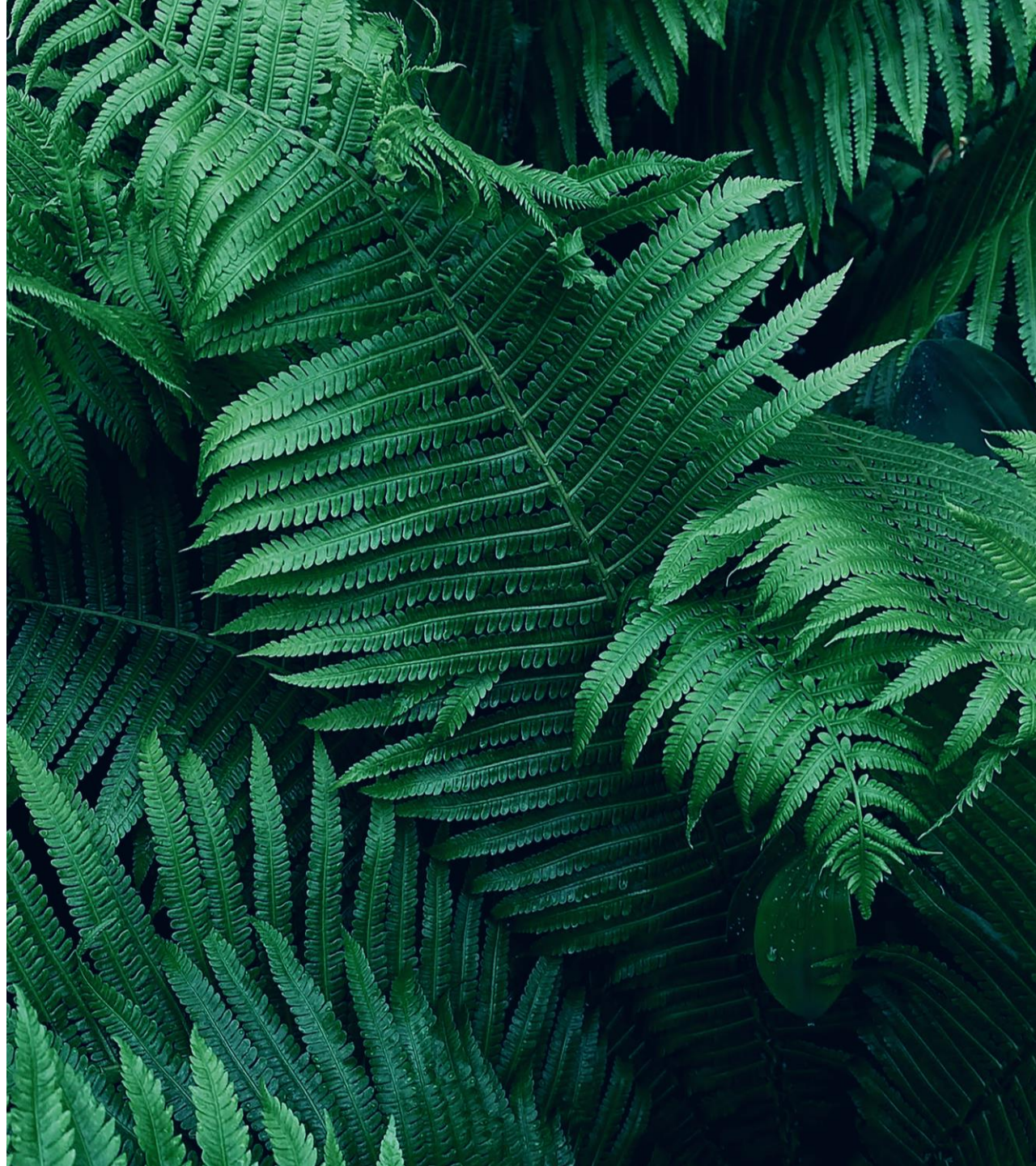
# Green to scale

**Sustainable and  
scalable adherent cell  
expansion solutions**

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Dr. Joel Eichmann

Sustainability Circle | 20.07.2022





- Based in Giessen and Berlin
- Founded in Dec. 2021
- Developing technology since 2018
- University spin-off
- World's first company to make labware from plant-based materials



