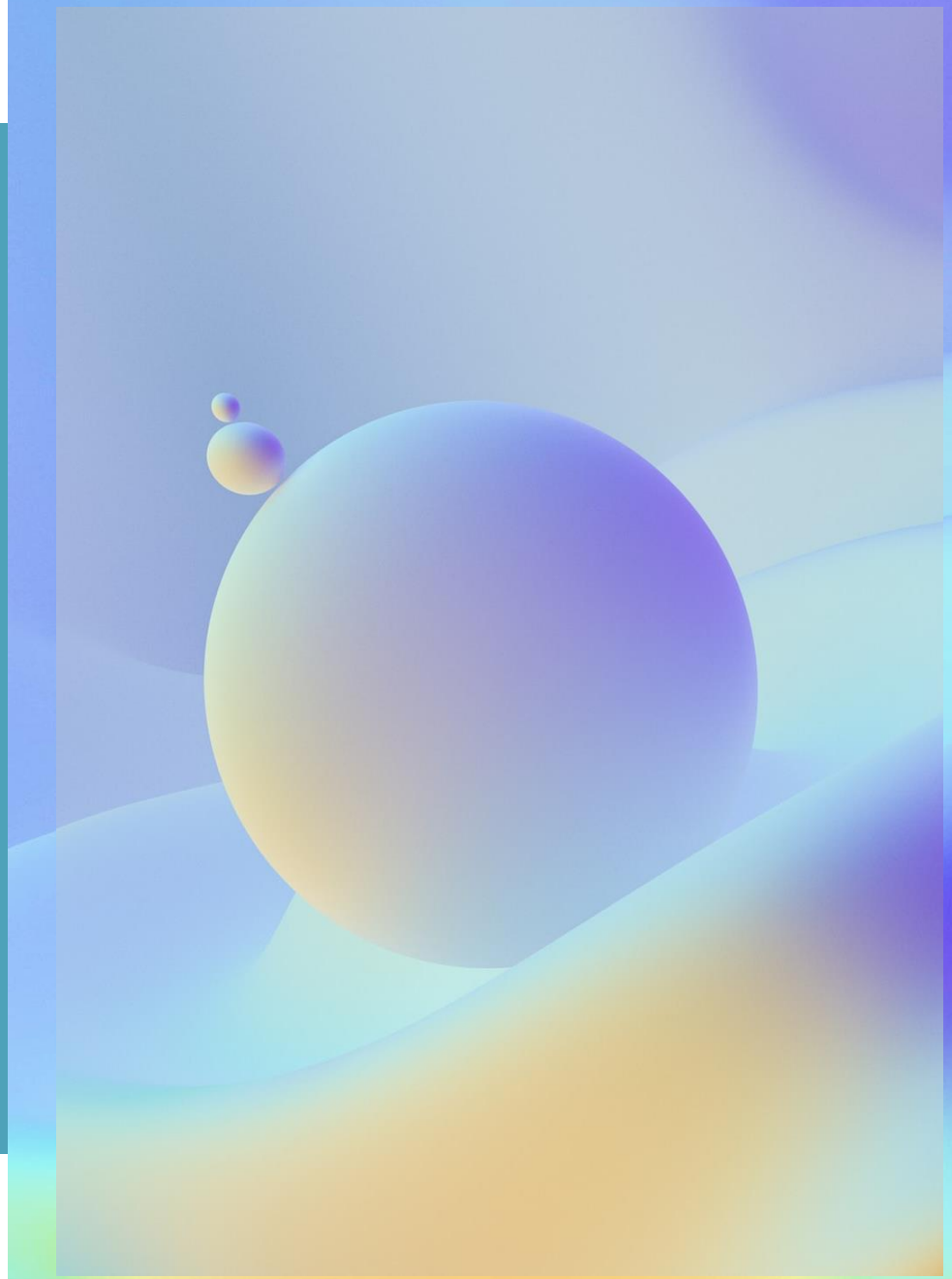
PERFORMANCE



TAKAPS™ 5G

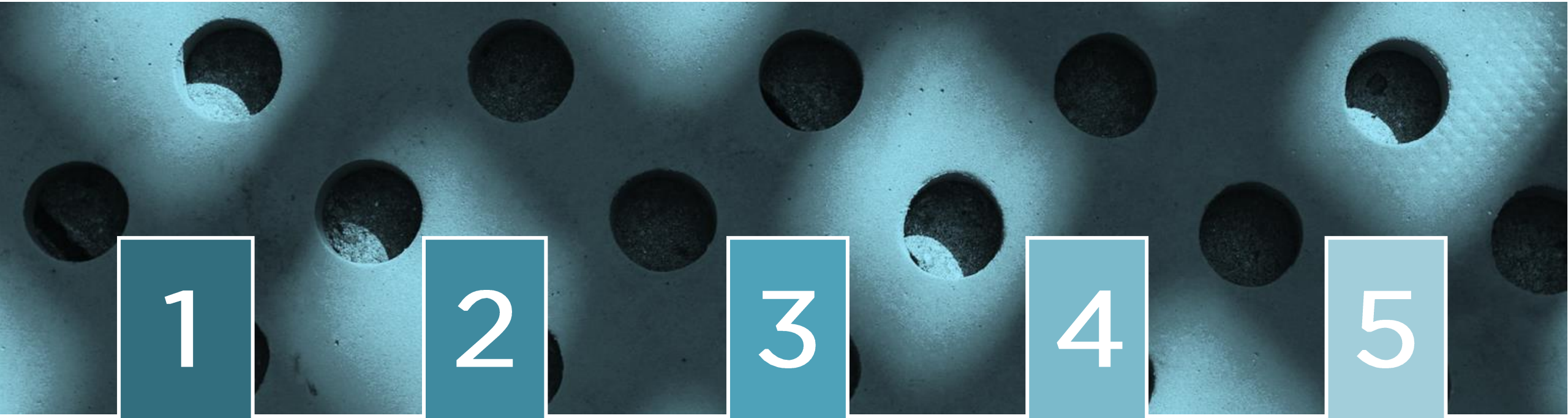
—

THE BIODEGRADABLE (R)EVOLUTION

TAKASAGO

PERFORMANCE

TAKAPS™ *(R)*EVOLUTION
SUMMARY



1 INTRODUCTION

Microencapsulation
Process & Mechanisms

2 BIODEGRADABILITY

Microplastics &
Biodegradability

3 TAKAPS™ EVOLUTION

TAKAPS™ 5G

4 FRAGRANCE COLLECTION

Properties
Olfactive & Secondary Benefits

5 CONCLUSION

Claims &
Fragrance Development

TAKASAGO

PERFORMANCE

TAKAPS™ *(R)*EVOLUTION
SUMMARY

TAKASAGO

MICRO--ENCAPSULATION

DEFINITION

Encapsulation definition: ([en-kap-suh-ley-tiōn])
n. The confinement of an individual molecule or a mix of molecules within a larger matrix shell.

