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biocomp

Bioplastics Biodegradability

Author: Belén Montero

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01. Bioplastics

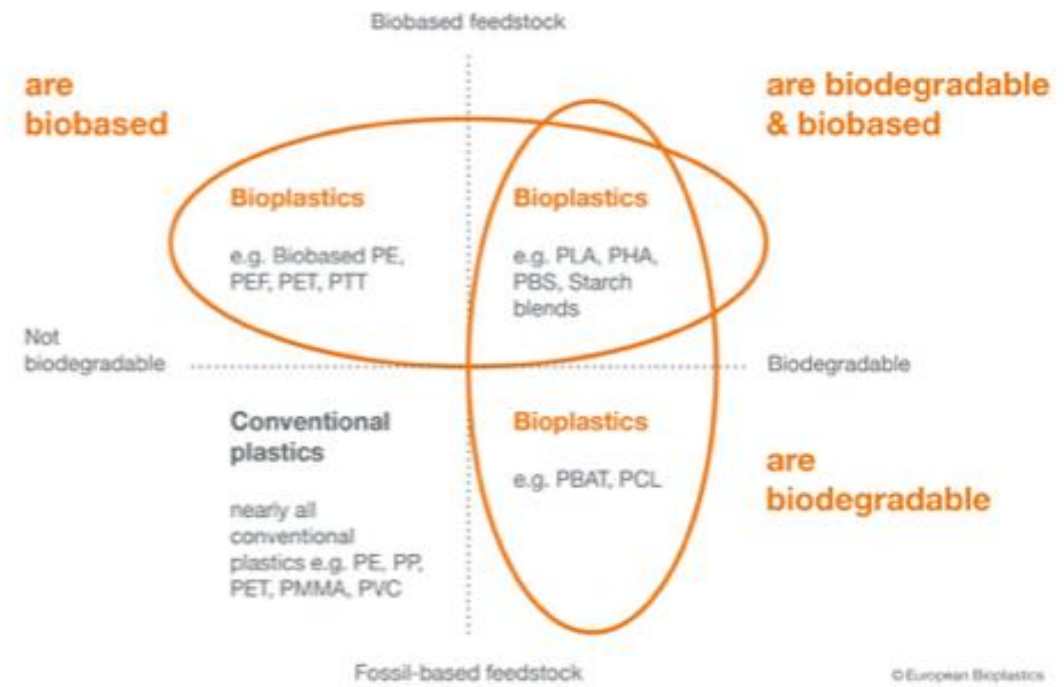
1- **Biobased: biological basis. Produced from renewable sources.**

2- **Biodegradable**



Material coordinate system for bioplastics

Bioplastics are biobased, biodegradable, or both.