# Plastic waste from single-use equipment

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**"Everyone wants to get rid of the plastic waste, but no one wants to get rid of the plastic."**

In 2014

**5.5 million tons**

plastic waste was  
generated by labs and  
bioprocessing

One of the

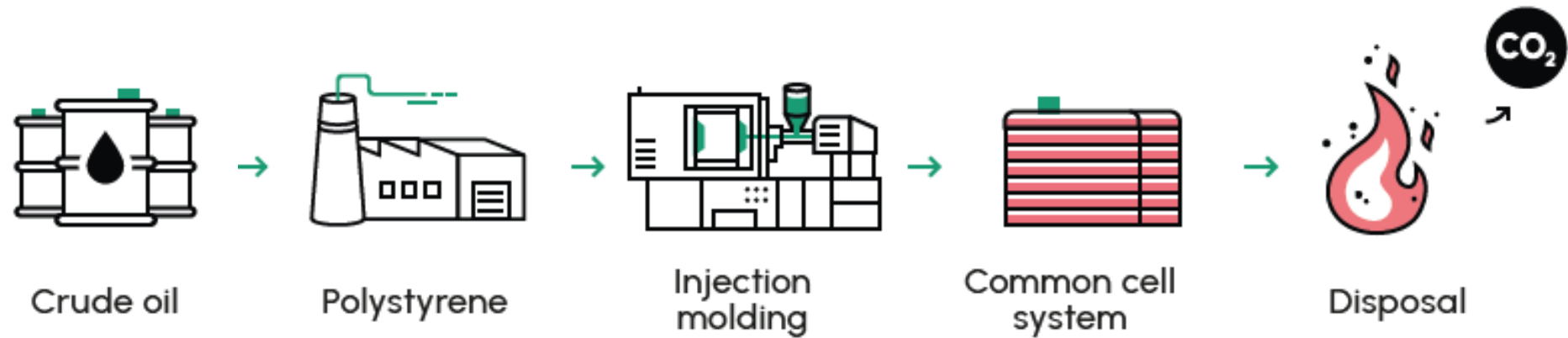
**main challenges**

for sustainable research  
and biopharmaceutical  
manufacturing



# Bioprocessing plastic life cycle

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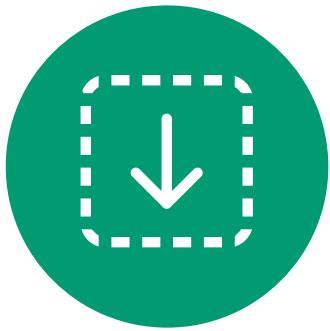




# Plastic-related CO<sub>2</sub> emission

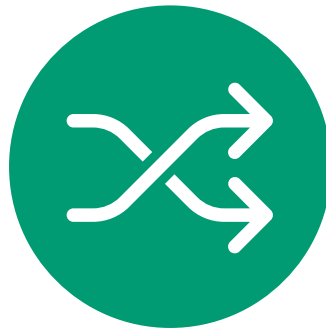
Reduction approaches

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## REDUCE

The amount of material  
needed per item



## REPLACE

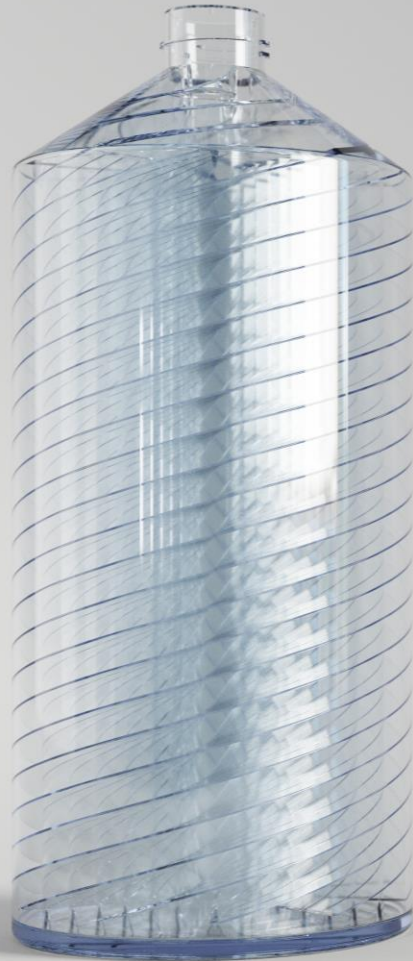
Crude oil-based plastic by  
plant-based materials