PERFORMANCE

TAKAPS™ SYNTHESIS

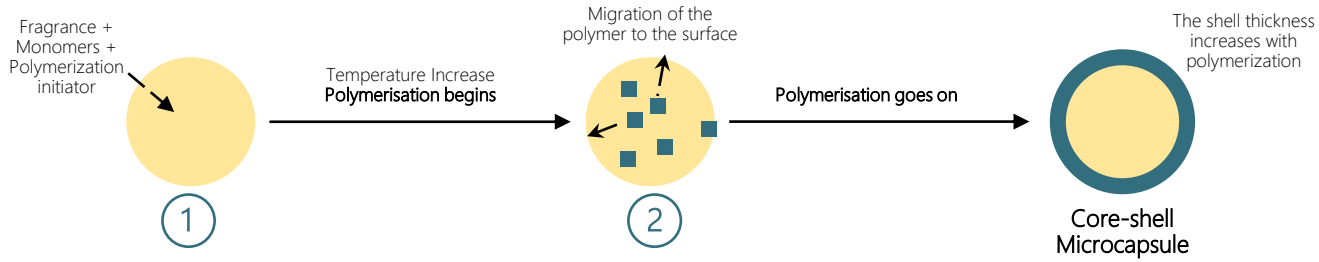
IN-SITU FREE-RADICAL SUSPENSION POLYMERIZATION

Formation of a fragrance-in-water emulsion :

1 Fragrance phase contains the reactants (Monomers+ Polymerization initiator)

Polymerization :

2 Monomers soluble in fragrance but corresponding polymer insoluble. This is the separation phase.
Hydrophily/hydrophobicity of the polymer is adjusted so that it goes to the interface and forms the microcapsule wall.

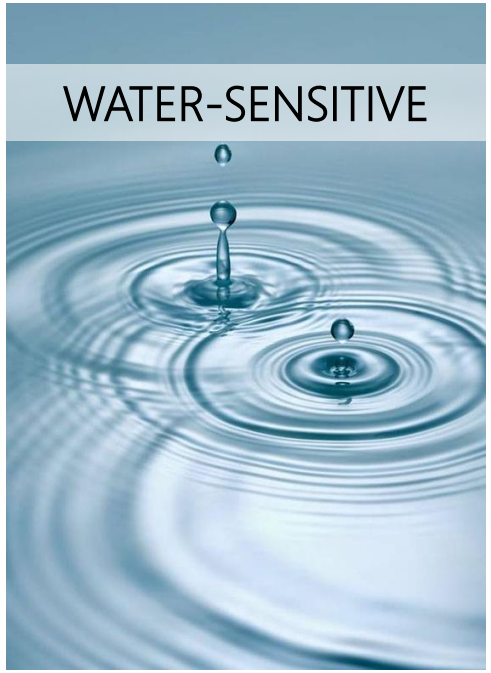


TAKASAGO

PERFORMANCE

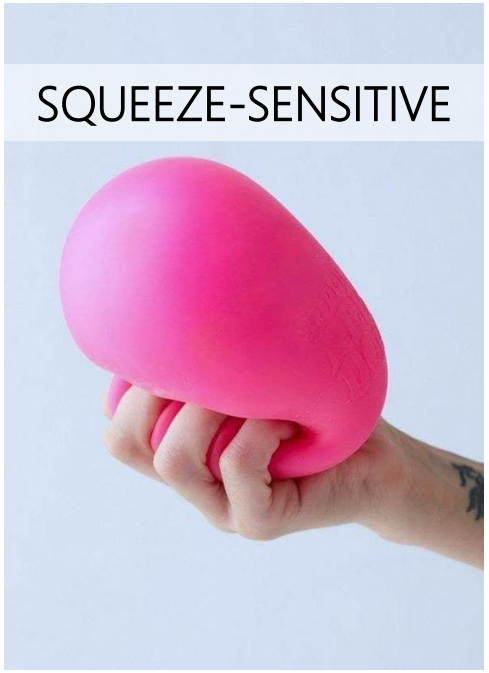
TAKASAGO'S CAPSULES PORTFOLIO

THREE RELEASE MECHANISMS



Matrix Microcapsules
Starch
Release fragrance
by dissolution in water

Core-Shell Microcapsules
Synthetic Polymer
Release fragrance
when broken



Core-Shell Microcapsules
Synthetic Polymer
Release fragrance
when squeezed

Capsules developed by Takasago are melamine-free, CMR-free and **formaldehyde-free**. They are distinguished by their **structures** and their **perfume release mechanisms**.

TAKASAGO

PERFORMANCE

TAKAPS™
WHY USING A MICROCAPSULE

ENHANCE THE FRAGRANCE CONSUMER EXPERIENCE
of final products with better Long-lasting, Performance, Emotional Benefits…

AVOID THE NOSE BLIND PHENOMENON
Forget about anosmia & fragrance habituation to trigger surprise

BRING A NEW LONG-LASTING EFFECT
Reactivate fragrance release through the day

ENJOY A NEW EXPERIENCE BESIDE THE FREE FRAGRANCE
A new hedonism wearing a perfume

TAKASAGO

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TAKASAGO


TAKASAGO
WE
ARE ALL
CONCERNED
CORRECTING OUR PLASTIC WASTE PROBLEM REQUIRES A FUNDAMENTAL CHANGE IN THINKING ABOUT HOW PLASTICS ARE MADE, USED, AND DISCARDED.

KEY FIGURES

MAJOR CONCERNS ABOUT PLASTIC & MICROPLASTIC

8

million tons of plastics end up in our oceans every year. (*WWF*)

42 000

tons of primary microplastics end up in the environment each year, when products with microplastics are used. (*ECHA*)

176 000

tons of unintentionally produced secondary microplastics into European surface waters amount per year. (ECHA)

1/5

less than a fifth of all plastic is recycled globally. (*national geographic*)

MICROPLASTICS

DEFINITIONS by ECHA

Microplastics are **solid plastic particles** composed of mixtures of **polymers** and **functional additives**. They may also contain residual impurities.

PRIMARY MICROPLASTICS

deliberately manufactured and added to products for specific purposes.

SECONDARY MICROPLASTICS

unintentionally formed when larger pieces of plastic, like car tyres or synthetic textiles, wear and tear.

PERFORMANCE

FUTURE OF MATERIALS

THREE DISTINCTIVE DEGRADATIONS

Degradation	DISINTEGRATION	BIODEGRADATION	COMPOSTABILITY
Definitions	*Physical* destruction of materials caused by multiple factors like wind and weather, tear force, UV radiation, microbial activity…	*Chemical* destruction of organic substances and materials through the action of enzymes from microorganisms.	Capacity of an organic material to be transformed into compost through the composting process, a mix between *disintegration* and *biodegradation*.
End Results	Little or even microscopic pieces of materials	Simple inorganic molecules such as water, CO_2, methane & biomass	CO_2, methane and biomass which can be used as compost

