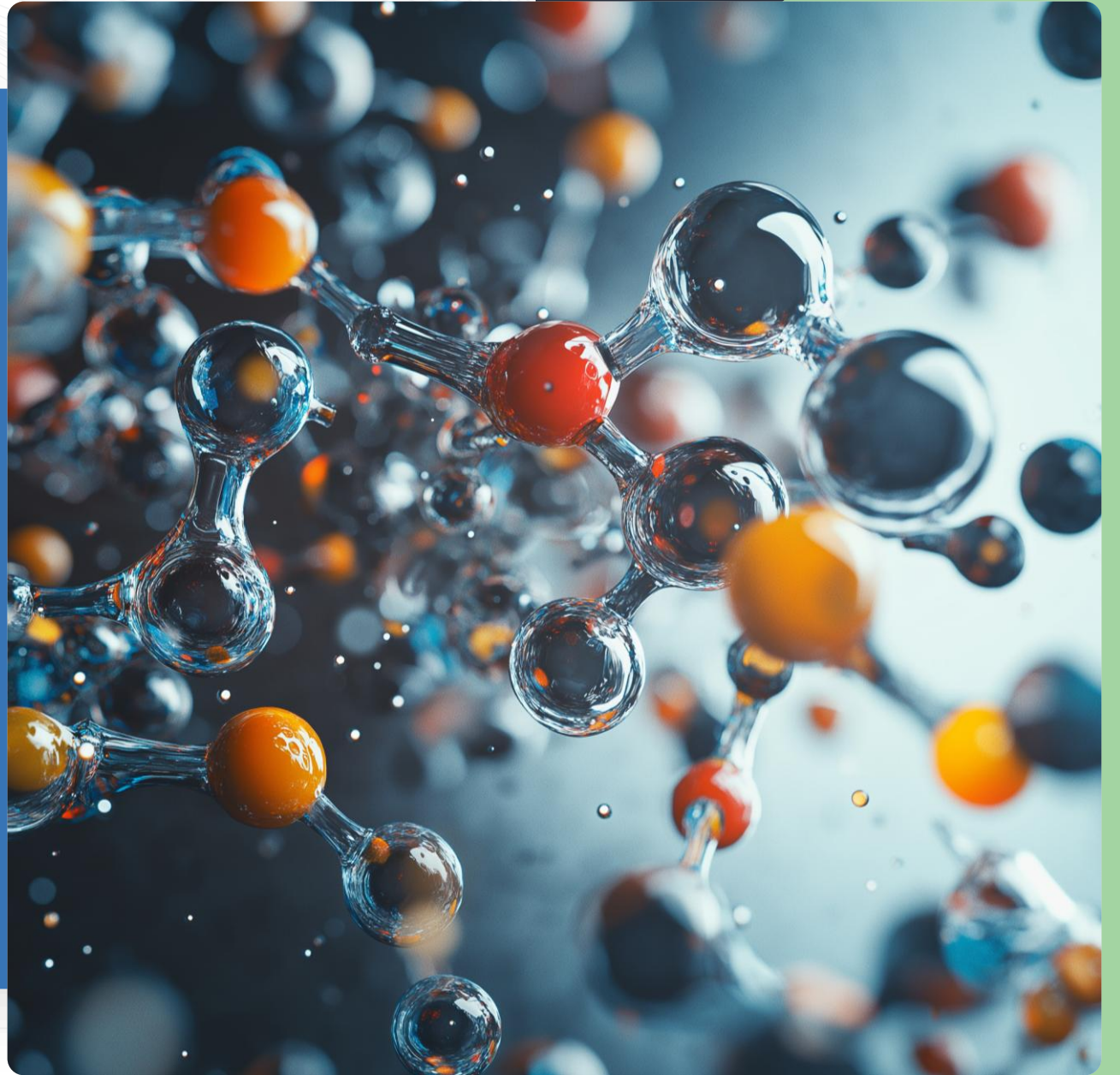




Seaweed Nanomaterials The high value approach.

SEAgriculture 2026

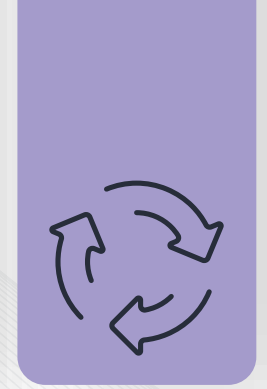
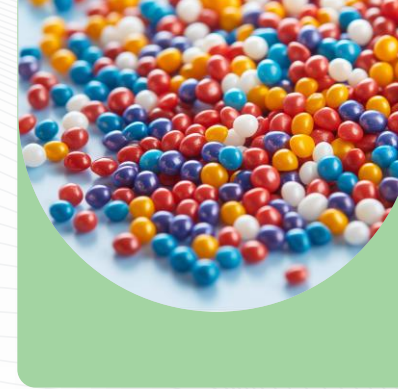
Dr Mark Dorris CEO



The market for **sustainable alternatives to microplastics** is experiencing significant growth (CAGR of 9.2% 2024-30).