## RECYCLE

Instead of burning  
single-use items after use





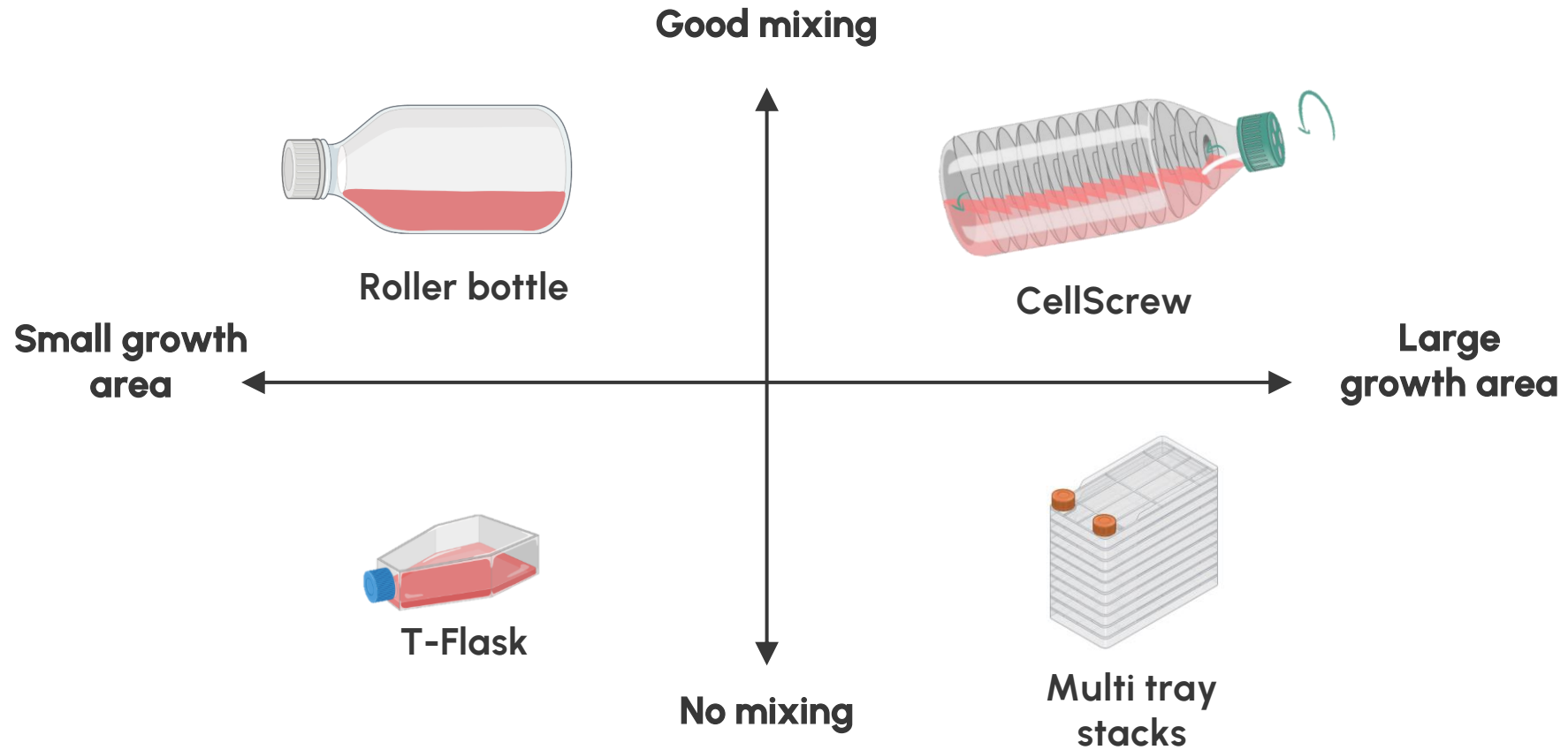
# CellScrew®

Scalable  
and sustainable  
cell culture system for  
adherent cell expansion



# The idea behind the CellScrew®

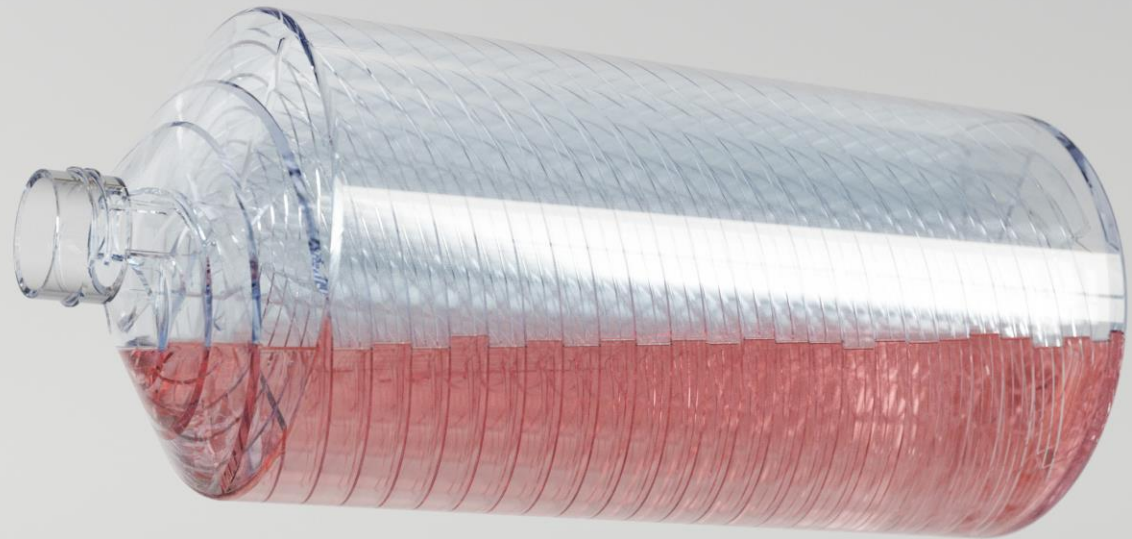
The CellScrew combines advantages of common cell expansion solutions



# Applications

- Cell & gene therapy
- Virus manufacturing
- Cultivated meat / seafood

**Whenever large amounts of adherent cells (or their products) are required!**





# Dimensions

## CS10K

Cell culture area: **10.000 cm<sup>2</sup>**

Media volume: **800 – 1.000 mL**