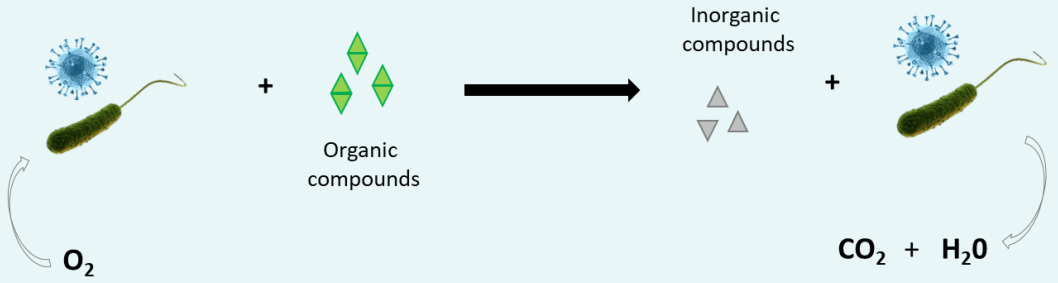
TAKASAGO

BIODEGRADATION PROCESS

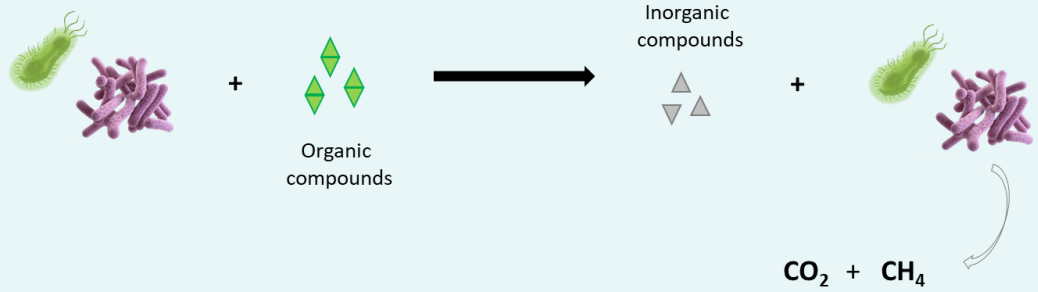
WHAT HAPPENS CONCRETLY

- Natural or induced consumption of the substance by microorganisms (bacteria, funghi, etc.) in different compartments & in biosphere (water and soil)
- Production of basic compounds by breaking down the initial substance
- Time scale
- Temperature dependent
- Number of microorganisms

- Aerobic biodegradability (with oxygen)



- Anaerobic biodegradability (without oxygen)



BIODEGRADATION

CATEGORIES
as defined by OECD

Type	Definition *Source : European Centre for Ecotoxicology and toxicology of Chemicals*
Ultimate Biodegradation	= Mineralisation The level of degradation achieved when the test compound is totally utilised by micro-organisms resulting in the production of carbon dioxide, water, mineral salts and new microbial cellular constituents (biomass)
Primary Biodegradation	= Biotransformation The alteration in the chemical structure of a substance, brought about by biological action, resulting in the loss of a specific property of that substance
Ready Biodegradation	An arbitrary classification of chemicals which have passed certain specified screening tests for ultimate biodegradability; these tests are so stringent that it is assumed that such compounds will rapidly and completely biodegrade in aquatic environments under aerobic conditions
Inherent Biodegradation	A classification of chemicals for which there is unequivocal evidence of biodegradation (primary or ultimate) in any test of biodegradability.
Half-Life	= t0.5 The time taken for 50% transformation of a test substance when the transformation can be described by first-order kinetics; it is independent of the initial concentration.
Disappearance time 50	= DT50 The time within which the initial concentration of the test substance is reduced by 50 percent.

PERFORMANCE

EUROPEAN CHEMICALS AGENCY

BIG ACTIONS AGAINST SMALL PARTICLES

ECHA
EUROPEAN CHEMICALS AGENCY

WHO IS ECHA?

This is the **European Chemicals Agency**, an agence which implements the EU's chemicals legislation in order to protect people's health and environment.

WHAT DOES IT MEAN « BEING ECHA COMPLIANT » ?

In the **Annex XV** of the **Restriction Report** published by ECHA about intentionally added microplastics, several guidelines are established. Takasago follows these guidelines to formulate microcapsules with less microplastics without compromising quality, performance and experience for consumers.

TAKASAGO

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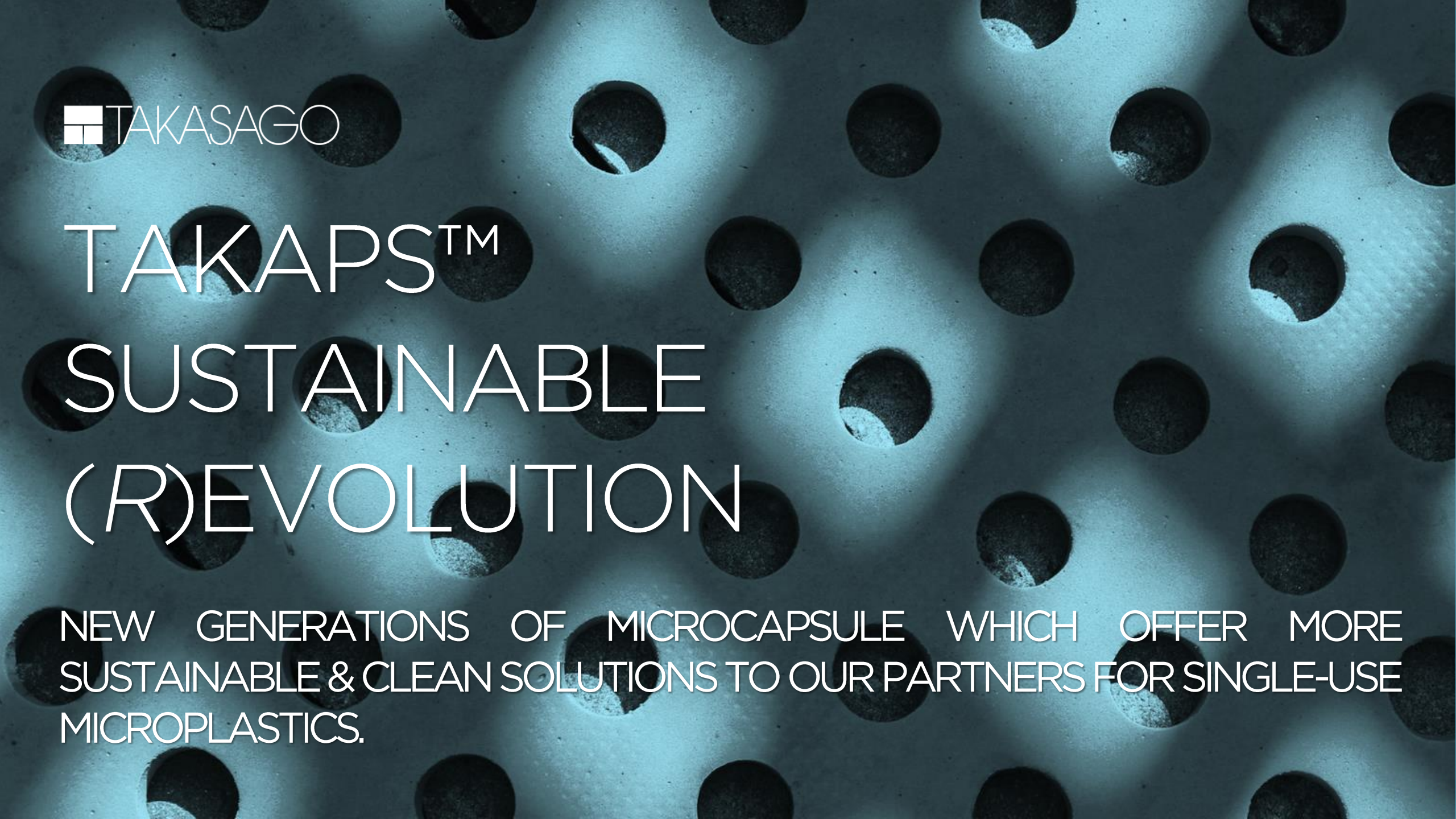

TAKASAGO
TAKAPS™
SUSTAINABLE
(R)EVOLUTION
NEW GENERATIONS OF MICROCAPSULE WHICH OFFER MORE SUSTAINABLE & CLEAN SOLUTIONS TO OUR PARTNERS FOR SINGLE-USE MICROPLASTICS.