NEWS AND VIEWS | 09 July 2025

GVR-2-68038-410-9 (2024)



Nanoplastics make up most of the plastic pollutants in the North Atlantic Ocean

A landmark field study reveals widespread plastic debris – raising questions about the impact of microplastics on marine life.

By K

Consumer demands for sustainability are forcing businesses to adopt new strategies

E



Lyudmil Karavasilev
May 19, 2025

We inhale a credit card's worth of microplastics each week

Microplastics are everywhere. Now a new study has found them where they've never been before – in human lungs. But what does this mean for our health?

hzadeh

EU cracks down on microplastic pollution with landmark regulation

Environment

10th April 2025

Recent advances in biodegradable polymers for sustainable applications

[Aya Samir](#), [Fatma H. Ashour](#), [A. A. Abdel Hakim](#) & [Mohamed Bassyouni](#)

[npj Materials Degradation](#) 6, Article number: 68 (2022)

[Cite this article](#)

Human Health Impact

Regulatory Pressure

Synthetic polymers: The time for change is now

Carbomers.

Issues with benzene levels, upcoming bans:

October 2027: Rinse-off products

October 2029: Leave on products

October 2035: Lip, nail and make up products

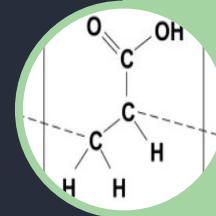
PVOH (Polyvinyl alcohol).

Soluble but is it biodegradable? Found in breast milk and blood.
Accumulates in the environment, bill to ban PVOH in New York 2024.

PFAS

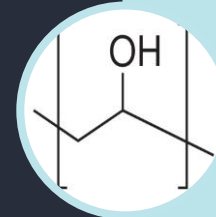
(per/polyfluoroalkyl substances).

Total universal ban from 2026



Carbomers

Synthetic superabsorbent polymers for thickening and stabilizing personal care formulations.



Polyvinyl alcohol

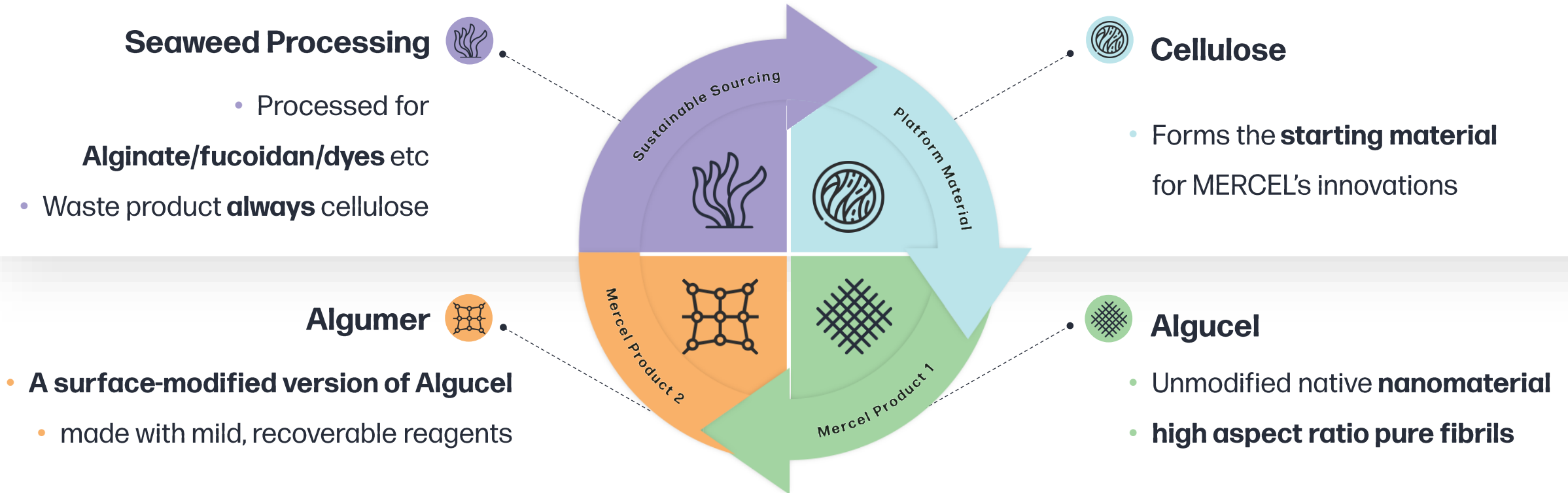
Water soluble **Binder** and coating agent for e.g. pads, wipes, face masks.



PFAS

Forever chemicals due to carbon fluoride bond. Used for water/grease/fire proof coatings.