## CS6K

Cell culture area: **6.000 cm<sup>2</sup>**

Media volume: **500 – 600 mL**



# Dimensions





# Automation potential

The CellScrew can be fully automated without robots and equipped with sensors for online-monitoring.

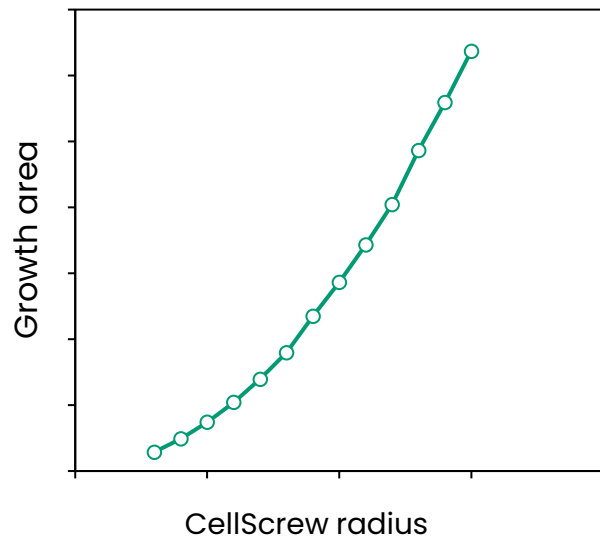
Automation includes:

- Coating (if required)
- Seeding, media change
- Cell harvesting
- Processing in Fed-batch or perfusion mode



# Scalability

The CellScrew can be scaled from a **stand-alone device** at lab scale to an automated system at **manufacturing scale** without changing the cultivation environment for the cells.