PERFORMANCE

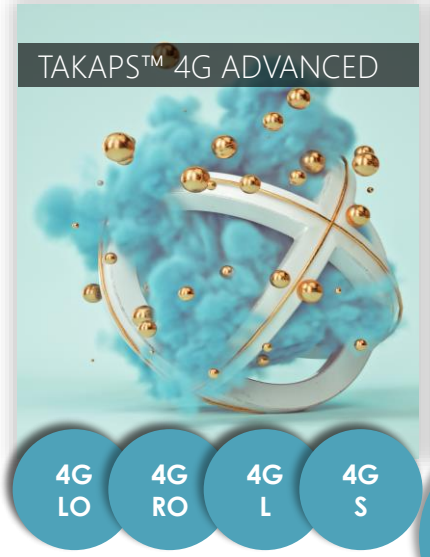
EVOLUTION OF TAKAPS™
FROM NOW TO FUTURE

2000
STARCH CAPSULES

Release mechanism
Melting with Water

2010 - 2020
TAKAPS™ 4G FORMALDEHYDE FREE WITH ACTIVE PROPERTIES

Collection with **Active MOC Properties**
Bursting with Friction



Collection **ECHA Compliant 100 ppm** & High % of **biodegradable** content
Bursting with Friction

2021+ ACHIEVEMENT
HIGH LEVEL OF BIODEGRADABILITY

Collection ECHA compliant **60/60 biodegradable** content
Squeeze & Friction

TAKASAGO


TAKASAGO
60/60 ECHA COMPLIANT
VEGAN
BIOSOURCED
BIODEGRADABLE
WE ARE THE FIRST FRAGRANCE HOUSE TO PROPOSE A COMPLIANCY SOLUTION FOR THE GLOBAL MICROPLASTICS PROBLEM WITH 60/60 BIODEGRADABLE MICROCAPSULES.

PERFORMANCE

TAKAPS™ 5G

GO FOR BIODEGRADABILITY

Radical makeover to protect our future with sustainable scent.

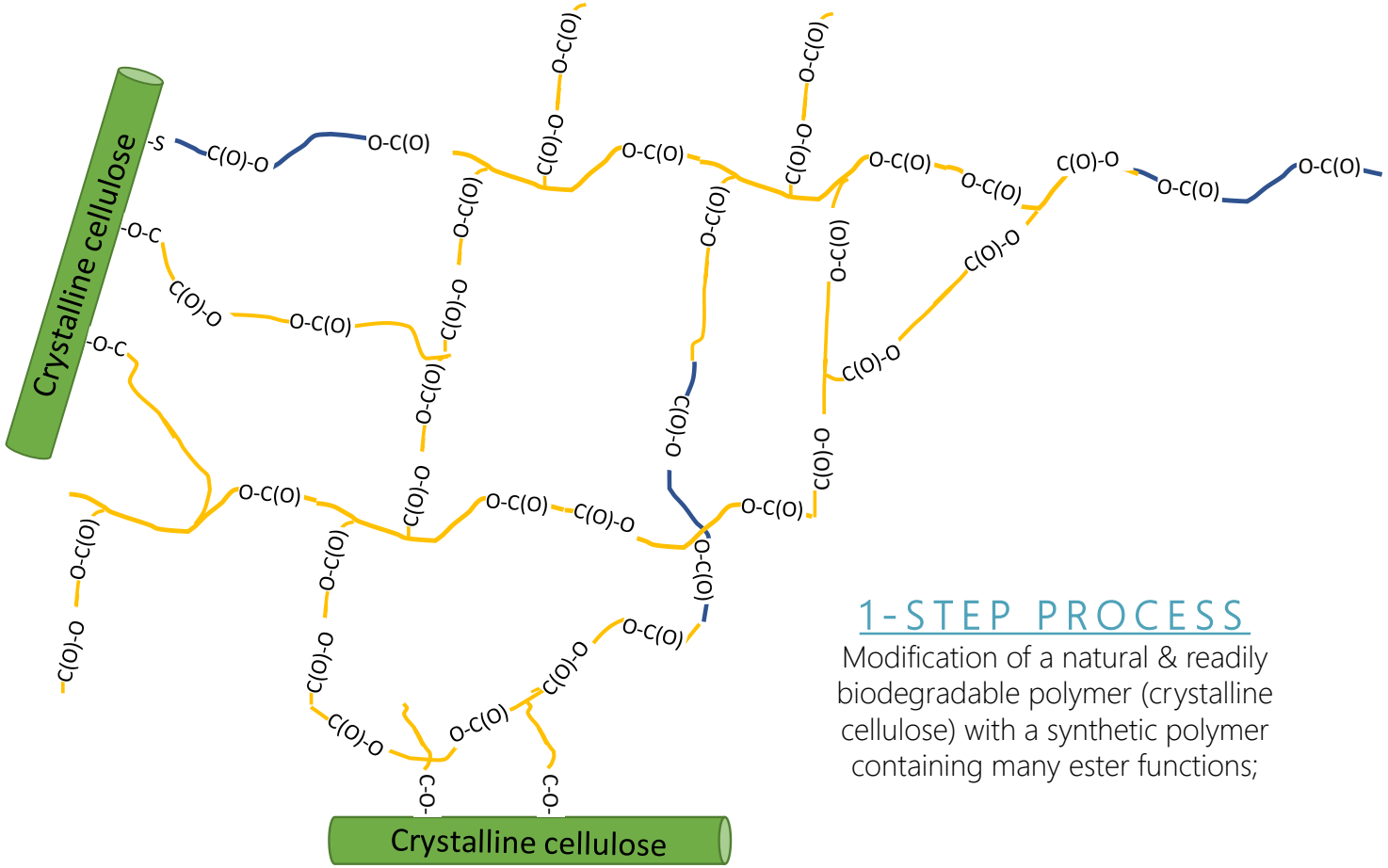
A UNIQUE SOLUTION :

- Fitting to ECHA definition of being not considered as a microplastic : **60% of biodegradation in 60 days in standardized tests** (tests made by a specialized and certified external laboratory).
- Inherently & primarily biodegradable, to reach the ultimate biodegradation
- Takasago is formaldehyde-free and melamine-free capsule supplier for homecare and beauty care product
- **Patent filled**

TAKASAGO

PERFORMANCE

TAKAPS™ 5G
BIO-SOURCED RAW MATERIALS



1-STEP PROCESS

Modification of a natural & readily biodegradable polymer (crystalline cellulose) with a synthetic polymer containing many ester functions;

NATURAL ORIGIN MEETS PURE SCIENCE

A first step towards lower environmental footprint

Takasago chooses an alternative and sustainable sourcing : **bio-sourced** & **vegan** raw materials with the aim of biodegradable polymers.