From Seaweed Waste to Sustainable Polymers.

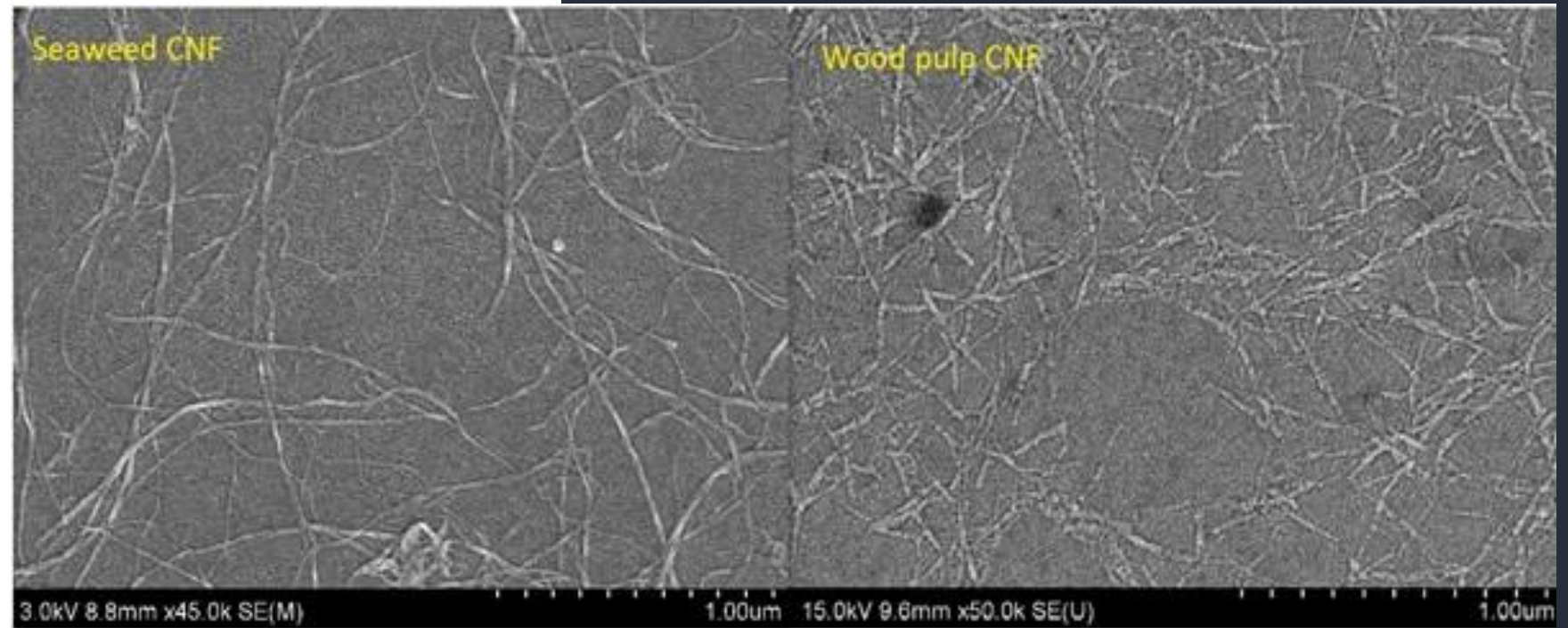


Patent: Method for Producing Surface Modified Nanocellulose Material.
US2024384009A1-2024-11-21

Patent: Methods for Processing Fibrous Cellulosic Material, Products
and Uses Thereof. US2022010489A1-2022-01-13

HIGH ASPECT RATIO FIBRILS

- Aspect ratio 700-1000
- Entanglement within and between fibrils
- Active ingredients encapsulated
- Two core products
 - Algucel (unmodified)
 - Binds lipids and amphipathic molecules
 - Algumer (anionic)
 - Binds cationic molecules



Beyond Sustainability.

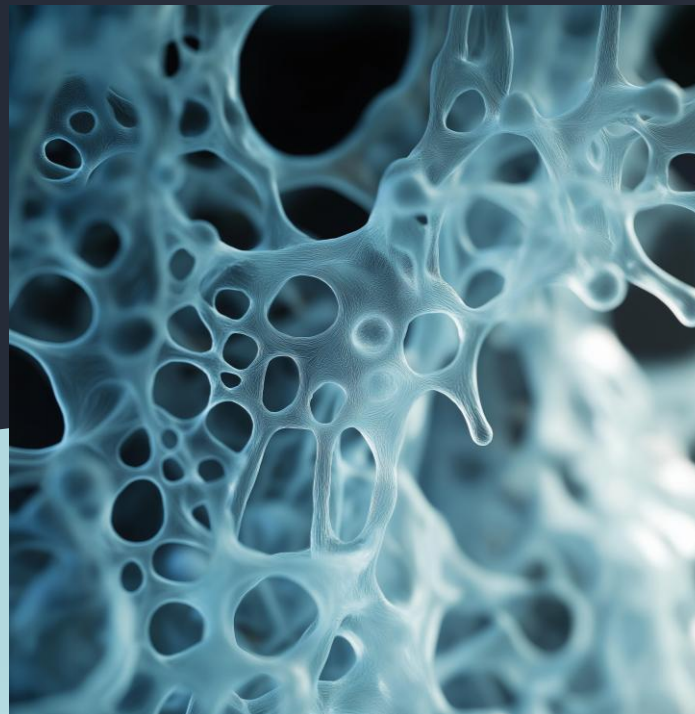
Delivering Added Value Through **High-Performance,**
Multiple Ingredient Replacements.



