

EnviroCaps

Replacing Microplastic Microcapsules
to enable a future of safer products
and cleaner oceans

Jamie Walters, CEO



Basel June 2019





MICROPLASTICS FACTS AND FIGURES

Did you know?

73%

Mesopelagic fish caught in the Northwest Atlantic had microplastics in their stomachs

(Frontiers in Marine Science, 2018)



MICROPLASTICS FACTS AND FIGURES

Did you know?

>90%

Sampled salt brands globally were found to contain microplastics

(Environmental Science & Technology, 2018)



MICROPLASTICS FACTS AND FIGURES

Did you know?

90%

Bottled water sampled globally were found to contain microplastics

(PLoS ONE, 2018)



MICROPLASTICS FACTS AND FIGURES

Did you know?

114

Pieces of microplastic settle on our plate in every meal through airborne particles

(Environmental Pollution, 2018)



MICROPLASTICS FACTS AND FIGURES

What is the scale of this ocean microplastic problem?

2 Million
MT/Year

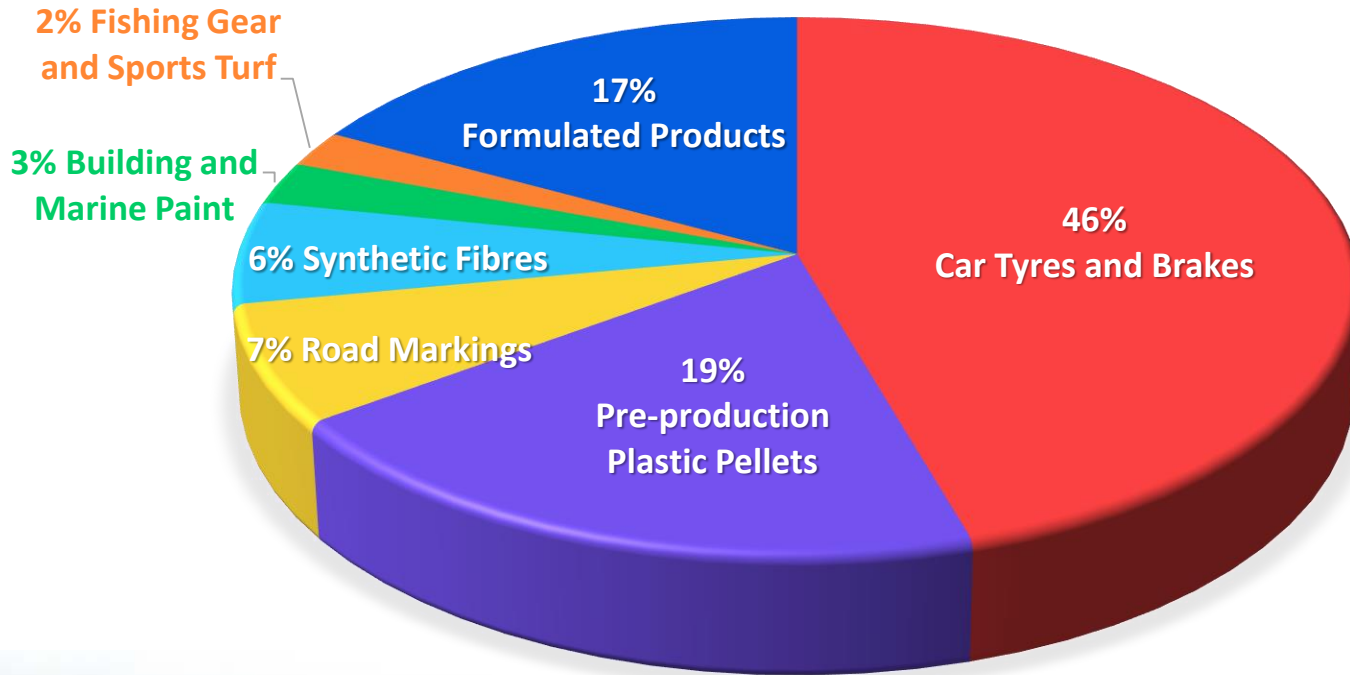


Every person in the world
dropping a plastic bag in the
ocean every week



MICROPLASTICS FACTS AND FIGURES

Where do the ocean microplastics come from?

