SYNERGIE SKIN
CLEAN SCIENCE

CLINICAL DATA – ALTEROMONAS (SEAWEED) FERMENT EXTRACT

Biomimetic shield against urban pollution & smog
Nature –inspired mechanism

- Unique protective exopolysaccharides.

Multi-protection against pollution:

- Reduces skin adhesive of $PM_{2.5}$
- Chelates heavy metals
- Fights free radical activity
- Decreases hydrocarbon & heavy metal induced damage

Customer benefits:

- Protects and immediately cleans skin
- Fast action in 7 days only!
  - Purifies asphyxiated and dull skin
  - Provides a luminous and healthy looking skin
  - Prevents pollution-induced irritation and premature ageing

Pollution is an increasing worldwide concern!

- 41% of Chinese consumers (20-49 year old) rank pollution as the third-highest concern of their daily life
- 31% of UK women who use facial skincare products use a moisturizer to counter the effects of pollution or the environment on the skin (48% for >65 years old)
- 30% of US facial skin care users worry about the effects of the environment on their skin
- ↑ number of products with anti-pollution claim between 2011 and 2013:
  - +40% in Asia Pacific region (27% products have anti-pollution claims in 2013)
  - +10% in the rest of the world (+60% for cleansing products, +31% in hair care, +22% skin care)

Air pollution is not a trend, it is a reality!

Atmospheric pollution and skin damage:

Alteration of skin barrier:

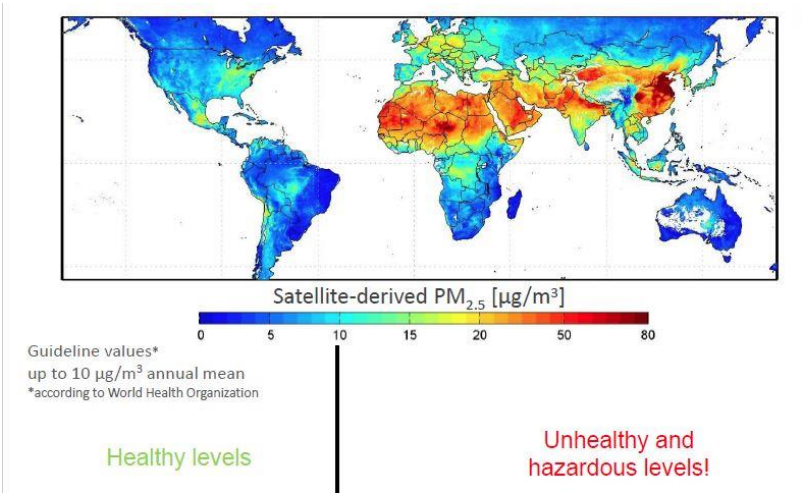
- Dehydration
- Irritation
- Uneven tone
- Dull complexion
- Acne
- Premature ageing

What is $PM_{2.5}$?

- $PM_{2.5}$ = Particulate Matter with a diameter less than 2.5µm (0.0025 mm). They are also known as fine particulate matter or fine particles.
- $PM_{2.5}$ refers to tiny particles and droplets suspended in the air which accumulate to form smog when levels are too elevated.

- $PM_{2.5}$ don't penetrate the skin but influence surface barrier functions causing:
  - Irritation
  - Skin reactivity
  - Skin ageing signs
  - Dryness
  - Uneven tone
  - Dull skin etc

$PM_{2.5}$ worldwide distribution



$PM_{2.5}$: the new battle in the war against pollution

$PM_{2.5}$ as anew trendy-anti-pollution claim!

Alteromonas (seaweed) ferment extract: biomimetic protective exopolysaccharide

- French Polynesia is a group of volcanic islands and atolls located in the Eastern South Pacific.
- Kopara is a unique ecosystem constituted of microorganism mats found along atoll rims and in large ponds inside islets.
- To protect themselves from UV, pH and salinity variations, Kopara microorganisms produce unique exopolysaccharides (EPS) as a protective shield.