Algucel

Replaces:

- PVOH in water soluble films
- PFAS in Waterproof coatings
- Carbomers as thickeners
- Plastics for tablets
- Plastic emulsifiers
- Starch
- Microcrystalline cellulose
- Natural gums



Algumer

Replaces:

- Carbomers in sunscreen
- Carbomers in cosmetics
- PFAS in barrier coatings
- Carbomers in drug delivery
- Plastics for fibres
- Plastics for protein immobilisation

Existing Bioplastic Comparison.

MERCEL Products outcompete poor performing natural alternatives to **Microplastics** for many desirable qualities in **Home** and **Personal Care** products.

Contribution to desirable characteristics:

■ Positive
 ■ Neutral
 ■ Negative

	MERCEL's Seaweed Nanocellulose	Bacterial Nanocellulose	Wood Pulp Nanocellulose	Natural Gums
Sustainability	● ● ●	●	●	● ●
Thickening Ability	● ●	●	●	●
Binding Ability	● ● ●	●	●	●
Tactile Qualities	● ● ●	● ●	●	●
Hydration Ability	● ● ●	● ●	●	●
Value End Product	● ● ●	● ● ●	●	●

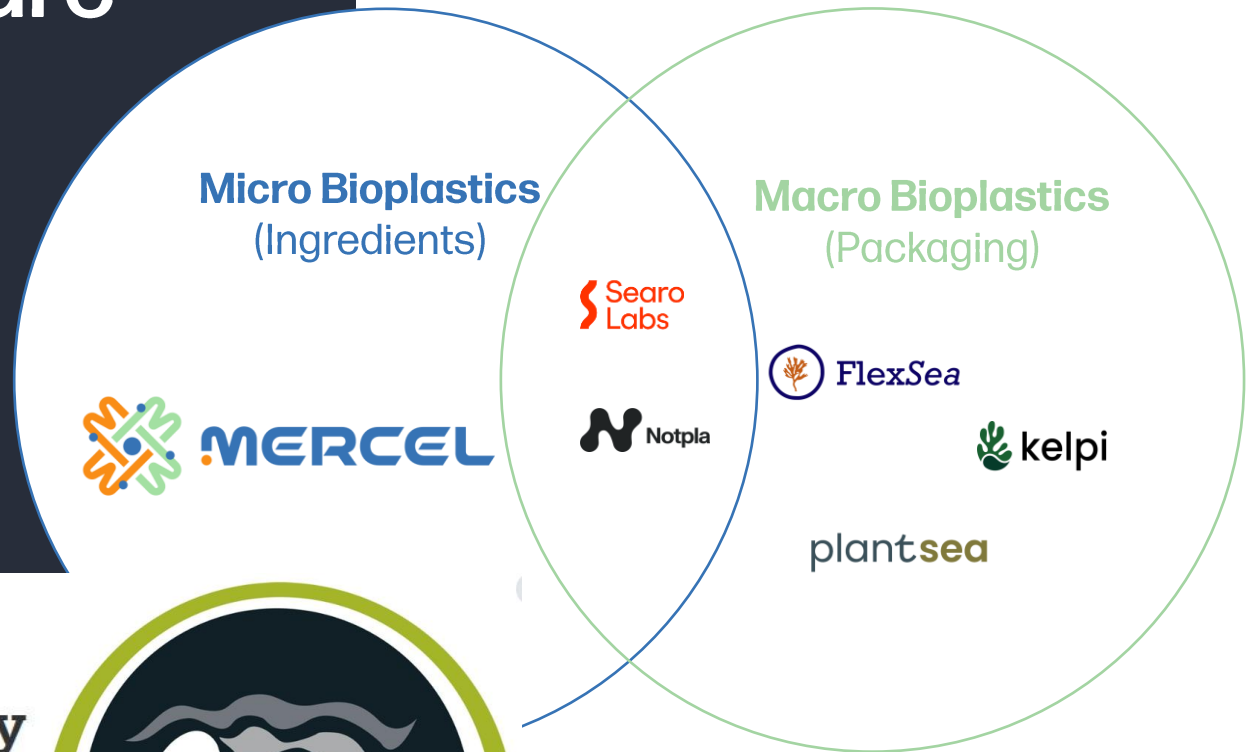
The Cutting Edge in pure natural ingredients.