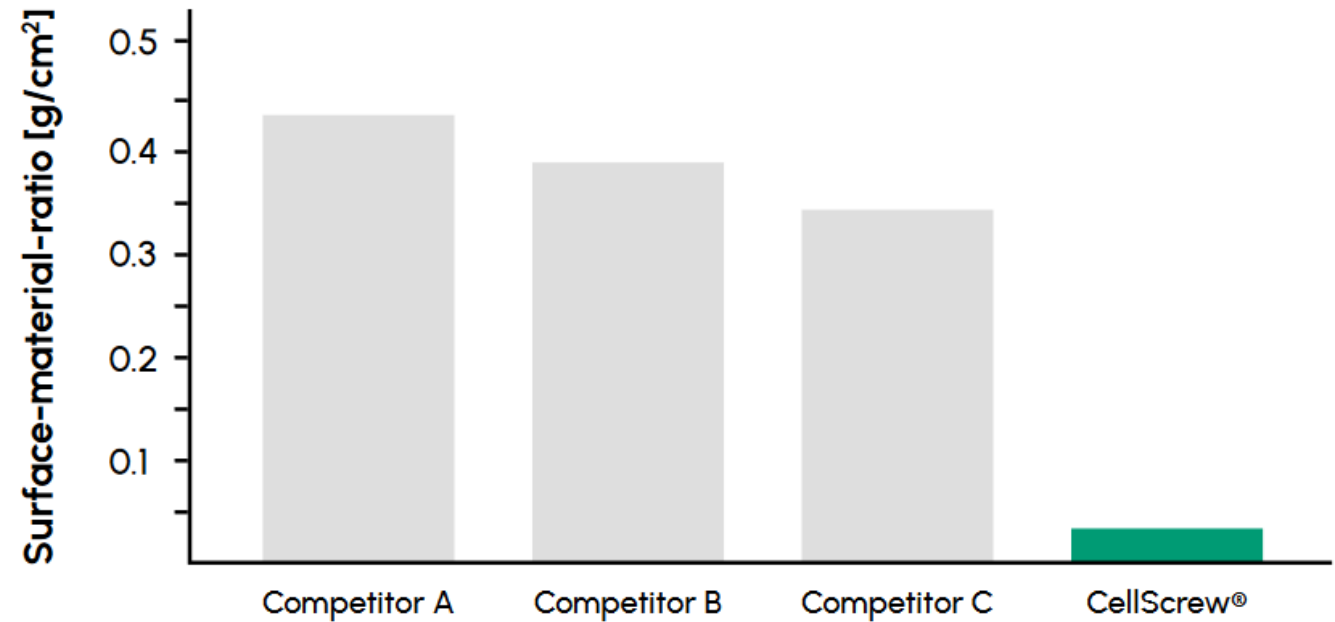


# Sustainability

Additive manufacturing reduces plastic waste

**90 % less  
raw material!**

The additive manufacturing process allows us to make **more growth area** from **less raw material**.