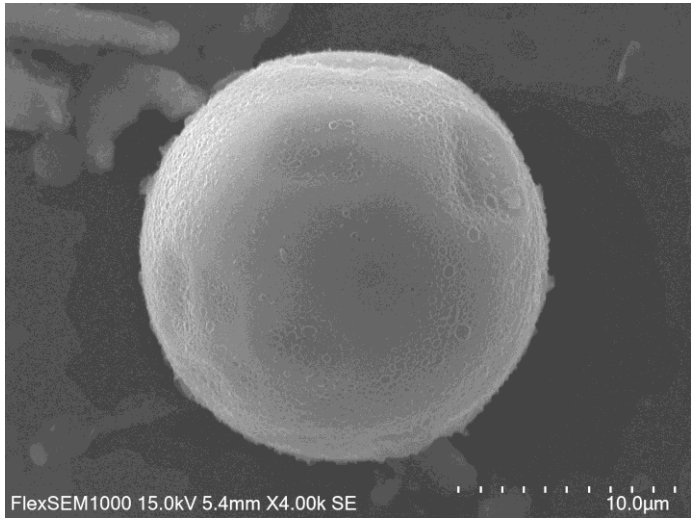
TAKAPS 5G are **natural origin carriers** formulated with vegan, GMO-free, ecocert/cosmos and plant-derived reactants.

TAKASAGO

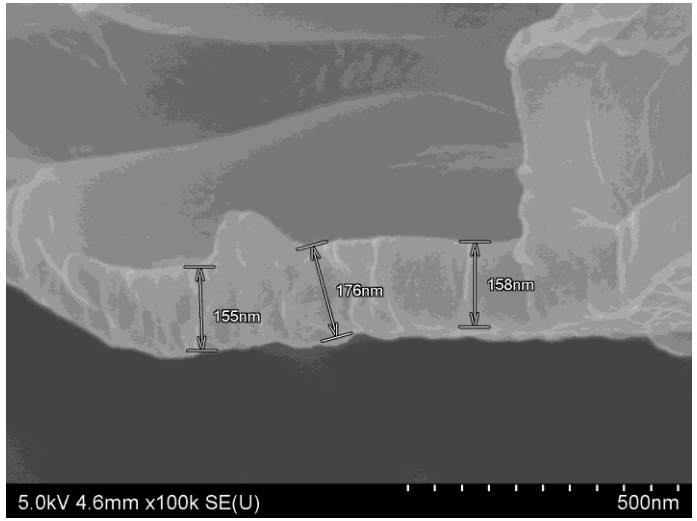
PERFORMANCE

TAKAPS™ 5G CHARACTERIZATION

WELL FORMED AND UNIFORM CAPSULES



INTACT MICROCAPSULE
(Scanning Electron Microscopy)



MICROCAPSULE WALL AFTER RUBBING
(Scanning Electron Microscopy)

- TAKAPS™ 5G are **spherical** well-formed microcapsules.
- After **rubbing**, the Scanning Electron Microscopy shows microcapsules with **uniform wall thickness**.

TAKASAGO

PERFORMANCE

TAKAPS™ 5G

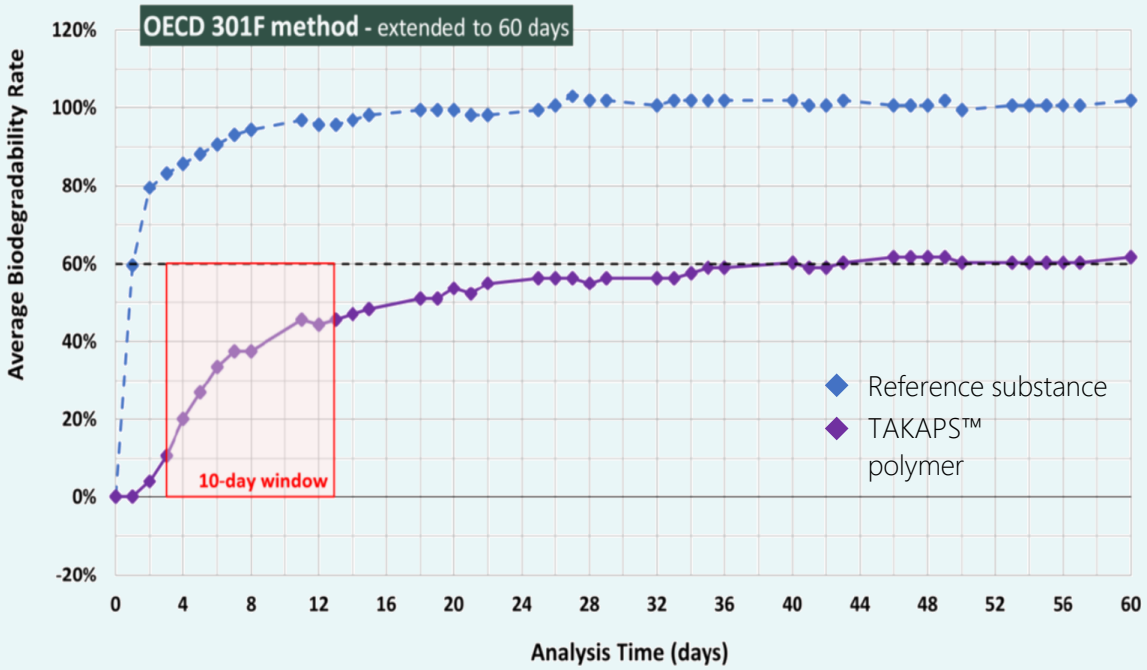
60/60 STRATEGY

GOOD LABORATORY PRACTICE

We carried out analyzes, in a specialized and certified **external laboratory**, on the polymer which constitutes **the membrane of TAKAPS™ 5G** (extracted from the microcapsules dispersion).

ECHA GUIDELINES

The results show that TAKAPS™ 5G polymer match the ECHA guidelines as being **consider not a microplastic** : to reach **60% of biodegradation in 60 days**.