Low volume, high value applications

Ingredients, not packaging

No competition for primary resources

Just one direct competitor:



SUSTAINABILITY | PROCESSING | SEAWEED / MACROALGAE +5 more

17 October 2025, at 8:30am

Seaweed nanocellulose biorefinery opens in New Zealand

The world's first commercial seaweed nanocellulose biorefinery has opened in Paeroa, New Zealand, promising to make a positive impact on a range of industries while minimising waste.



Example 1: Cosmetics Market

A Premium Share of a £768.8B Beauty Industry.

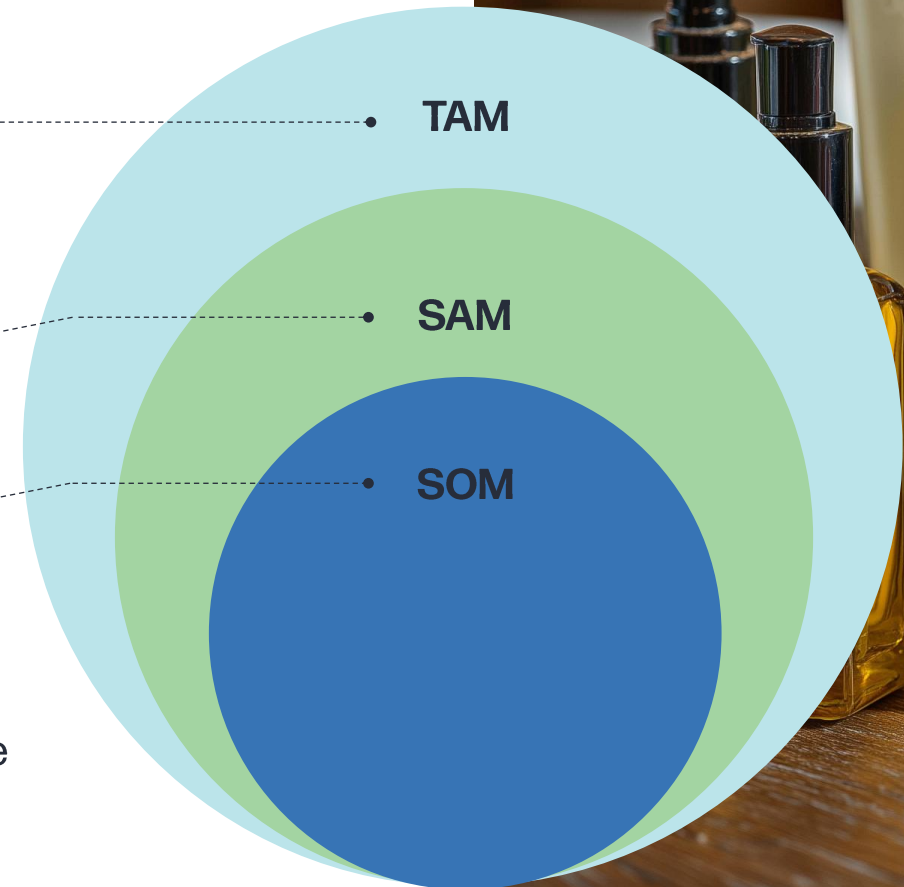
Premium niche focus **aligned to sustainability**
and **clean beauty trends**.

TAM (Total Market) – **£768.6B**

SAM (Serviceable Segment) – **£9B**

SOM (Premium Niche Target) – **10%**

Mercel also targets **growing markets** in other sectors where there
is a **proven use for our products**



Example 2: Water barrier coatings via physical interaction

Physical interaction between nanocellulose
and candelilla wax

Addition of nanocellulose:

- Increases crystallisation temp of wax
- Increases melting temp of wax
- Slows phase transition-
 - no distinct melting point