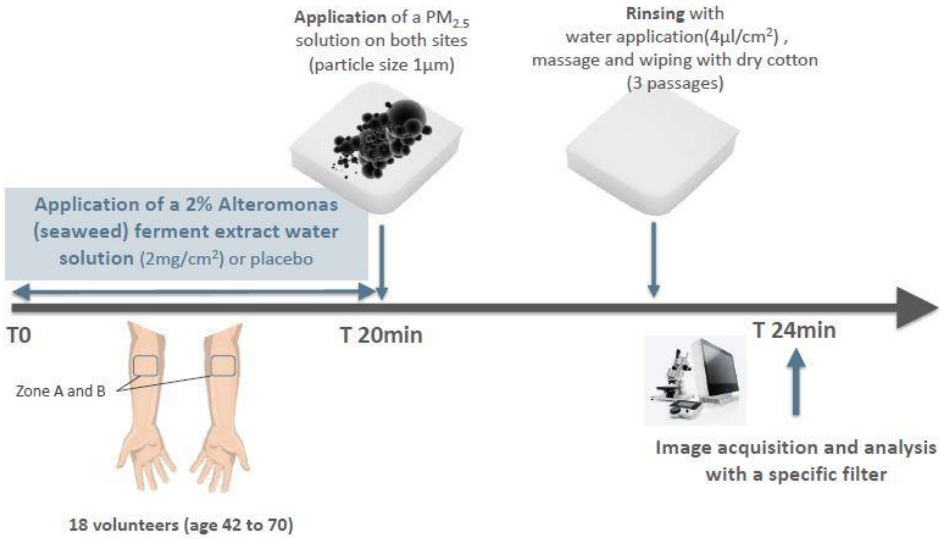
Sustainable ExoPolySaccharides production

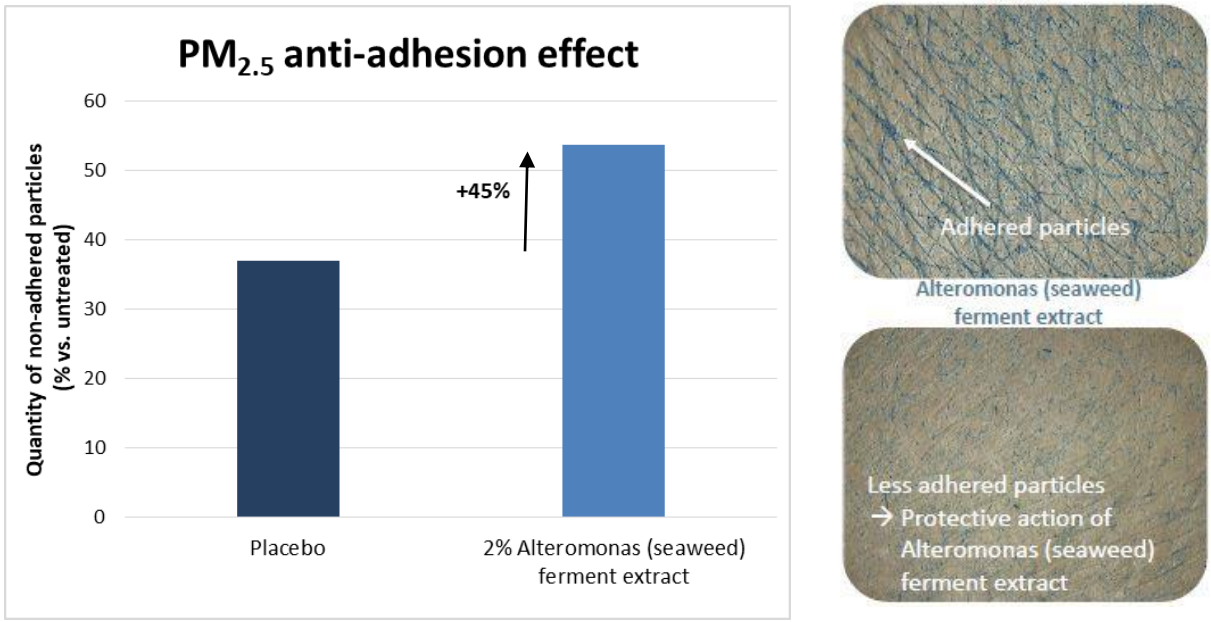
- Exopolysaccharides are obtained through a proprietary blue biotechnology process, which reproduces the Kopara ecosystem without damaging the natural resources and disrupting the biodiversity.
- EPS are produce in French Polynesia to help maintain the local economy.