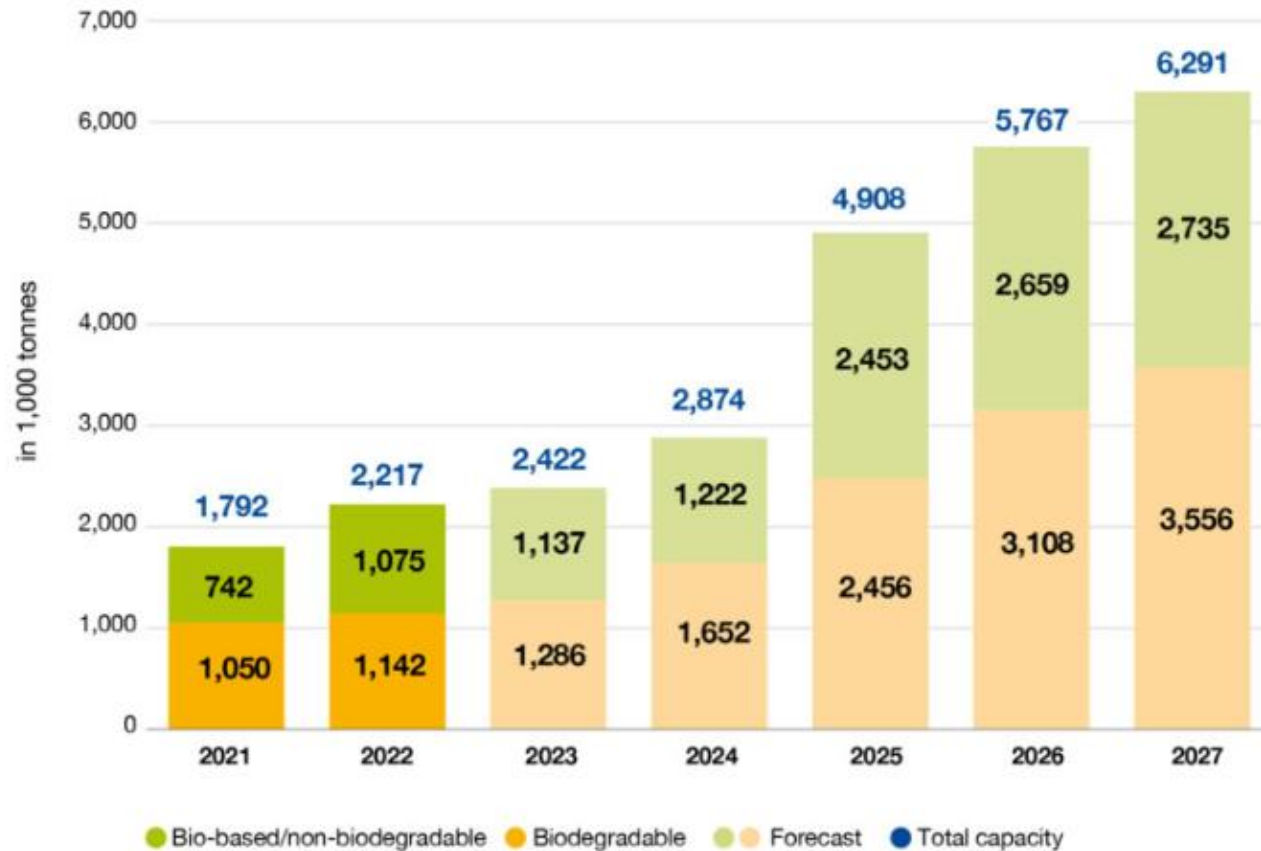
Source: Institute for Bioplastics and Biocomposites (IB3) and European Bioplastics (EUBP)

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01. Bioplastics-Producción y perspectiva

Global production capacities of bioplastics



