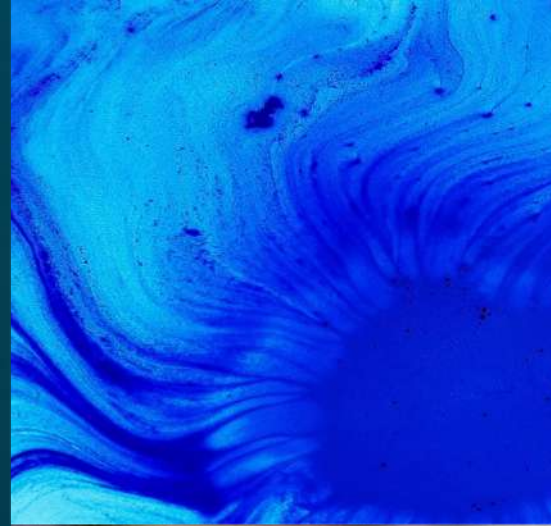




Pi Nyvall, PhD
Head of Scientific Affairs

18 June 2026- Seagriculture, Göteborg, Sweden



From academy to industry:
30 years of seaweed research



Seaweed can save the world... but not alone!

- **90% of global seaweed volume** comes from only **20 species**. The **discovery potential** is huge—within those 20 and across all the others
- A natural & renewable resource that must be **used responsibly**
- Growing agricultural markets, growing need for **seaweed education**
- Continue characterizing bioactive compounds and proving field performance—this requires sustained **investment in fundamental and applied R&D**
- Develop balanced regulations to protect the resource, ensure sustainable use, and support global market growth

My Seaweed Journey from academic to applied research

- **Master's in Biology**
Uppsala University, Sweden
Limnology and Plant Physiology
- **Research Internship**
University of California Santa Cruz, USA
Molecular methods in algal research
- **PhD – Plant Physiology**
Stockholm University, Sweden
Starch metabolism in red algae
- **Postdoctoral Research**
University of São Paulo, Brazil
Gracilaria transcriptomics
- **Researcher (2001–2011)**
Roscoff Biological Station
Algal cell wall polysaccharides and enzymes
- **Head of R&D → Scientific Director →
Head of Scientific Affairs**
Olmix Group



Steering Board member:



Scientific board member:



30+

Years of seaweed research

60+

Published scientific papers

8

Patents filed

10

Supervised PhD theses

Member – French Academy of Agriculture

OLMIX - A strong international presence across all continents



*Clear international footprint
Selling products across the 5 continents*



HQ & Main Production site



Raw materials:

- Trace elements
- Clays
- Seaweed
- Yeasts
- Wood chips



Activity sectors :

- Plant care
- Animal care



Innovation
Value-added solutions
Sustainable agriculture



900+
Employees

3,800+
Clients

4
R&D Centers

41
Subsidiaries

9
Industrial sites

100+
Countries covered

Seaweed: Natural resources fostering innovation

Today

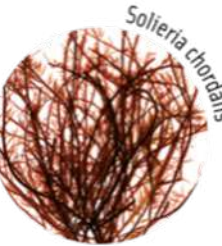
Wild algae harvest



GREEN
ALGAE



RED
ALGAE



BROWN
ALGAE



Tomorrow

Algae cultivation



Reduced impact

- Biosourced resources
- Local production
- Green processes
- Strain selection
- Concentrates
- Ecoconception
- Agricultural needs
- Scientific evidence
- Industrial partnerships

Guaranteed raw materials traceability
Qualified analytical methods
Guaranteed efficacy

Our expertise: biotechnology



Research & Development platforms dedicated to innovation based on active ingredients extracted from seaweed, yeast and wood



- Laboratories for the extraction of active ingredients
- Laboratories for the characterization of our extracts
- Pilot installations for extraction and process innovation
- Formulation laboratories

 **30**
patents families

Close to
 **10%**
employees dedicated



Our R&D partners



Research & Development : Driver of Olmix innovation

R&D challenges & opportunities

3 pillars to take into account for seaweed valorization, with associated opportunities & challenges



R&D Selected Collaborative projects

Major Research Projects

ULVANS (2012–2015)

[BPI France]

First seaweed biorefinery in France. Proof of concept for large-scale green seaweed valorization. Foundation of the MSP® extraction chain.