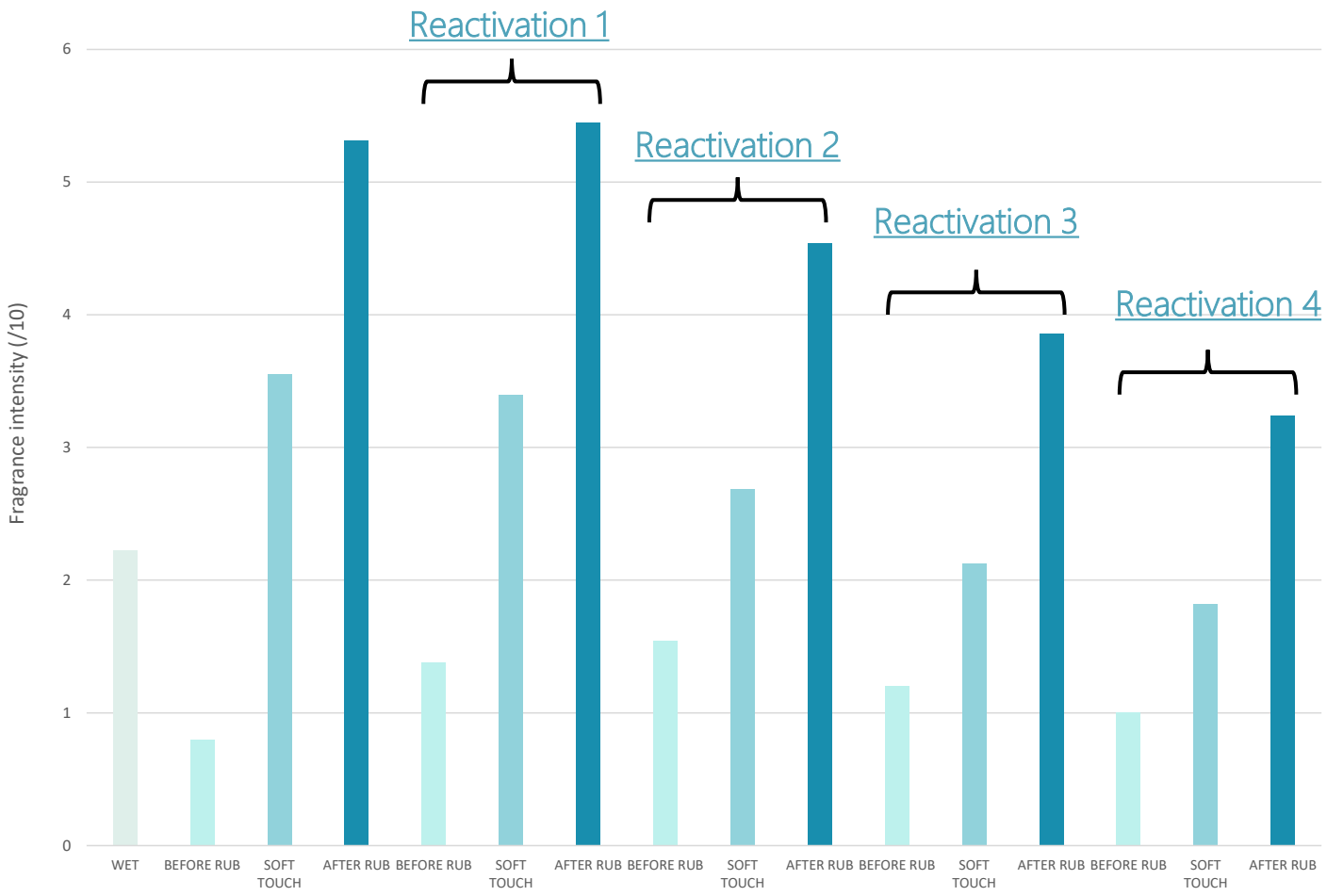
RESULTS OF BIODEGRADATION OF TAKAPS™ 5G POLYMER

TAKASAGO

PERFORMANCE

TAKAPS™ 5G
LONG-LASTING FRAGRANCE INTENSITY

FRAGRANCE INTENSITY BEFORE RUB,
SOFT TOUCH AND AFTER RUB OF TAKAPS™ 5G AURA SCENT
(Internal Panel Test)



Panel results show **satisfying olfactory performances** in fabric softener & in liquid laundry detergent applications

PANEL TEST CONDITIONS

Fabric softener application: results of panel test
(Fresh applications, **0.26% of slurry Aura 5G = 0.1% of encapsulated fragrance)**

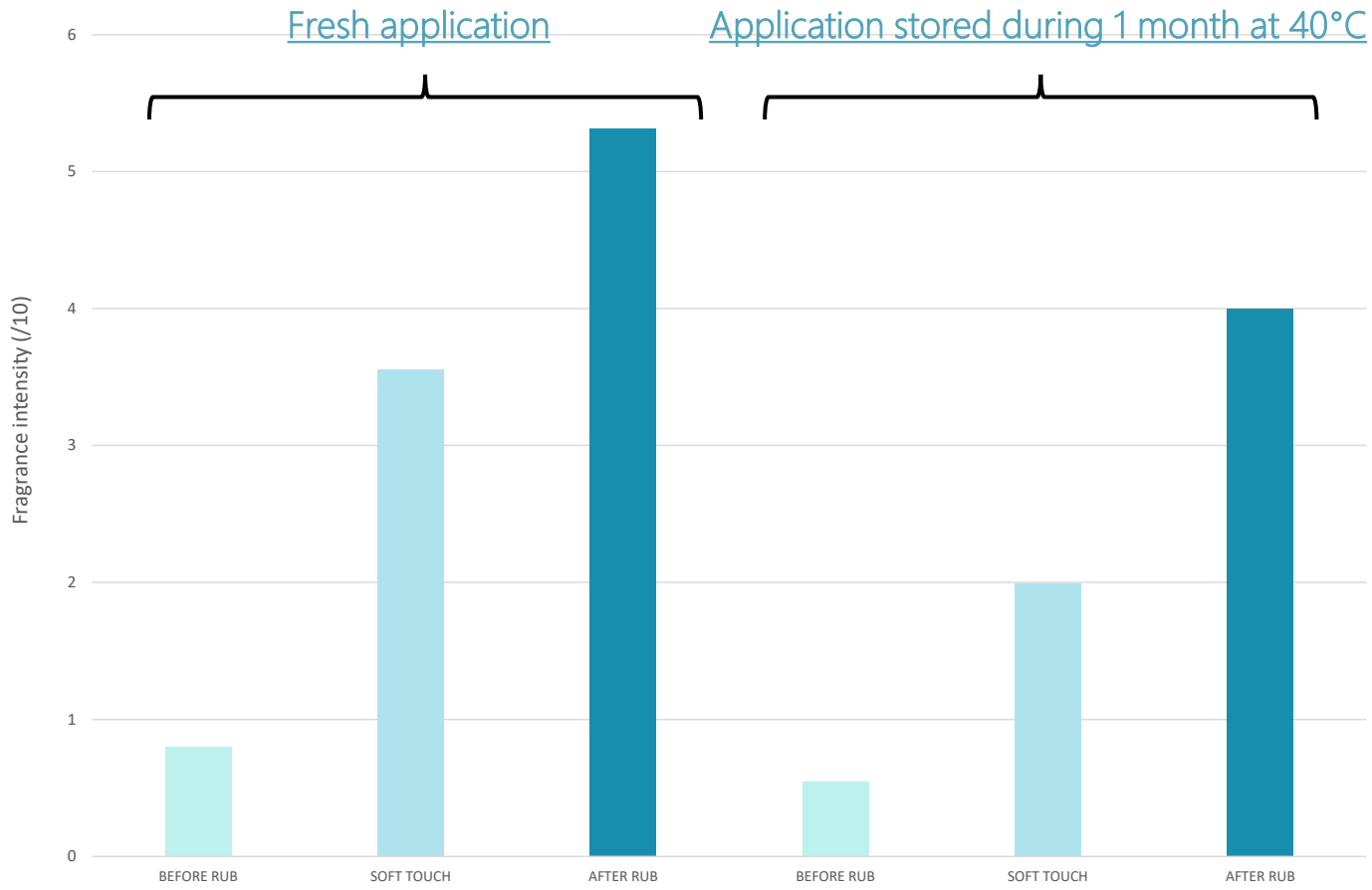
1. Internal Panel trained to rate fragrance intensity (n=16)
2. Evaluation on cotton fabrics: washing with 40 g of fabric softener for 2kg wash load, 40min cycle at 40°C,1300rpm

TAKASAGO

PERFORMANCE

TAKAPS™ 5G
STABILITY IN BASE

FRAGRANCE INTENSITY BEFORE RUB,
SOFT TOUCH AND AFTER RUB OF TAKAPS™ 5G AURA SCENT
(Internal Panel Test)