CHALLENGES AND LIMITATIONS

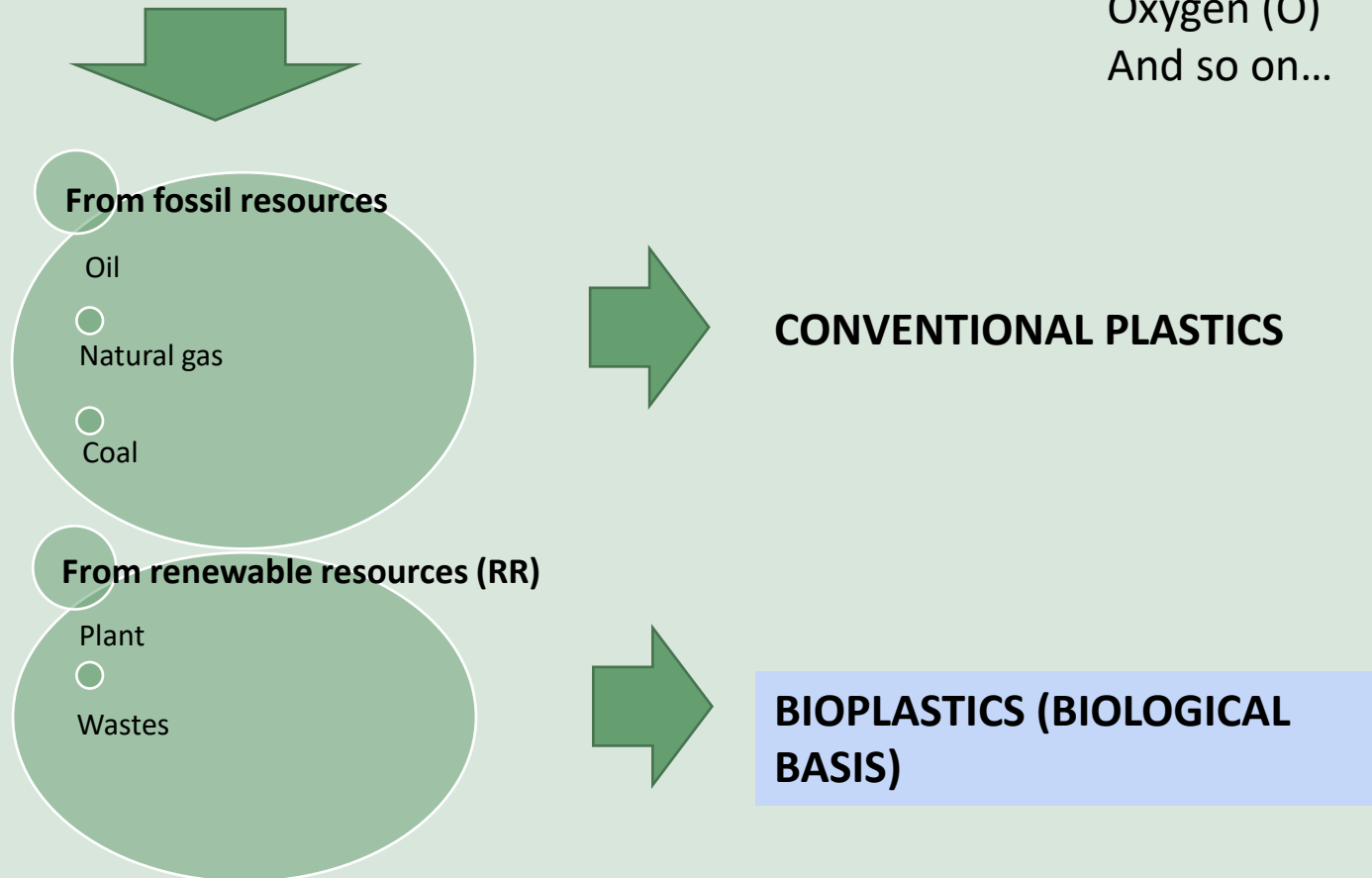
- High production costs compared to conventional ones
- Limitations in mechanical and thermal properties.
- Need to improve the efficiency of production processes.
- Education and awareness of the benefits of biopolymers.