ALGOLIFE (2015+)

[ULVANS follow-up]

Refinement of active molecule extraction. Development of animal and human health applications.

H2020 GENIALG

[European Commission]

Pan-European seaweed biorefinery & genetics project. Strengthened Olmix's scientific credibility at the European level.

FUI STUDIMA / SAGA / PROSEAWEEED

[EU & French agencies]

Collaborative R&D networks. Contribution to regulatory pathways and standardization of seaweed-based products.

Olmix Seaweed Biorefinery

A bio-refinery technology in constant improvement

2002 - 2011

2 000 T/year (project Eureka)

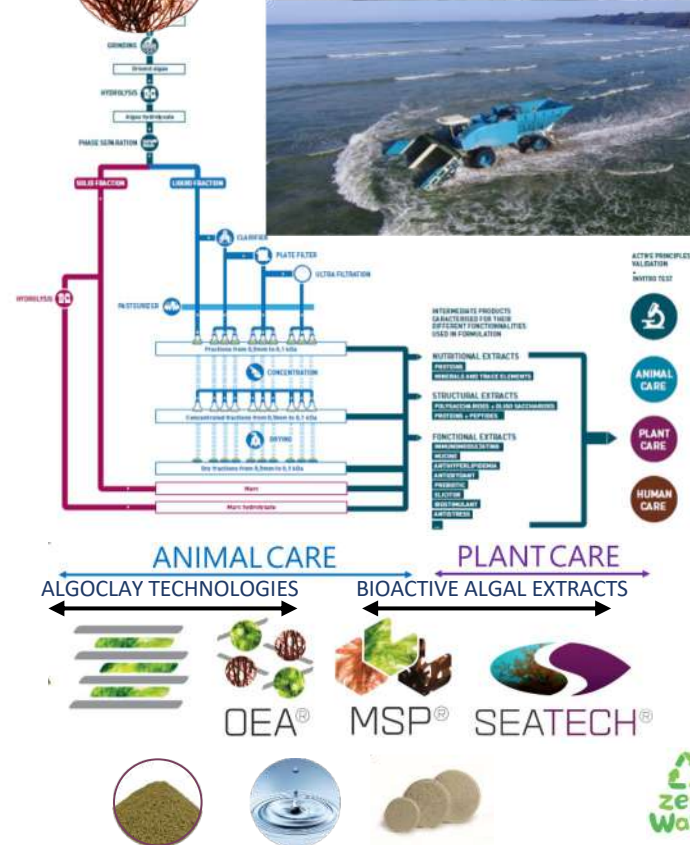
One main extractive technology
One main product



2012 - 2017

5 000 T/years (project ULVANS)

Seaweed biorefinery
Multiproducts



2018 -

10 000 T/years (project GENIALG)

Seaweed biorefinery
Multiproducts



OLMIX UNIQUE KNOW-HOW

BIOREFINERY: UNIQUE PROCESS 100% OLMIX DESIGNED
– FROM SEA to FINAL PRODUCT

HARVEST
EXTRACTION
COMPLEXATION

FULL CONTROL OF SUPPLY CHAIN

Proteus project

PROTEUS: Flagship Project to establish the world's first Industrial scale biorefinery for brown seaweeds

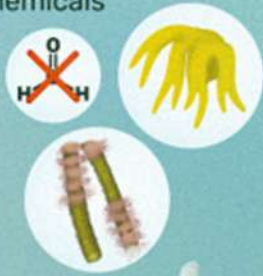


PROTEUS IN A NUTSHELL



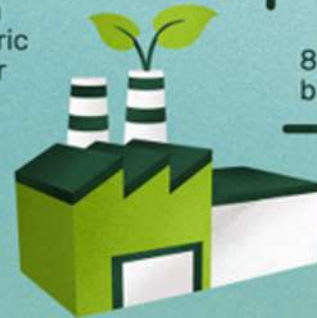
PROTEUS: a streamlined *L. hyperborea* supply chain utilising 100% of kelp biomass