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0.26% of slurry Aura 5G = 0.1% of encapsulated fragrance)
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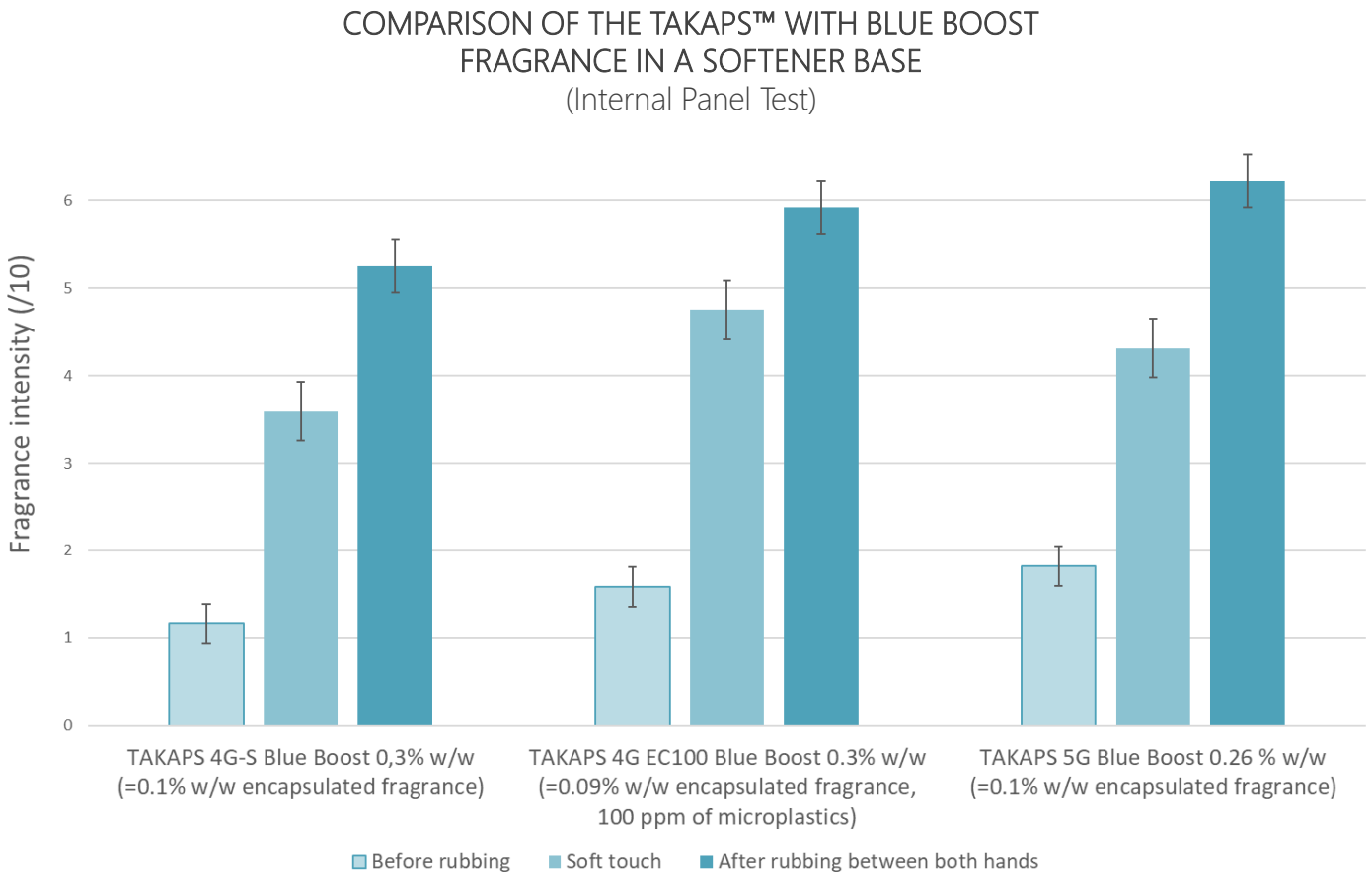
TAKASAGO

PERFORMANCE

COMPARISON BETWEEN 4G & 5G
FRAGRANCE INTENSITY



In fabric softener application, **fragrance intensity** for **TAKAPS™ 5G** is significantly **higher** than for TAKAPS™ 4G-S and slightly higher after rubbing than for TAKAPS™ 4G EC-100

PANEL TEST CONDITIONS

Fabric softener application: results of panel test

1. Internal Panel trained to rate fragrance intensity (n=14)
2. Evaluation on cotton fabrics: washing with 40 g of fabric softener for 2kg wash load, 40min cycle at 40°C,1300rpm

TAKASAGO

PERFORMANCE

TAKAPS™ 5G
TECHNICAL ID CARD

- Biodegradable polymer wall following ECHA definition (60% of biodegradation in 60 days)
- Alternative sourcing : Vegan & Bio-sourced raw materials
- Friction sensitive fragrance microcapsules
- Formaldehyde-free / Melamine-free / Isocyanate-free
- Controlled fragrance release (possible controlled wall breakability)
- Liquid slurry (aqueous capsules dispersion) stable at room temperature (12 months)
- No pH sensitivity
- Base compatibility --> No ethanol, others polar solvents < 5 %
- Several possible claims
- Already industrialized

Applications	N° CAS	Fragrance load (in slurry)	Slurry dosage (in finished product)
Fabric softener	2696236-02-7	37%	0,15-0,4%
Laundry Detergent (Powder & Liquid)			> 0,2%
Scent Booster (solid, liquid)			> 2%

TAKASAGO

PERFORMANCE

TO KEEP IN MIND

KEY WORDS TO TALK ABOUT TAKAPS™ 5G

60/60 ECHA BIODEGRADABLE

Takasago follows the ECHA restriction guidelines of 60% of biodegradation in 60 days. TAKAPS™ 5G are inherently & primarily biodegradable to reach the minimal impact for the Planet.

BIO-SOURCED & VEGAN

Takasago chose alternative sourcing & used vegan bio-sourced raw materials with the aim to form biodegradable capsules.

NONTOXIC INGREDIENTS

Made with nontoxic ingredients, both for human & environment.
Melamine-free, Formaldehyde-free, CMR-free (Isocyanate-free, Glutaraldehyde-free)

HIGH PERFORMANCE

Satisfying olfactory performance with a long-lasting intensity (measured in softener and detergence).