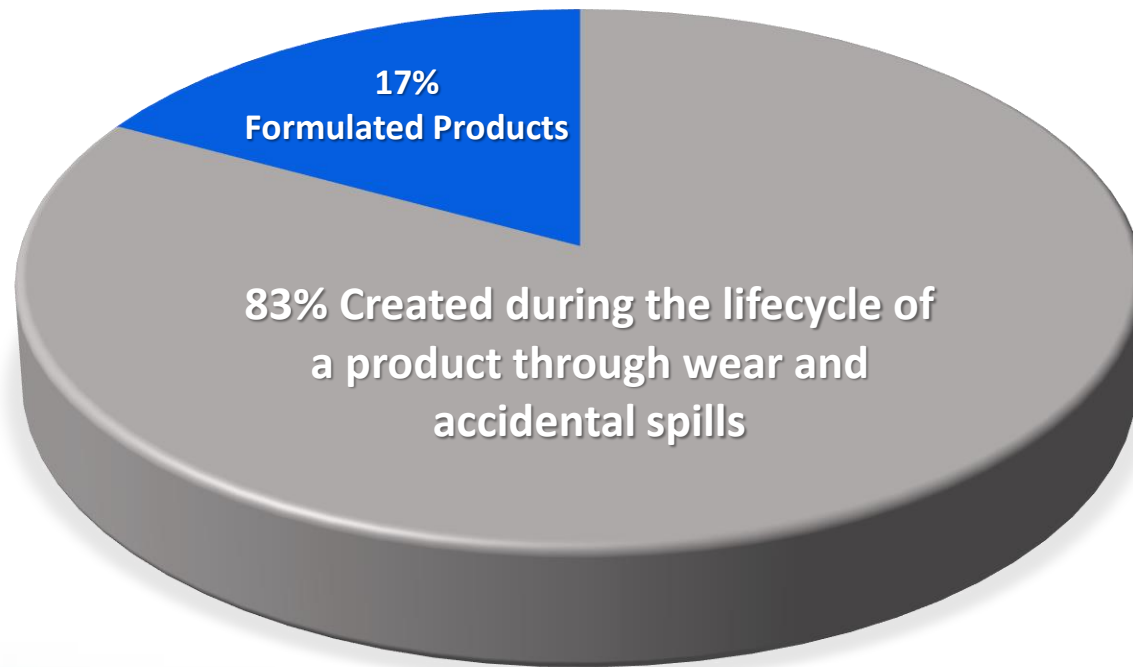


(European Commission Report, 2018)



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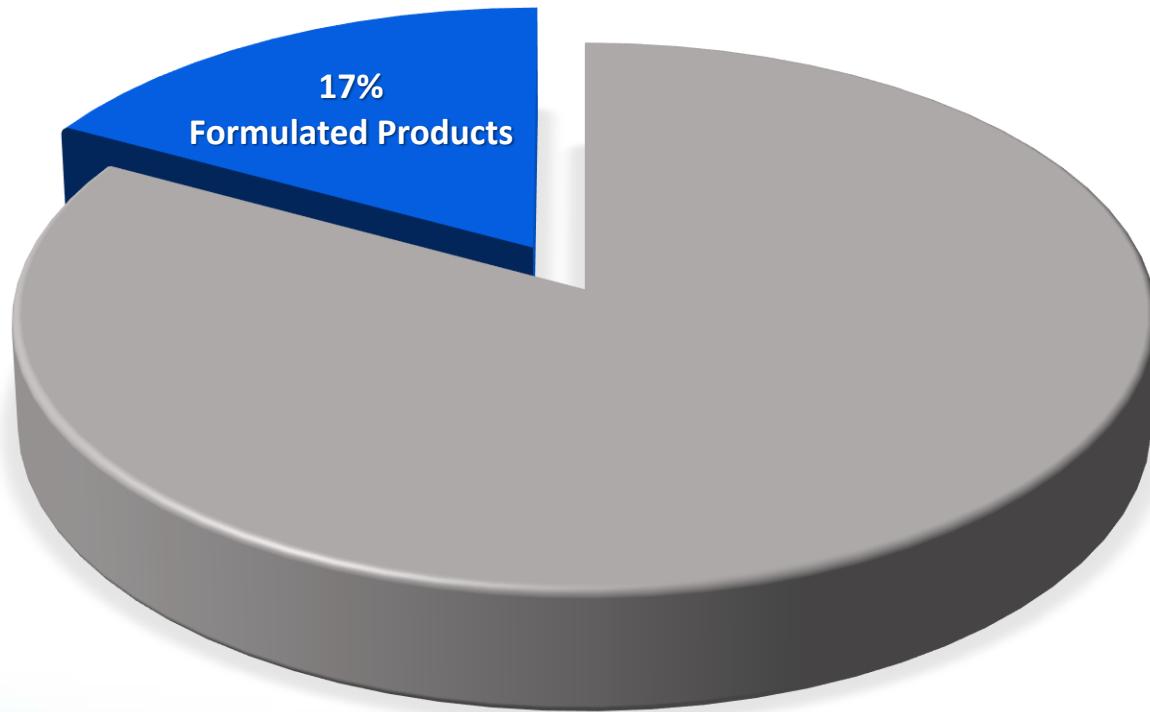