No chemicals used



Harvest separated into leaf and stipe on vessel

Short hops with rapid diesel-electric hybrid harvester



Alginate



To alginate value chains

15% of biomass

85% of biomass



Kelp powders



Fucoidans



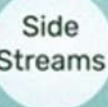
Kelp extracts



Cellulose



Kelp fibres



Side Streams



Multiple new biobased value chains

First fully integrated industrial biorefinery for brown seaweeds

Scientific proof of activity and mode of action

Strong collaboration with

INRAE



Scientifically proven mode of action *in vitro*

INRAE (Pig model)

IPEC-1 Cells and HEK293 –TLR4, 5, 9, NOD1, NOD2)

Direct contact

Modulation of mucosal immune response *in vivo*

Author's personal copy

J Appl Physiol
DOI 10.1007/s10811-016-0822-7



Marine-sulfated polysaccharides extract of *Ulva armoricana* green algae exhibits an antimicrobial activity and stimulates cytokine expression by intestinal epithelial cells

Mustapha Berri^{1,2} · Cindy Slagocki^{1,2} · Michel Olivier^{1,2} · Emmanuelle Heloin^{1,2} · Isabelle Jacques^{1,2} · Henri Salmon^{1,2} · Hervé Demais³ · Matthieu Le Goff⁴ · Pi Nyvall Collén⁴

Received: 8 January 2016 /