Source: www.european-bioplastics.org



02. Biobased (biological basis)

PLASTICS -> Carbon (C) + hydrogen (H) + Other components: Nitrogen (N)
Oxygen (O)
And so on...





Renewable resources (RR)

- **NATURAL POLYMERS:** Synthesised by any living organism.
 - **Polysaccharides (Carbohydrates)**
 - Cellulose
 - Starch
 - Chitin
 - **Proteins**
 - Gluten
 - Collagen
 - Casein
 - **Lignin**
 - **Natural rubber**
 - latex
 - **Others:**
 - Polyhydroxyalcanoates (PHAs)



Renewable resources (RR)

- **SMALLER MOLECULES:**

- **VEGETABLE OILS**

- Soybeans
- Castor
- Palm
- Rapeseed
- Sunflower...

- **Others:**

- Monosaccharides: Glucose, fructose
- Disaccharides: Sucrose
- Bivalent alcohols

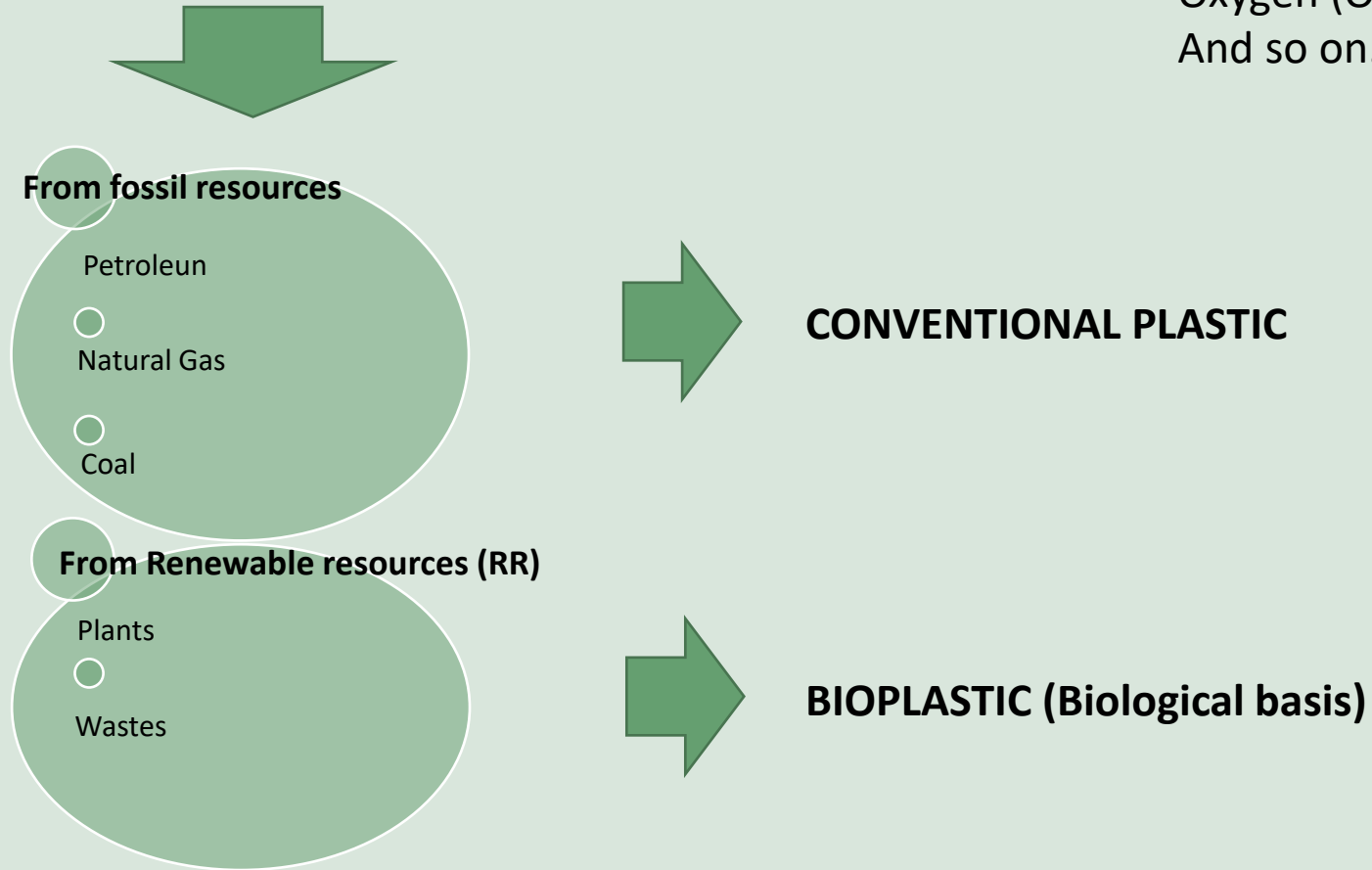


02. Biodegradable

PLASTICS -> Carbon (C) + hydrogen (H) + Other components:

Nitrogen (N)
Oxygen (O)
And so on...

END OF LIFE CYCLE



Incineration
(Contributes to global warming and climate change))

Aerobic/Anaerobic Biodegradation
Composting
(Climate neutral)

BIODEGRADABLE



03. Biodegradation/Compostability

A substance or material is **BIODEGRADABLE** if it is naturally broken down by micro-organisms in the environment.

MICROORGANISMS: Bacteria, protozoa, fungi, enzymes.

ENVIRONMENTAL FACTORS: Sunlight, temperature, average pH, water.