Clinical studies

PM2.5 protective action (anti-adhesion)

In vivo protocol.

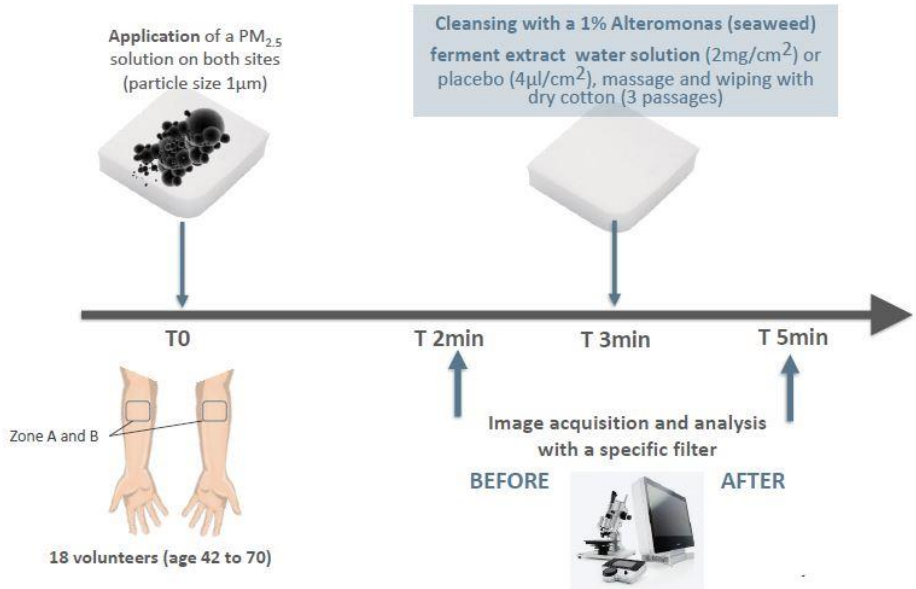


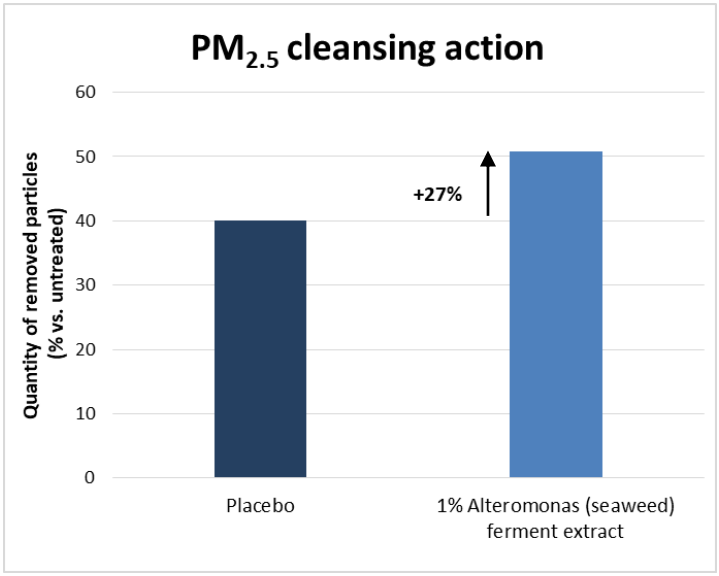


Up to +83% adhesion. 100% positive response.

By creating a film at the surface of the skin, Alteromonas (seaweed) ferment extract decreases the skin adhesion of $PM_{2.5}$ to prevent and reduce pollution-induced damage.

$PM_{2.5}$ cleansing action
In vivo protocol





100% Positive response. Up to +82% cleansing action!