© Springer Science+Business

Abstract An aqueous extract, prepared from the was tested as an antibacterial strains and isolates found positive and Gram-negative. The most susceptible pathogen was *Mannheimia haemolytica*. *Staphylococcus aureus*, an inhibitory concentration of 6.25 mg mL⁻¹. *Enterobacter dysgalactiae*, *Corynebacterium*, *Bordetella bronchiseptica* with a complete inhibition of 50 mg mL⁻¹. The stimulation of the host's gut with the system of differentiated polyploid (1). RT-qPCR analysis showed expression of cytokines and TGFβ as well as the significantly induced transcription factor



Ulvan from *Ulva armoricana* (Chlorophyta) activates the PI3K/Akt signalling pathway via TLR4 to induce intestinal cytokine production

Mustapha Berri^{a,*}, Michel Olivier^a, Sébastien Holbert^a, Matthieu Le Goff^d, Pi Nyvall Collén^d

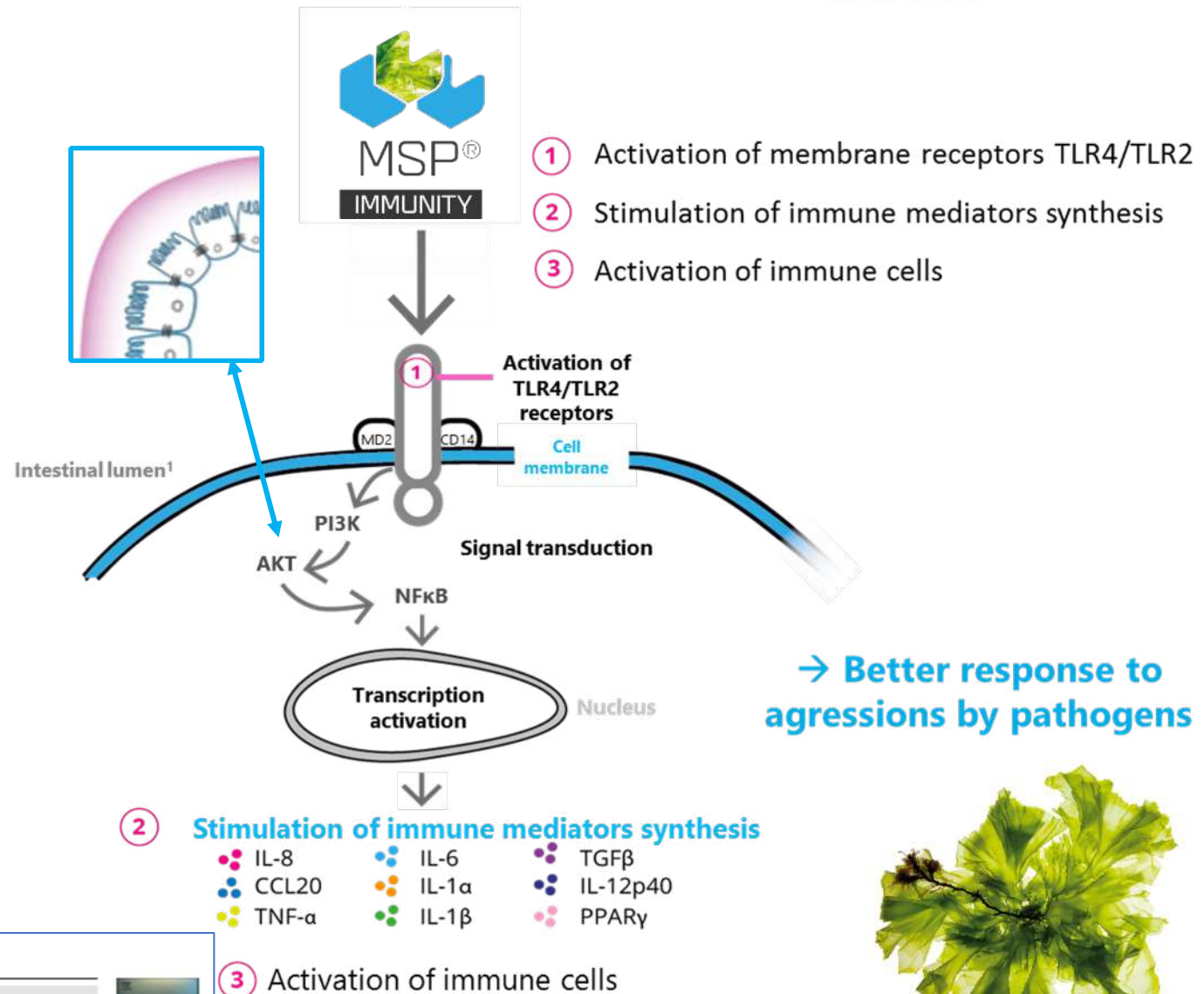
^a INRAE, UR1213, Université de Tours, 37200, Nozay, France
^b UMRI1253, Physiologie de la Reproduction et des Comportements, Nozay, France
^c Bioréacteur, 1 Rue du Livin, F-54500, Malzeville, France
^d Anses, UR1213 "Pôle Biotechnologique" du Haut du Bois, F-54500, Malzeville, France