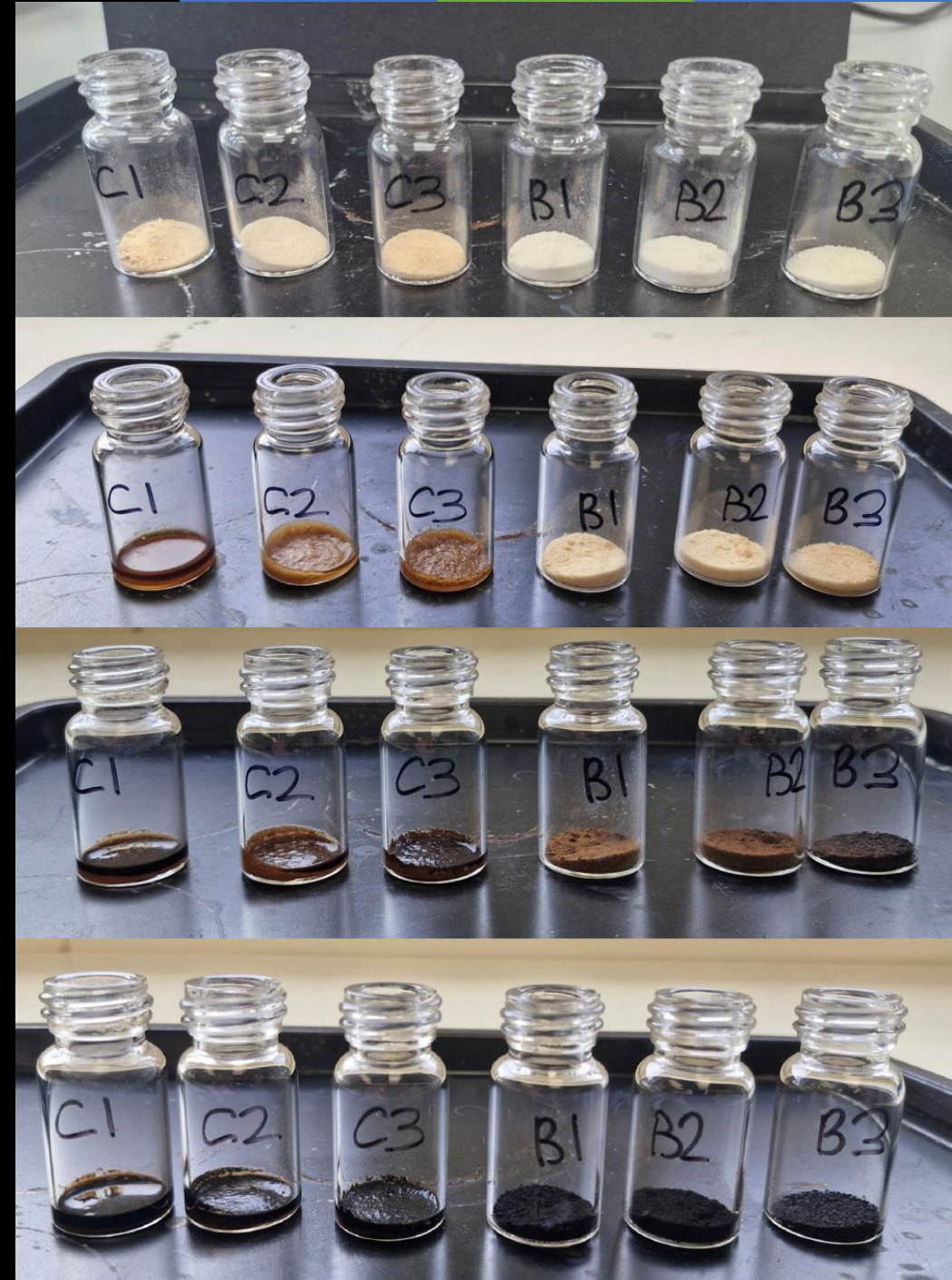


Filter paper before and after coating

Example 2: Water barrier coatings via Covalent esterification

Covalent interaction between nanocellulose
and candelilla wax /beeswax

Images of the products in glass vials before oven heating (top), after heating to 120 °C (second from the top), after heating to 190 °C, (third from the top) and after heating to 250 °C (bottom).



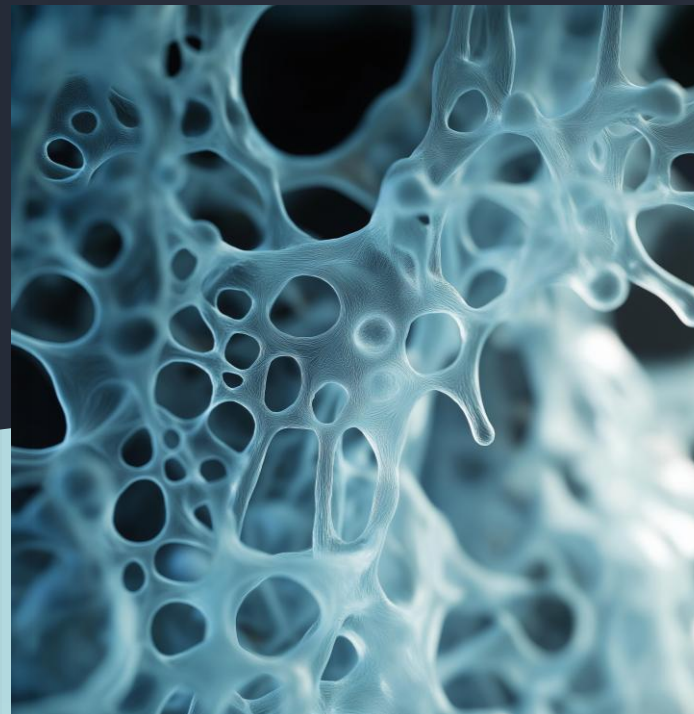
Example 3: Medicines

Superabsorbent polymers, superdisintegrants, transdermal patches/wound care gels



Technical

- Slow biodegradation
- Toxic accumulation
- Disposal
- Soil salinization
- Eco-friendly alternatives from gums/woodpulp
 - Poor performance
 - 1st generation feedstocks
 - Wood pulp derived 10x GWP of fossil fuel plastics