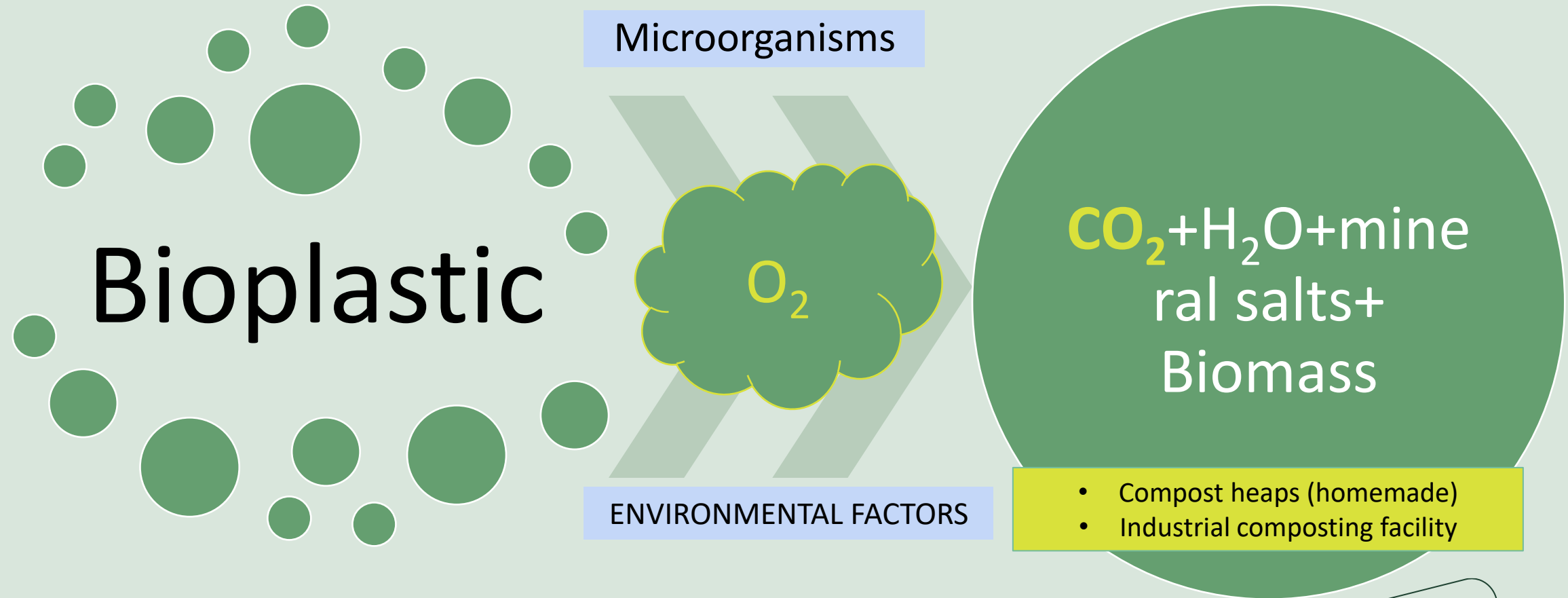


Source: <https://www.desplastificate.com.mx>

We say that a substance or material is **COMPOSTABLE** when its total decomposition in the compost heap is achieved in a comparatively short time (1-3 months in industry).