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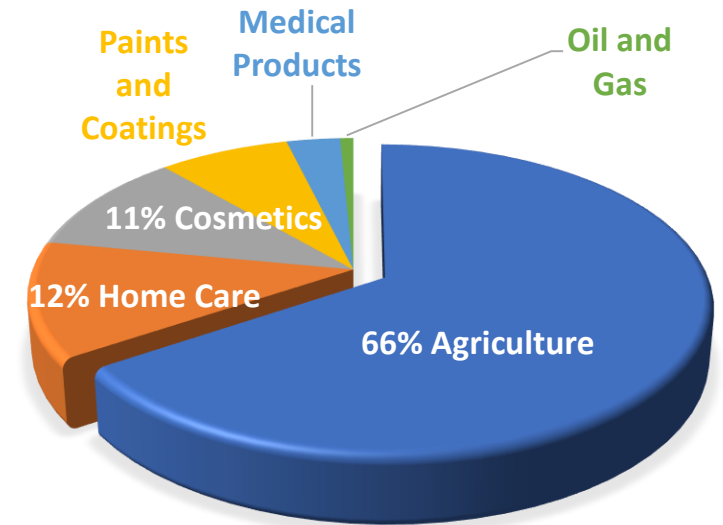
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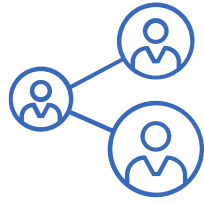


(European Commission Report, 2018)

Intentionally Added Microplastics to Formulated Products



(European Commission Report, 2019)

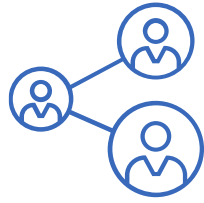


REGULATION AND INDUSTRY

What are we doing about these microplastics?



The general public alongside Greenpeace is putting increasing pressure on regulatory bodies calling for the elimination of microplastics in products.



REGULATION AND INDUSTRY

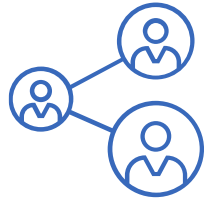
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ECHA has prepared a restriction dossier under REACH to eliminate all non-biodegradable microplastics in formulated products by 2024. (Intentionally added)



REGULATION AND INDUSTRY

What are we doing about these microplastics?



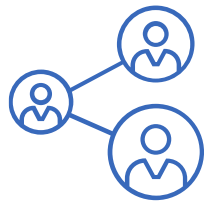
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All major manufacturers of formulated products have pledged to eliminate non-biodegradable microplastics globally, and are investing heavily with this goal.



REGULATION AND INDUSTRY

Why 2024?