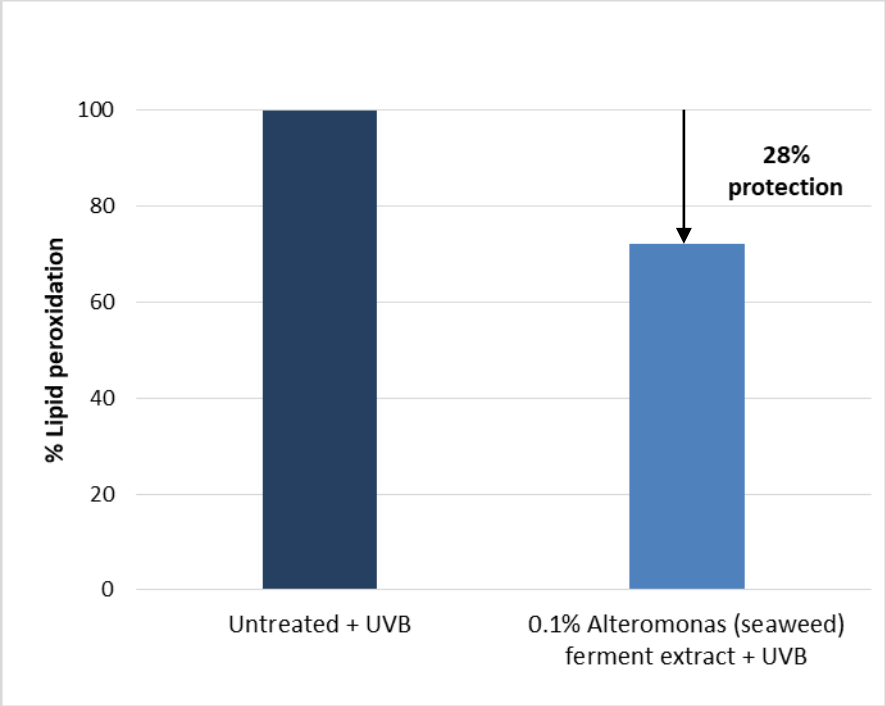
Alteromonas (seaweed) ferment extract forms a mesh able to entrap $PM_{2.5}$ and remove it from the skin surface to prevent and reduce pollution-induced damage.

***In vitro/ ex vivo* studies**

- Reduction in free radical-induced damages
- Chelation of heavy metals
- Protection from hydrocarbon- & heavy metal-induced damages.

Reduction in free radical-induced damages
***In vitro* test protocol**

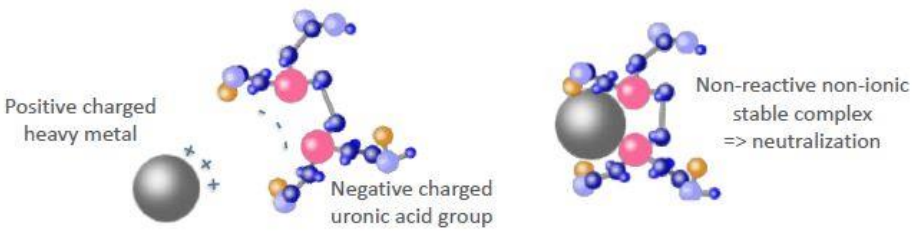
- Human keratinocytes were incubated with Alteromonas (seaweed) ferment extract or positive control (Antioxidant BHA) for 24hrs
- Cells were irradiated with UVB (induction of free radicals)
- Lipid peroxidation was identified with a specific fluorescence probe and quantified by cytometry.



Alteromonas (seaweed) ferment extract protects and prevents skin damage caused by free radicals.