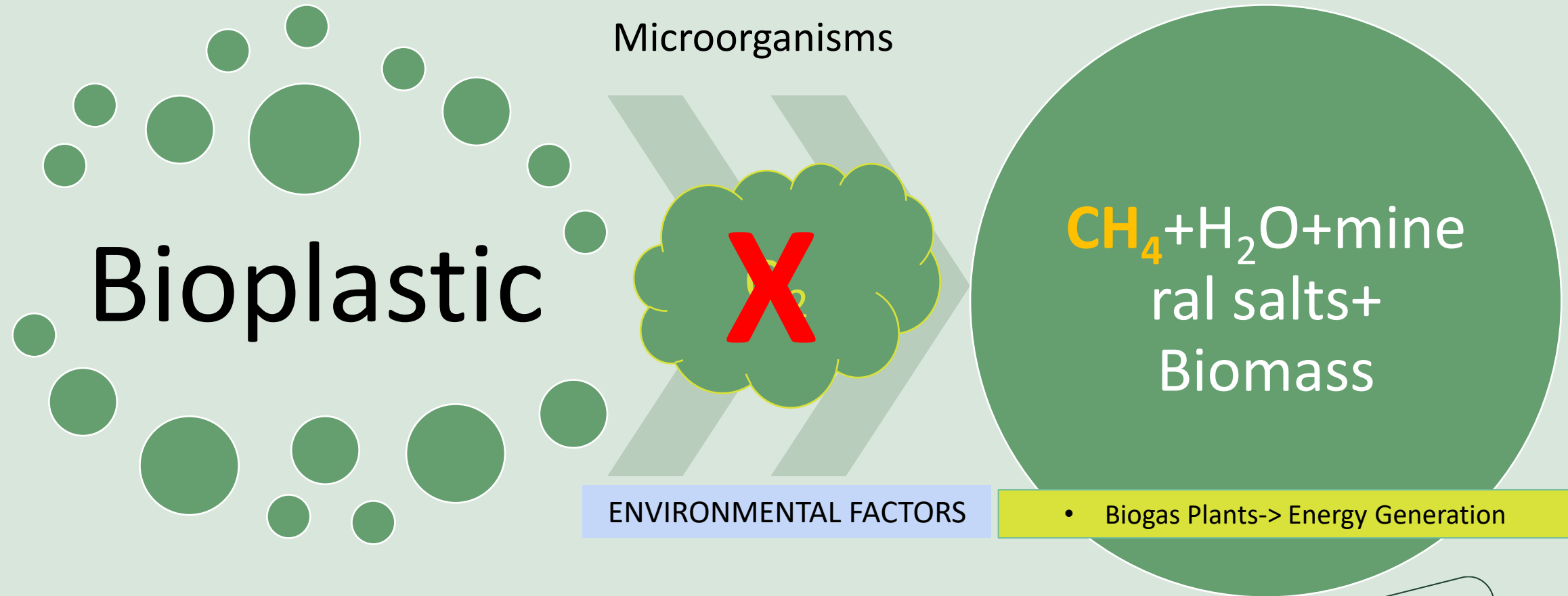


03. Aerobic biodegradation



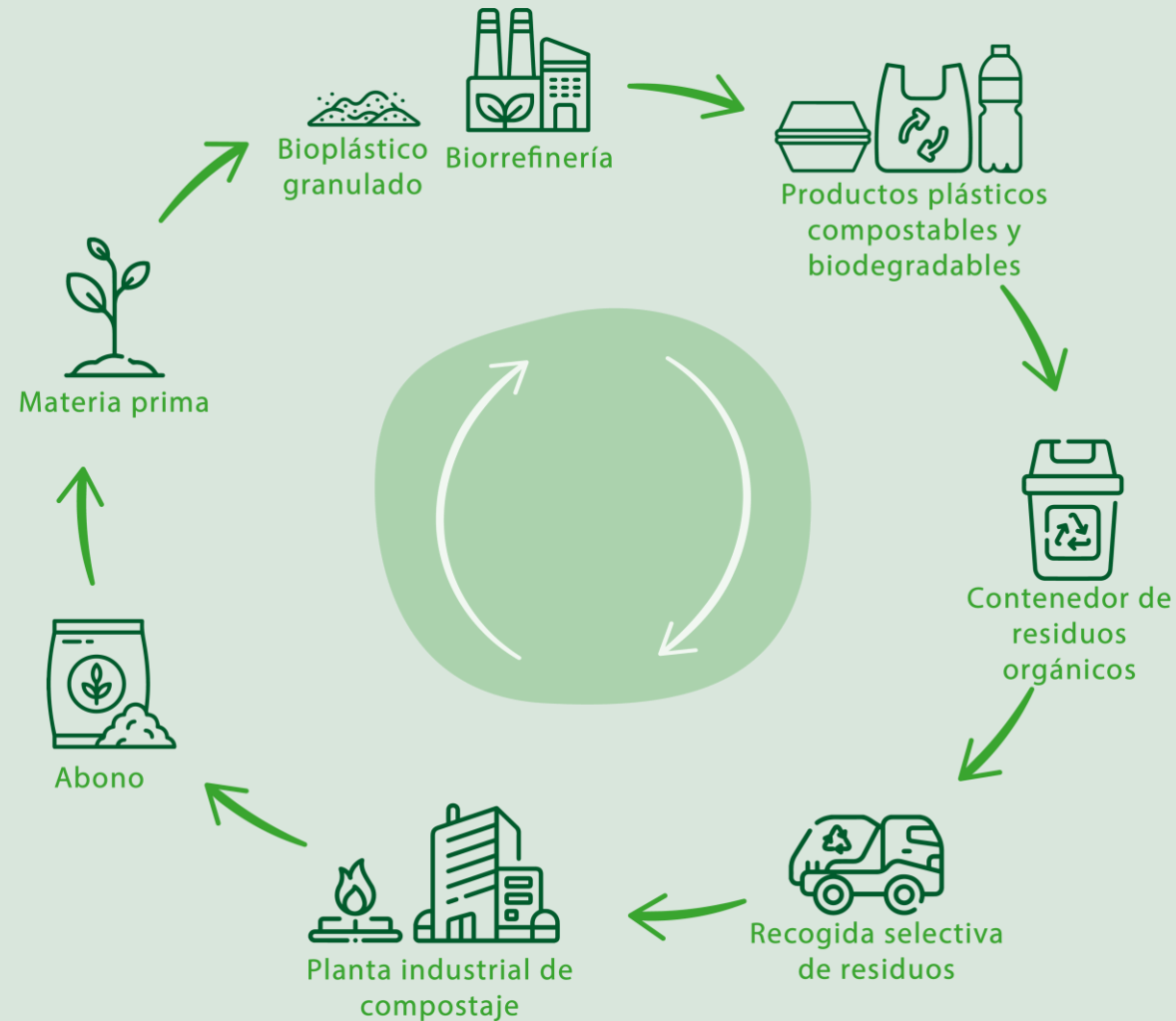


03. Anaerobic biodegradation





04. Bioplastics - a mission for the future





05. Bioplastics-Applications

Bioplastics

are already part of our **everyday life.**



<https://www.elmundo.es/economia/2014/05/14/53733950ca4741395e8b456e.html>

<https://inibsa.es/producto/PGA-Resorba/37>

<https://primebiopol.com/servicios/grados-zimia/>

<https://www.aimplas.es/blog/aimplas-desarrolla-bioplasticos-para-envases-cosmeticos-activos-y-lechos-absorbentes-para-mascotas-con-el-proyecto-beonnat/>