HOME CARE

Suitable for multiple categories from Home Care (Laundry Detergent, Softeners)

TAKASAGO

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TAKAPS™ 5G COLLECTION

* RM: raw materials

VENUS 5G

3 ACTIVE PROPERTIES

- Odor Elimination RM*
- DeoEffective RM*
- CNV-EEG Relaxing RM*

Fruity, Green, Apple

CLAIMS

- Kick malodors off
- Active odor shield
- Sweaty body response protection
- Contain relaxing raw materials

FRAGRANCE
99,5%
biodegradable

PHOENIX 5G

3 ACTIVE PROPERTIES

- Odor Elimination RM*
- DeoEffective RM*
- Long-lasting actives RM*

Aromatic Herbal, Floral, Green

CLAIMS

- Neutralize odors
- Fresh control formula
- Sweaty body response protection
- Long lasting protection

FRAGRANCE
>90%
biodegradable

AURA 5G

4 ACTIVE PROPERTIES

- Odor Elimination RM*
- CNV-EEG Relaxing RM*
- DeoEffective RM*
- Long-lasting actives RM*

Aromatic Herbal, Fruity, Apple

CLAIMS

- Fight malodors
- Lasting properties
- Clean power
- Feel protected, stop stressing out

FRAGRANCE
>96%
biodegradable

APHRODITE 5G

2 ACTIVE PROPERTIES

- Odor Elimination RM*
- DeoEffective RM*

Fruity, Citrus, Tropical, Blackcurrant

CLAIMS

- Kick malodors off
- Active odor shield
- Sweaty body response protection
- Malodors lasting elimination

FRAGRANCE
>95%
biodegradable

HELIOS 5G

1 ACTIVE PROPERTY

- Odor Elimination RM*

Citrus, Aldehydic, Grapefruit

CLAIMS

- Odors stop fragrance solution
- Active against bad odors
- Actively fights malodors

FRAGRANCE
>90%
biodegradable

TAKASAGO

PERFORMANCE

SO WHAT
FOR TAKAPS™ 5G

TECHNICAL REMINDER

Key categories to target:
Home Care / Laundry care : Softeners, detergents

Key benefits for consumers:

- Discover Bloom/Burst of fragrance for each use
- Safer Choice for your health : Formaldehyde/Melamine free encapsulation
- Better choice for the environment : Biodegradable
- Drive the category via the biodegradable approach
- Bring long lasting fragrance performance with an eco-conscious approach
- Fragrance release technology: trigger surprise

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PERFORMANCE

FREE FRAGRANCES
APPLIED TO TAKAPS™ 5G

3 MAJOR DIMENSIONS
TO ACHIEVE THE BEST FREE FRAGRANCE COMBINAISON

Our free fragrances have a high substantivity on fabric, reach a high level of sustainability & biodegradability and are line with market research tools like STAR TREK & best sellers in fabric care.

star trek

TAKASAGO

PERFORMANCE

FREE FRAGRANCES
OLFACTIVE PYRAMIDS

Two softener best sellers' fragrances that **fit with all capsules collection**

FREE FRAGRANCE
FOR BLUE
T12060293

Chypre Floral Aldehydic

TOP
Green, Apple, Aldehydic

MID
Rose, Jasmine, Lily of the Valley

BASE
Woody, Ambery, Patchouli

100% biodegradable fragrance
Contains malodors elimination ingredients

FREE FRAGRANCE
FOR PINK
T12060292

Floral Fruity Rose

TOP
Pear, Aldehydic, Red Berry

MID
Rose, Peony, White Flowers

BASE
Musky, Woody, Ambery

100% biodegradable fragrance
Contains malodors elimination ingredients

TAKASAGO

PERFORMANCE

SO WHAT
FOR TAKAPS™ 5G

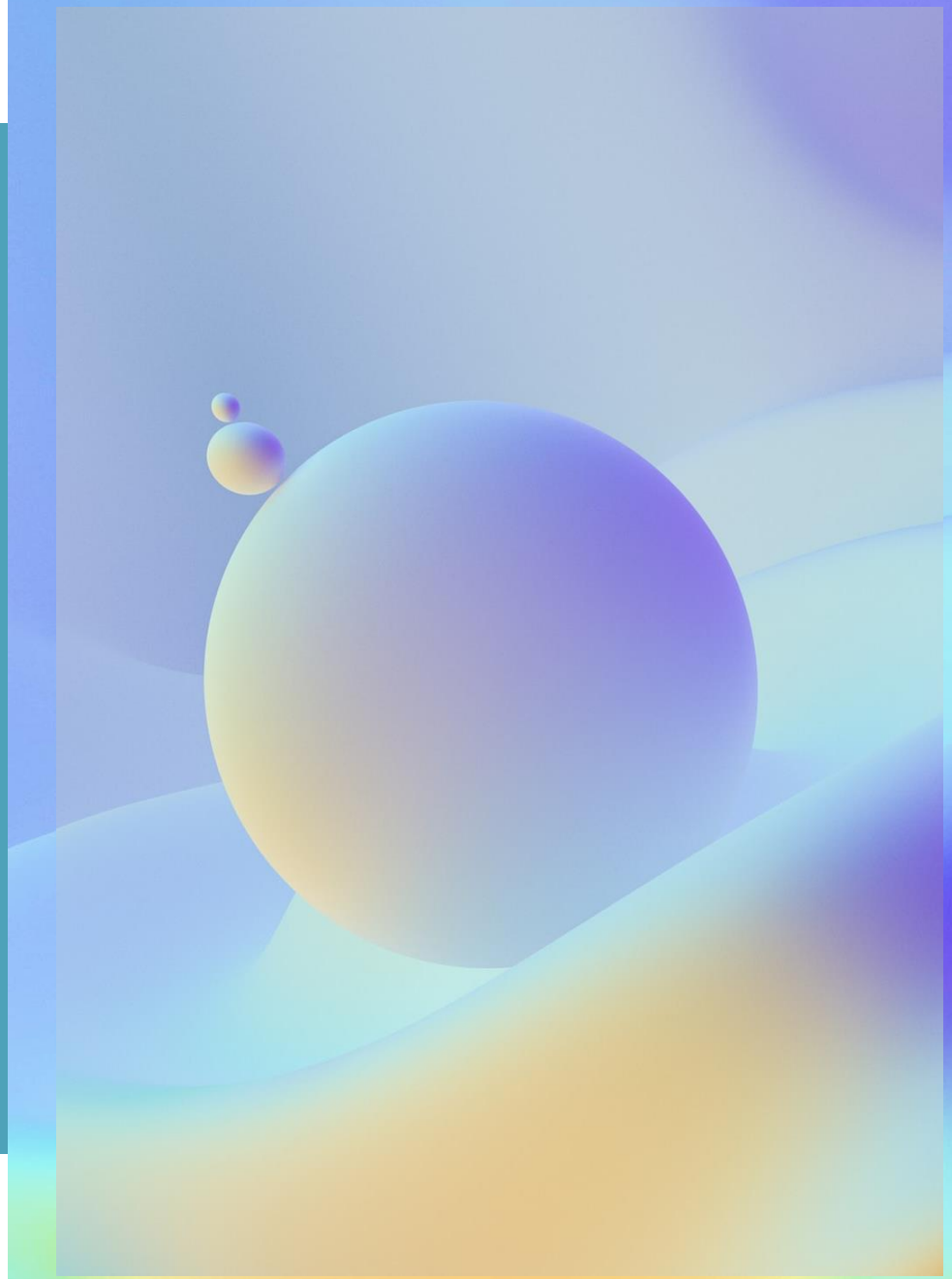
CLAIMSTORMING*

- A huge change for our Planet, without compromising on fragrance efficiency
- Reduce your microplastics footprint
- Powerful biodegradable fragrance microcapsules
- Earth friendly ingredients inside
- Biodegradable efficiency
- Thoughtful product for the planet
- For people that care about their impact on the environment
- Long-lasting fragrance technology with minimal impact on the environment
- A fragrance experience that takes care of our planet
- Biodegradable burst of fragrance
- Environmentally conscious fragrance experience
- No concession made on performance and sustainability of your fragrance
- Cleaner scent with no concession made on your pleasure

**List is not intended to be exhaustive*

TAKASAGO

PERFORMANCE



THE BIODEG *(R)*EVOLUTION

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TAKASAGO