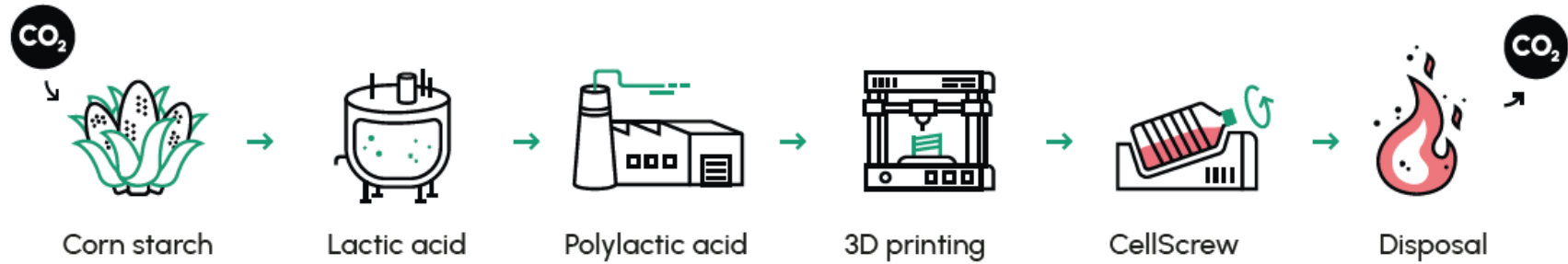




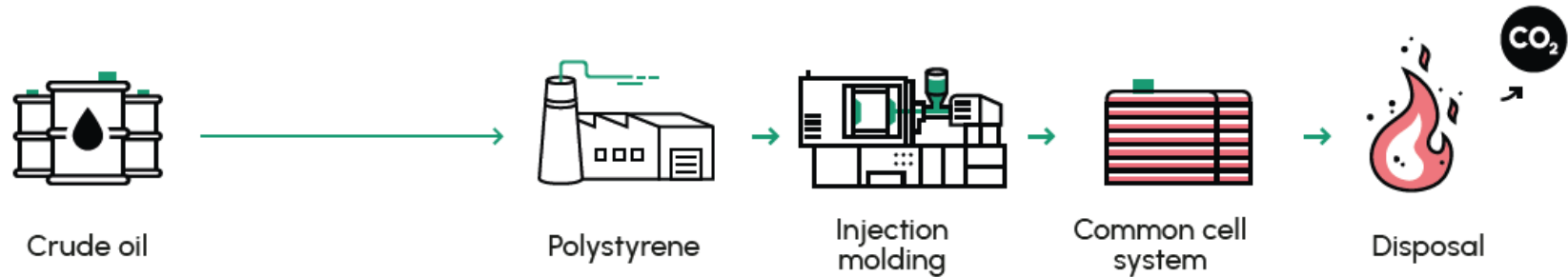
# Sustainability

The CellScrew is made from the plant-based plastic PLA

CellScrew



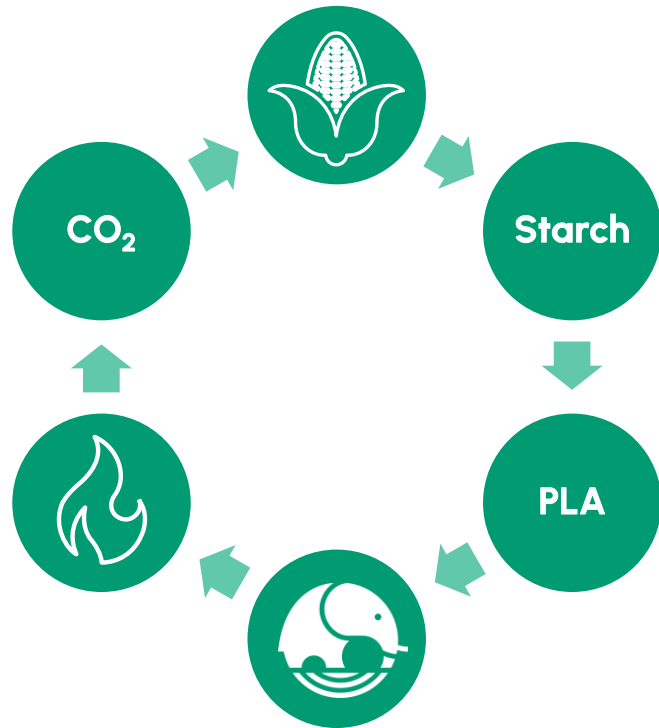
Common systems



# Why PLA?

PLA has the potential to substitute PS and PP in many applications

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- Biocompatible
- Already used in MedTech applications
- Very good mechanical properties
- Visually clear (like PS)
- Cell attachment
- Can be Gamma-irradiated
- Can be processed by 3D printing and injection molding

①



## Reduced manufacturing costs

The large growth area, intensified processes and ease of handling reduce **labour costs** and required **manufacturing space**.

②



## Reduced time to market

As the CellScrew can be applied from lab scale to manufacturing scale, **no additional process development** is necessary to scale-up.

③



## Reduced environmental impact

Your **CO<sub>2</sub> emission** is reduced by more than **90%** using the CellScrew, compared to conventional multilayer flasks.



**THANK YOU!**







**Backup**



1: Prepare



2: Inoculate



3: Rotate



4: Incubate