Commercial

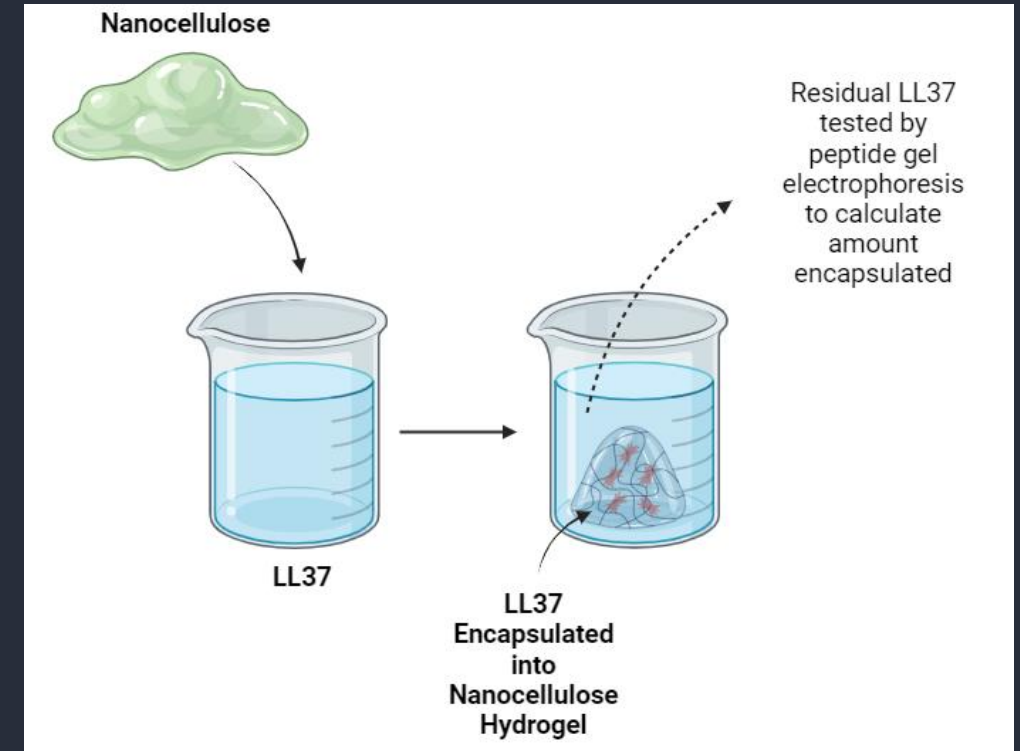
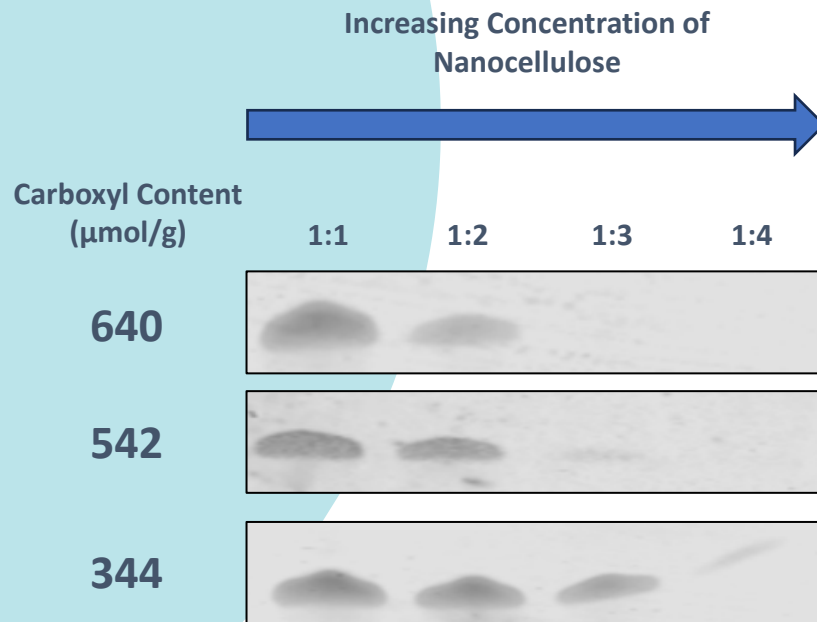
Global SAP market USD 13.2 billion by 2030, CAGR of 6.3%