<https://www.dantoy.dk/en/bio-3>

<https://www.cando.es/2021/04/27/muebles-de-bioplastico-el-material-del-futuro/>

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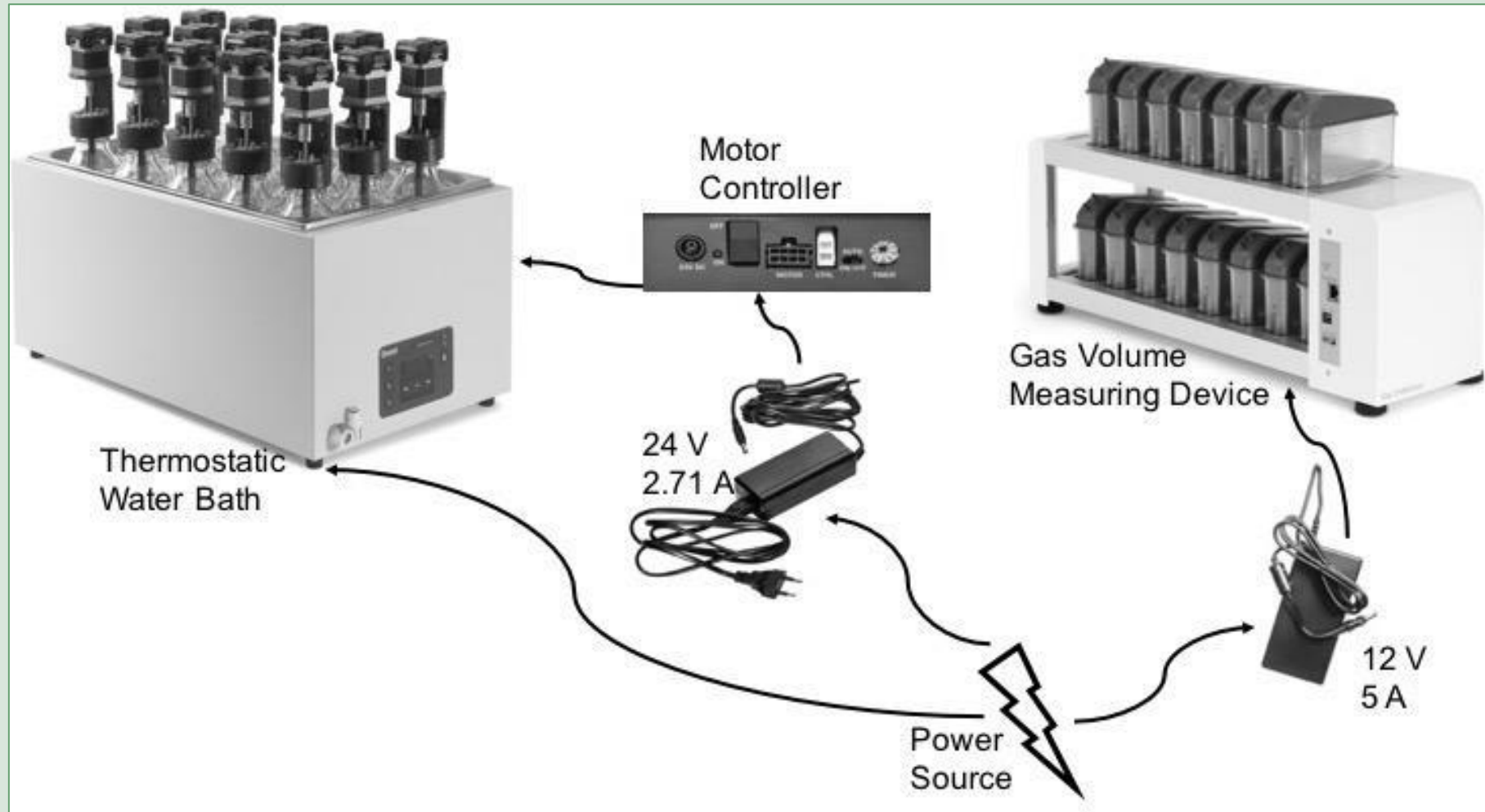
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BPC instruments