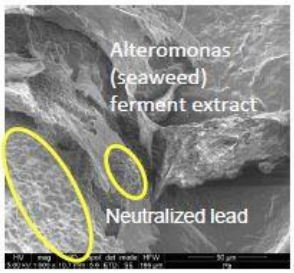
Chelation of heavy metals

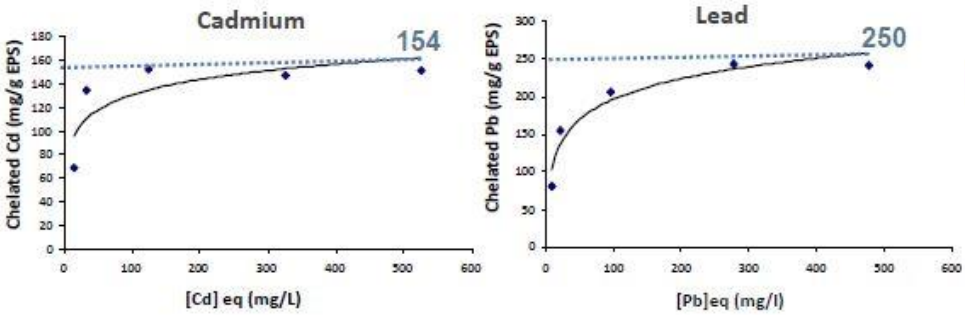
- Heavy metals are metallic chemical elements highly reactive due to their ionic charge. They are natural component of the Earth's crust and cannot be degraded or destroyed.
  - Lead (Pb), Cadmium (Cd), Arsenic (As), Mercury (Hg), Nickel (Ni).
- Chelation is the neutralisation of heavy metals by ionic binding (attraction between a negative and positive charge). Chelation properties of Alteromonas (seaweed) ferment extract are the due to the presence of 25% uronic acids (gluconic and galacturonic acids) => interaction between metal cation and negative charge of acid functional groups of EPS.

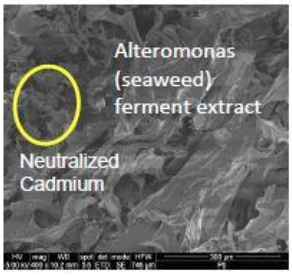


Chelation of heavy metals
In tubo test protocol

- Water solution with 5% Alteromonas (seaweed) ferment extract was incubated for 3 hours under agitation in the presence of 0.3µg/mL of cadmium (Cd) or lead (Pb).
- After 3h, the concentration of the different metal was measured by flame atomic absorption spectrometry (FAAS) in order to determine the chelation capacity of Alteromonas (seaweed) ferment extract.