Global hydrogel dressing market USD 1,209.7 million by 2032, CAGR of 5.5%

Global transdermal patches market \$8.0 billion by 2029. CAGR of 6.5%

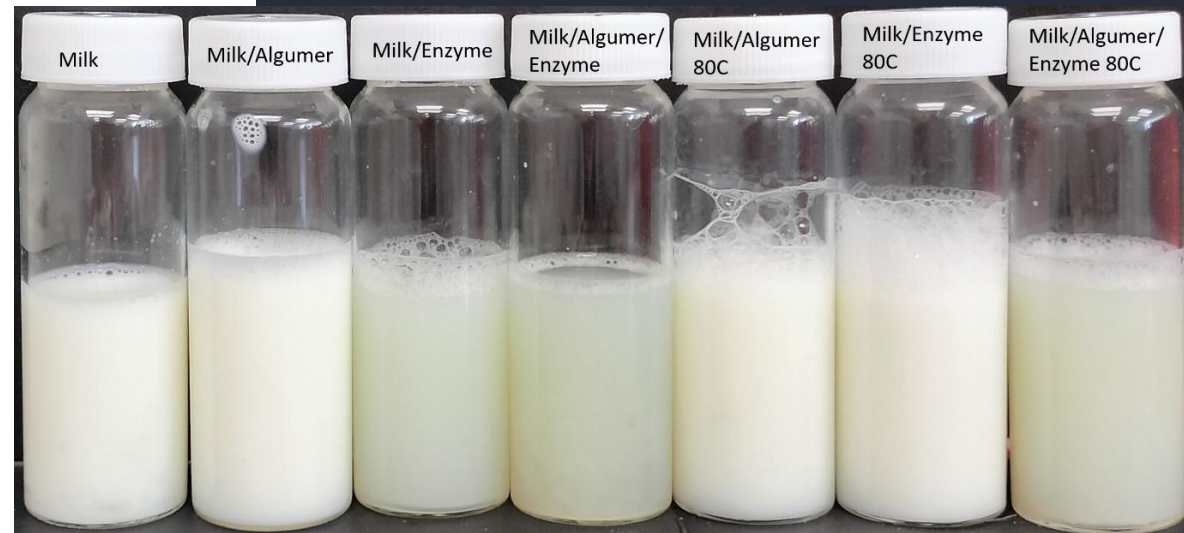
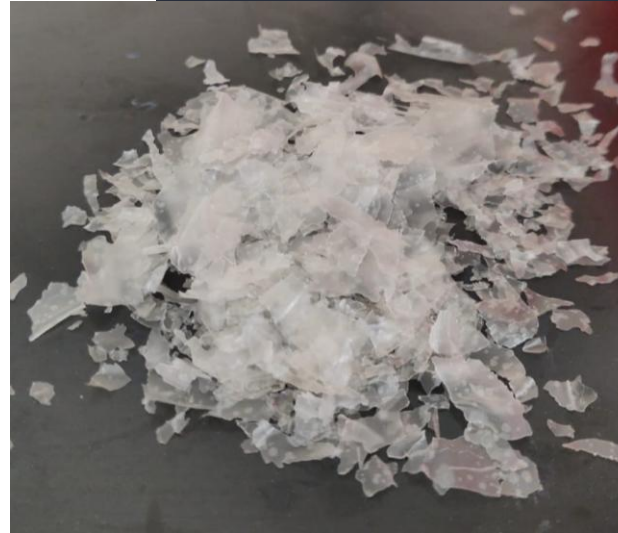
Global superdisintegrants market, USD 769.8 million by 2030, CAGR of 5.3%,

Drug delivery: Therapeutic peptide is encapsulated in a charge dependent manner



Drug delivery: API protection with no cold chain

- Peptides, proteins and enzymes require protection during storage and delivery
- Algumer known to be a good binder and stabiliser
- Algumer has 10x loading capacity of next best cellulose
- Enzyme binding and protection was assessed by blending Algumer with protease enzyme
- Active enzyme will digest the Casein and effect phase separation of the milk
- Allows for storage, transport and delivery of API without cold chain



In summary:



Ingredients not packaging

No whole seaweed products, fractionate into higher value seaweed components, modify using green chemistry for specific applications



Low volume high value

No more than 1% product in final formulation. Target high value applications in cosmetics, coatings and medicines and smaller independents. 10,000 units at high value better than 10 mill at low value.



Regulation-Ready

Provide future-proofed solutions aligned with tightening UK and EU restrictions on microplastics and petrochemical use.

Mercel is always looking for **partners**, from seaweed processors to contract developers.

Please get in touch.





Thanks!

Please contact us for more information.



Address

10 Colinton Road, Edinburgh, EH10 5DT



Email

info@mercel.co.uk



Telephone

+44 (0)131 455 2608