Gas endeavour



GAS ENDEAVOUR





GAS ENDEAVOUR

bioprocess
CONTROL

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Control

Mixing system
 Agitator Water bath shaker

Motor control
Speed adjustment [%]
Mixers on time [sec]
Mixers off time [sec]
 Off On

Data calculation
 Normalisation (0 °C, 1 atm, dry gas)
 No normalisation

Line Control
 Change FCU placement

| Line ID | Name | Eliminate over/under estimation <input checked="" type="checkbox"/> Hide | Control | Status |
|----------|---------------------------------------|---|---------|---------|
| Line 1: | <input type="text" value="SampleA1"/> | <input type="checkbox"/> Apply | | Empty |
| Line 2: | <input type="text" value="SampleA2"/> | <input type="checkbox"/> Apply | | Stopped |
| Line 3: | <input type="text" value="SampleA3"/> | <input type="checkbox"/> Apply | | Stopped |
| Line 4: | <input type="text" value="SampleB1"/> | <input type="checkbox"/> Apply | | Stopped |
| Line 5: | <input type="text" value="SampleB2"/> | <input type="checkbox"/> Apply | | Stopped |
| Line 6: | <input type="text" value="SampleB3"/> | <input type="checkbox"/> Apply | | Stopped |
| Line 7: | <input type="text" value="SampleC1"/> | <input type="checkbox"/> Apply | | Stopped |
| Line 8: | <input type="text" value="SampleC2"/> | <input type="checkbox"/> Apply | | Stopped |
| Line 9: | <input type="text" value="SampleC3"/> | <input type="checkbox"/> Apply | | Stopped |
| Line 10: | <input type="text" value="Control1"/> | <input type="checkbox"/> Apply | | Stopped |
| Line 11: | <input type="text" value="Control2"/> | <input type="checkbox"/> Apply | | Stopped |
| Line 12: | <input type="text" value="Control3"/> | <input type="checkbox"/> Apply | | Stopped |
| Line 13: | <input type="text" value="Blank1"/> | <input type="checkbox"/> Apply | | Stopped |
| Line 14: | <input type="text" value="Blank2"/> | <input type="checkbox"/> Apply | | Stopped |
| Line 15: | <input type="text" value="Blank3"/> | <input type="checkbox"/> Apply | | Stopped |



GAS ENDEAVOUR

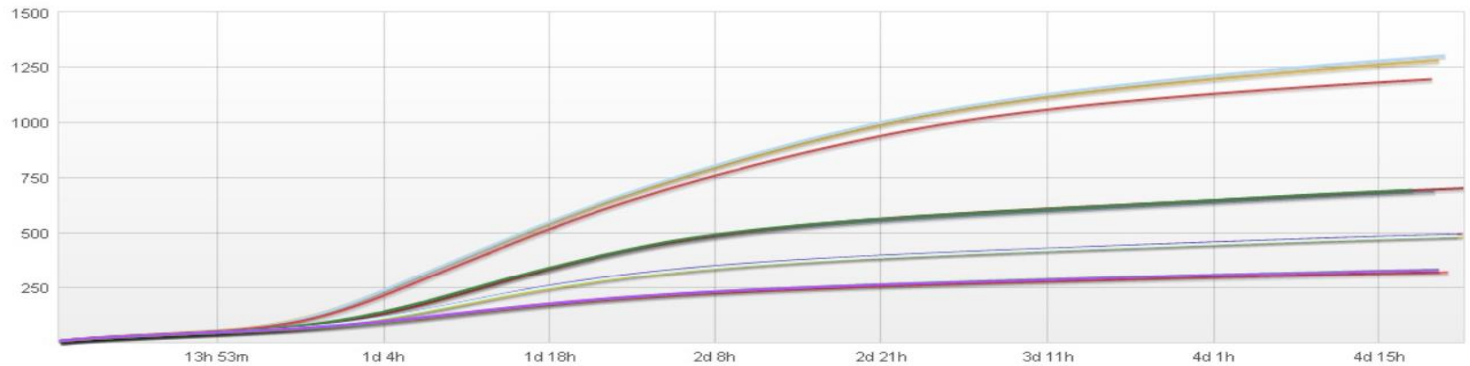
bioprocess
CONTROL

Home Experiment Control **Graphs** Download report System

Cells to display in graph



Accumulated gas volume [Nml]



Flow rate [Nml/day]