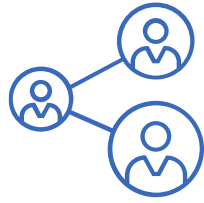
Exfoliating
Microparticles



Easily substituted with a bio-
alternative (ground walnuts)



**Banned in Europe with
immediate effect**



REGULATION AND INDUSTRY

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Exfoliating
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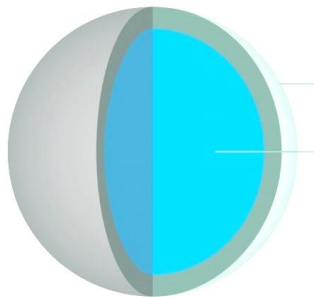


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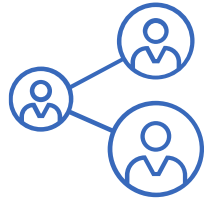
Controlled Release
Microcapsules



No biodegradable
alternative today



**Manufacturers have been granted
5 years to find a solution**



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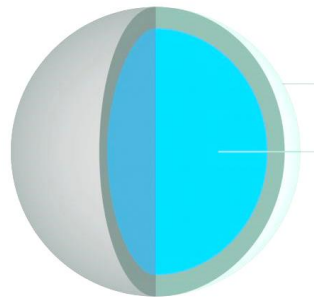


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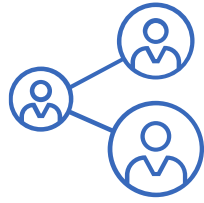
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REGULATION AND INDUSTRY

Microcapsules present a real benefit to key Industries

#1 Market – Agriculture



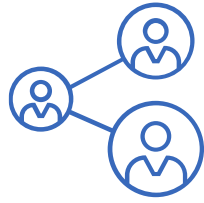
Microcapsules are used to:

- Protect against AI degradation (pesticides, fertilisers etc)
- Target the AI to the leaf or to the soil
- Deliver the AI over the season

Benefits are massive:

- Reduce the amount of harmful AIs required
- Improve ease-of-use for farmers (less treatments)
- Enhance crop protection and thus world food supply

Microcapsules improve the safety, environmental impact and performance of agriculture products



REGULATION AND INDUSTRY

Microcapsules present a real benefits to key Industries

#2 Market – Home Care



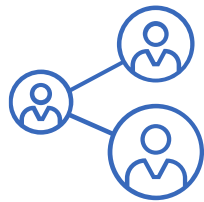
Microcapsules are used in laundry products:

- Prevent fragrance evaporation during storage
- Selectively adhere to fabrics during the wash cycle
- Slowly deliver the fragrance on wear

Benefits are massive:

- The amount fragrance can be reduced by over 50%
- Long-lasting freshness can be increased up to 20x

Microcapsules provide the olfactory effect of fabric conditioners and laundry detergents.

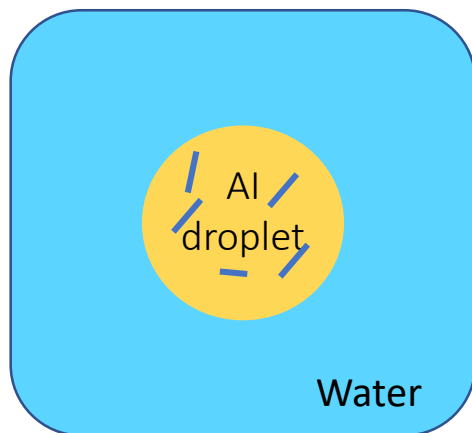


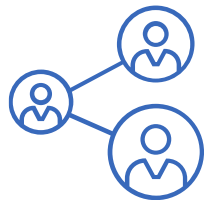
REGULATION AND INDUSTRY

Why can't we just create Biodegradable Microcapsules?

Process 1:

Emulsion interfacial
assembly and polymerisation



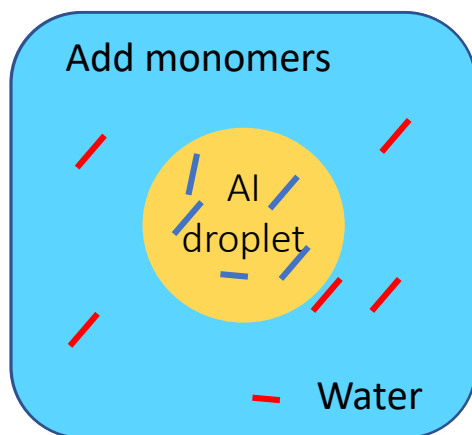


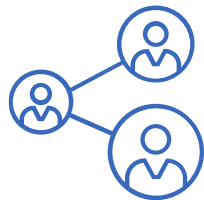
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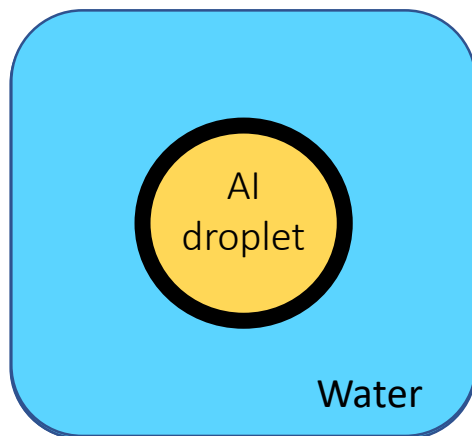


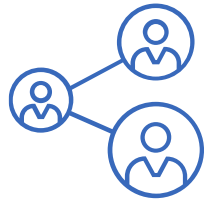
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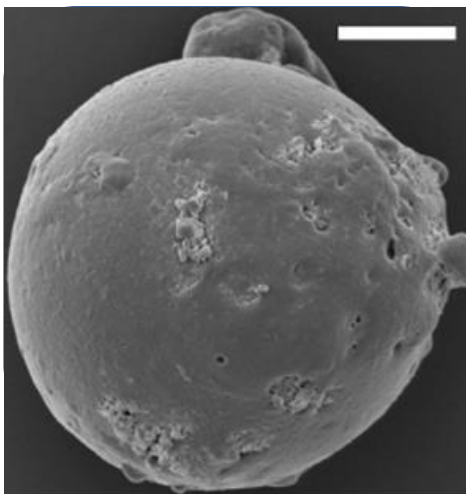


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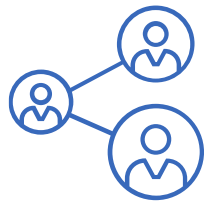
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Polyurethane
Microcapsules

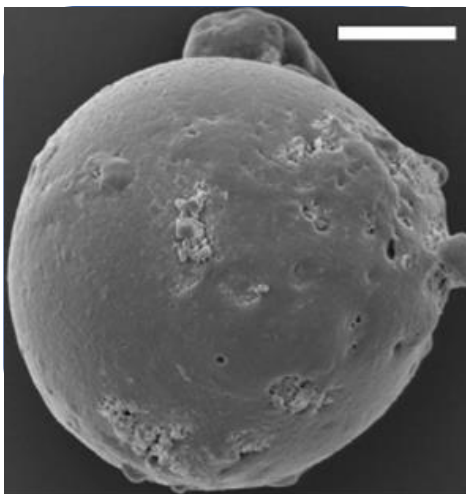


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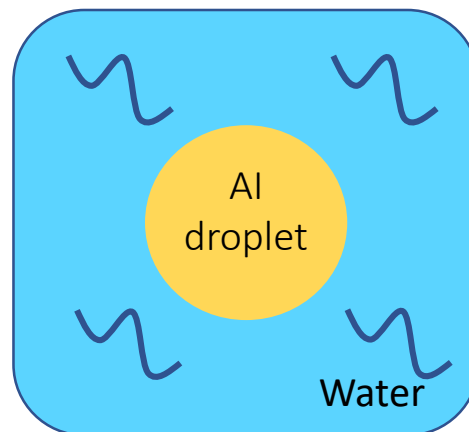
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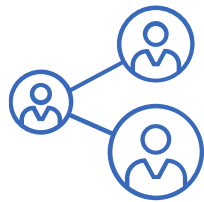


Polyurethane
Microcapsules

Process 2:

Emulsion interfacial
precipitation and polymerisation



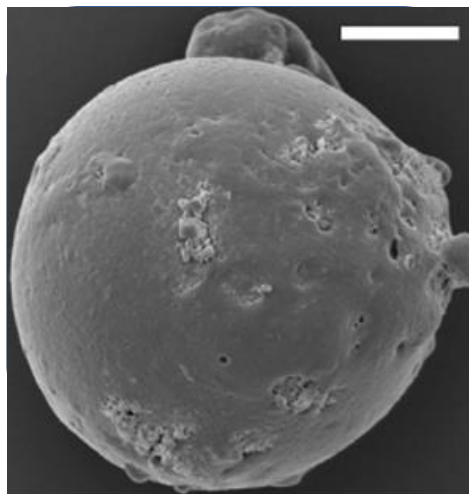


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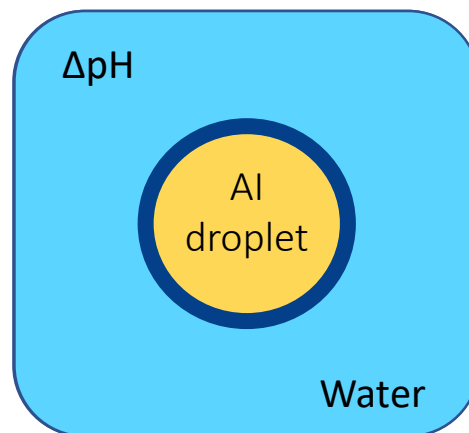
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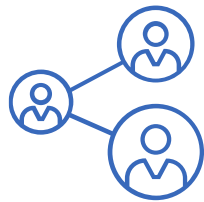


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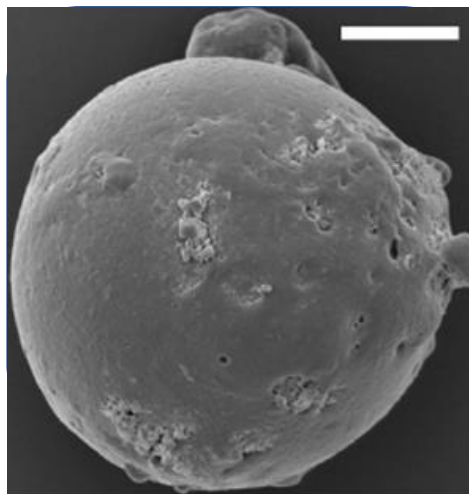


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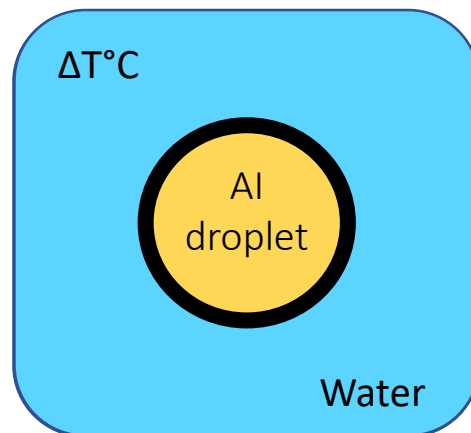
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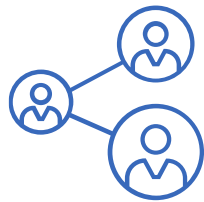


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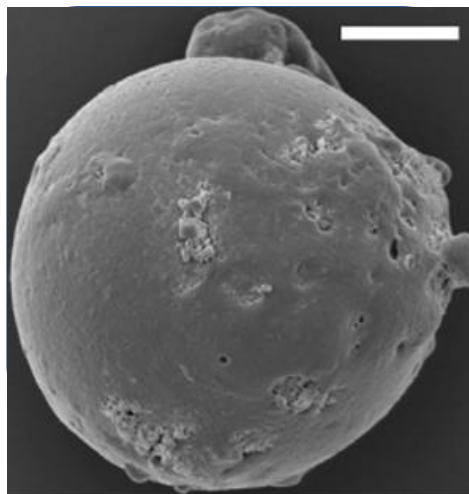


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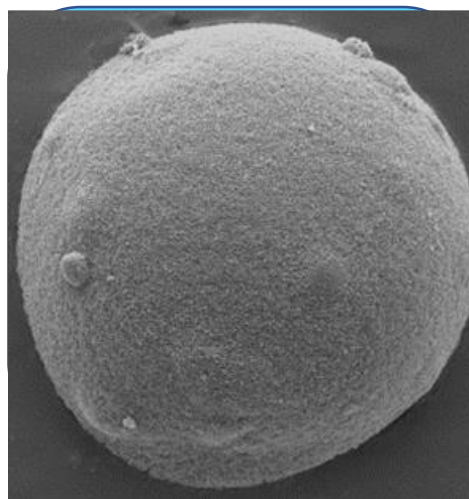
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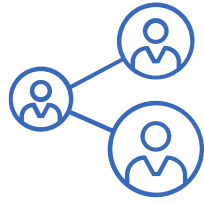
Polyurethane
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Polymelamine Formaldehyde
Microcapsules