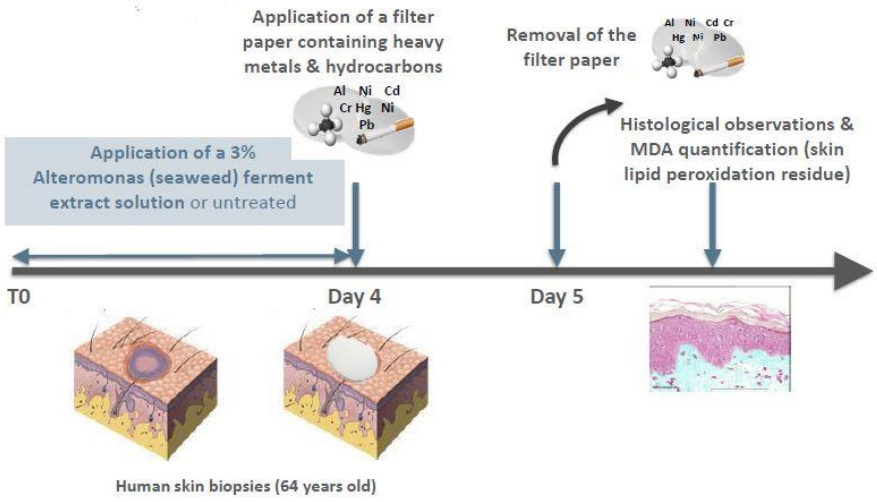




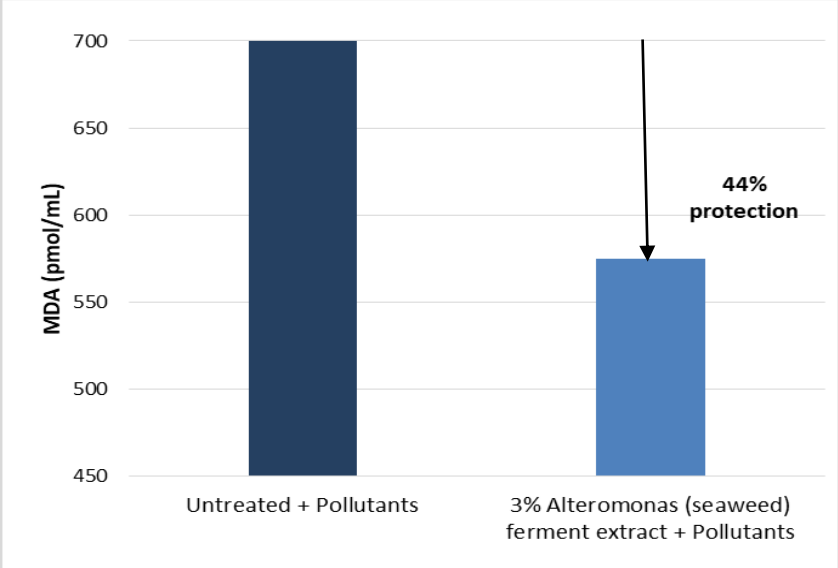


Alteromonas (seaweed) ferment extract neutralises heavy metals to reduce the skin toxicity.

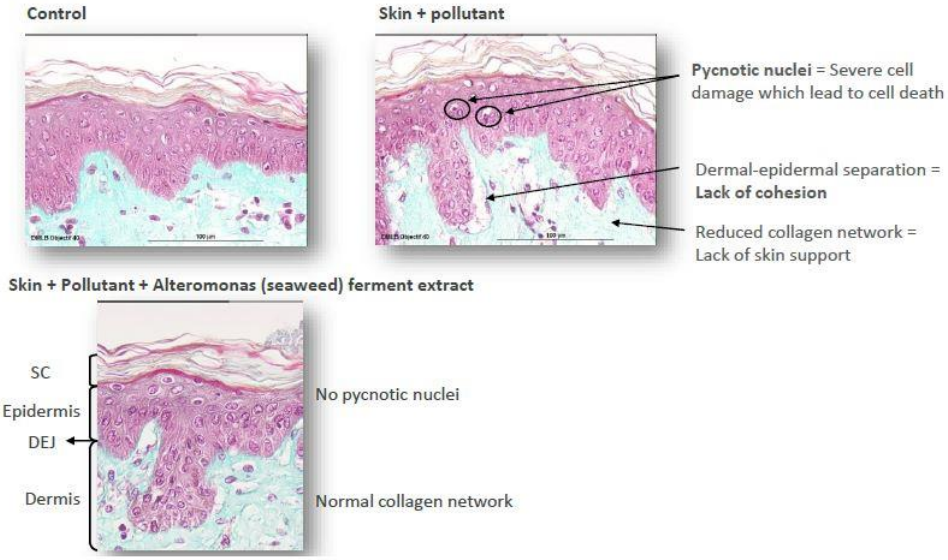
Reduction in hydrocarbon- & heavy metal-induced damages
Ex vivo test protocol



Alteromonas (seaweed) ferment extract reduces the production of MDA by 44% under urban pollution conditions.



Alteromonas (seaweed) ferment extract protects skin and cells against urban pollution to prevent premature ageing and irritation.



Alteromonas (seaweed) ferment extract preserves cell integrity and improves dermal-epidermal cohesion to prevent premature skin ageing.

Consumer test
Anti-pollution consumer test
Test Protocol

- 57 consumers (aged 30 to 50) living in a polluted city (mainly Paris) – 50% are smokers (29 out of 57)
- Application of a cream with 2% Alteromonas (seaweed) ferment extract 2X/day during 7 days.

Positive Opinion	%
Improvement in skin dullness	82%
Resistance to external aggressions	82%
Moisturising effect	80%
Shielding effect	79%
Protection from pollution	77%
Healthy looking skin	77%
Luminous skin tone	74%
Improved adaptation to climatic changes	73%
Prevention of skin irritations	70%

Alteromonas (seaweed) ferment extract provides luminous and healthy-looking skin in only 7 days.