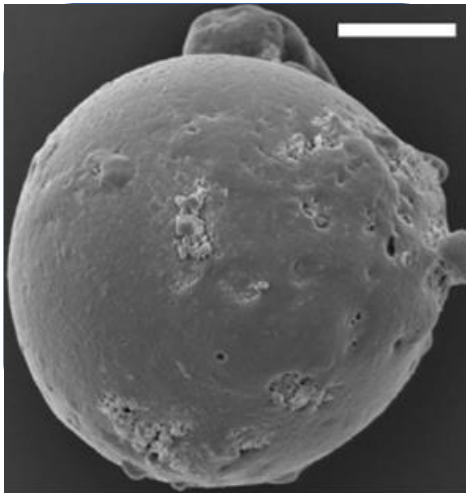


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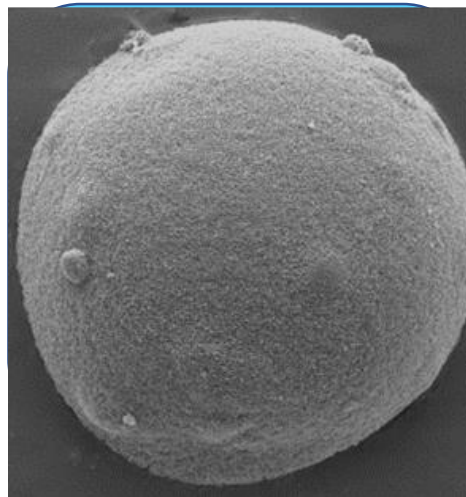
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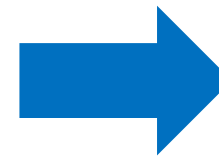
The 2 processes are compatible with
only a small number materials

All materials tested to date (>10 Yrs):

Biodegradable but formulation unstable

Or

Formulation stable but not biodegradable



So... What is the Solution...?



Calyxia

b e y o n d c h e m i s t r y[®]



THE SOLUTION TO AN UNMET NEED

What's different about Calyxia Microcapsules?

A breakthrough technology and process to produce microcapsules



Monodisperse Microcapsules
Size-controlled (1- 20 μm)

Conventional Processes

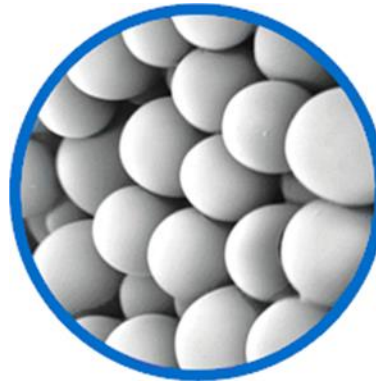
Polydisperse Microcapsules
(1- 40 μm)



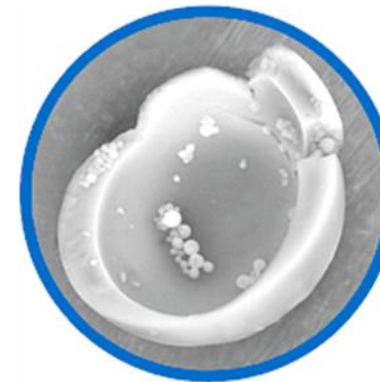
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Non-Porous Microcapsules
Shell Pore Size < 1 nm

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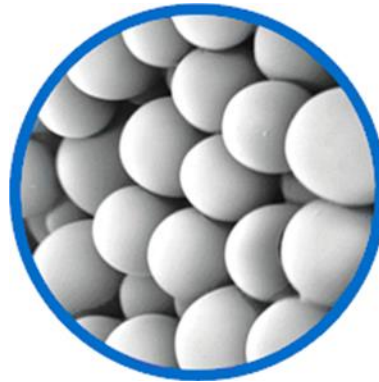
Porous Microcapsules
Shell Pore Size > 10 nm



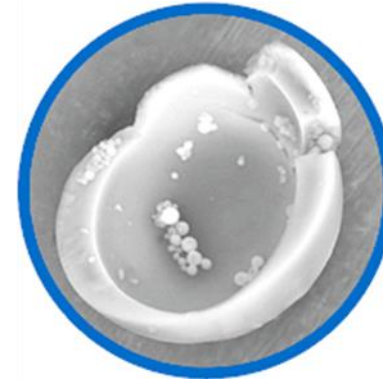
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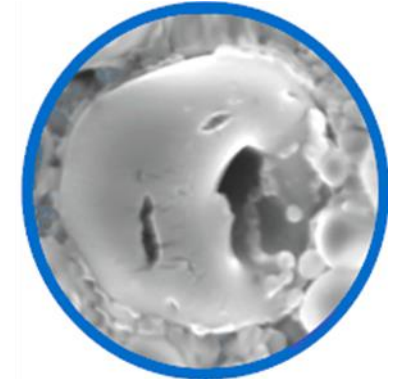
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Monodisperse Microcapsules
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Non-Porous Microcapsules
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Compatible 100s Shell Materials
Incl. Biodegradable & Biosourced

Conventional Processes

Polydisperse Microcapsules
(1- 40 μm)

Porous Microcapsules
Shell Pore Size > 10 nm

Compatible with a
limited number of shell materials

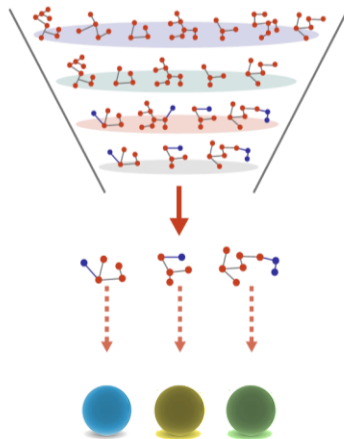


THE SOLUTION TO AN UNMET NEED

Why is compatibility a big difference?

2015 – 2018

Screen massive library of shell materials



New Range of Biodegradable Materials for
Stable and High Performance Microcapsules

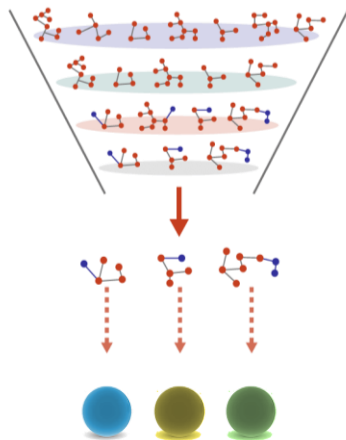


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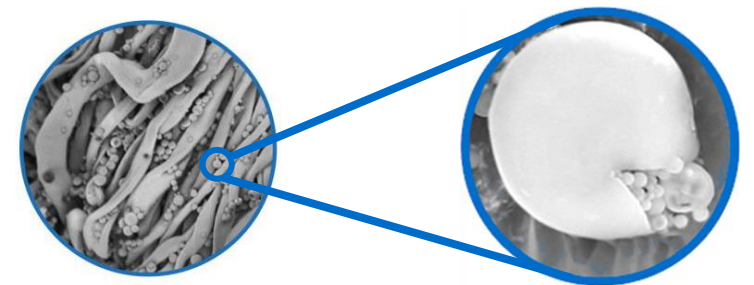


New Range of Biodegradable Materials for Stable and High Performance Microcapsules



EnviroCaps

The 1st Perfectly Sealed and Biodegradable Microcapsule for Laundry Products



EnviroCaps deposited and delivering on a fabric



THE SOLUTION TO AN UNMET NEED

Tell us more about Envirocaps?

Enviro  caps



Biodegradable according the EU guidelines



Performance Validated by Laundry Product Manufacturers



Supported by the European Commission via the SME Instrument Award



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Benefits for Our Customers



Comply with EU regulation and preserve the oceans of bio-accumulating microplastics



Enhance their public image by marketing biodegradable products globally



New products with up to 20 x long-lasting freshness >50% x less fragrance.



ENABLING A FUTURE OF SAFER PRODUCTS AND CLEANER OCEANS



THANK YOU TO THE ORGANISERS



THANK YOU TO THE ORGANISERS



THANK YOU TO OUR SUPPORTERS



THANK YOU TO THE ORGANISERS



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THANK YOU FOR YOUR ATTENTION