ARTICLE INFO

Keywords:
Algae
Ulvan
Intestinal
Epithelial cells
Immunomodulatory
Cytokines

ABSTRACT

The biological activities of ulvan as bioactive molecules from the green algae *Ulva* the immune response of HEK293 cells and ELISA analysis showed CCL20, IL-8, and TNFα. Ulvan, ulvan was found different signalling pathway ulvan-treated HEK293-TL nuclear factor-κB. Inhibited enhancement of IL-8 secretion



Immunomodulating effect of a seaweed extract from *Ulva armoricana* in pig: Specific IgG and total IgA in colostrum, milk, and blood

Frederick Bussy^a, Le Goff Matthieu^a, Henri Salmon^b, José Delaval^c, Mustapha Berri^d, Nyvall Collén Pi^{d,*}

^a Anses, ZA du Haut du Bois, 54500 Malzeville, France

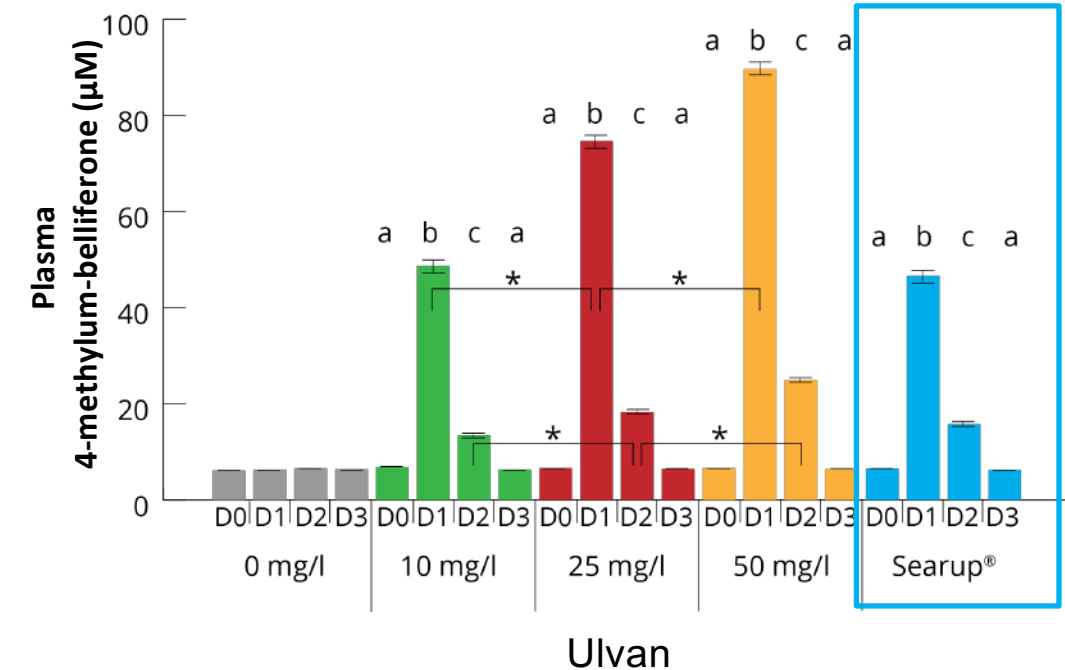
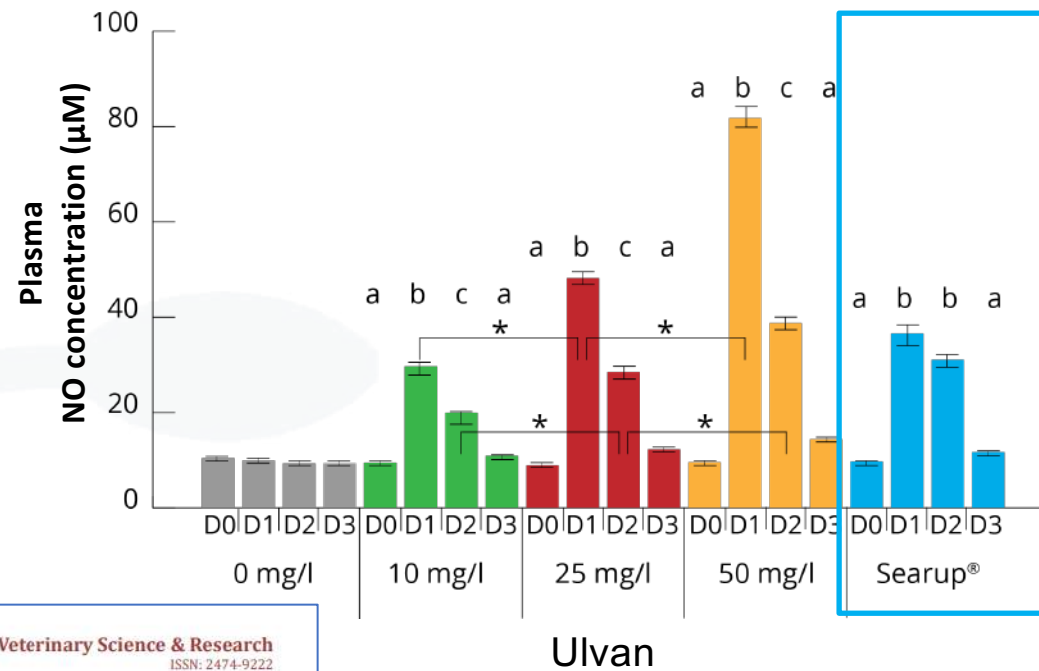
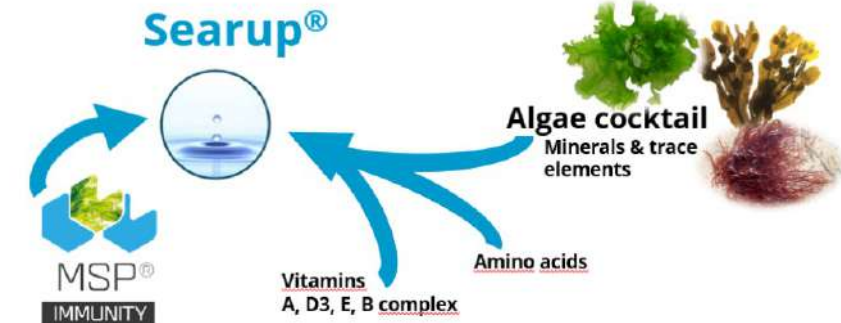
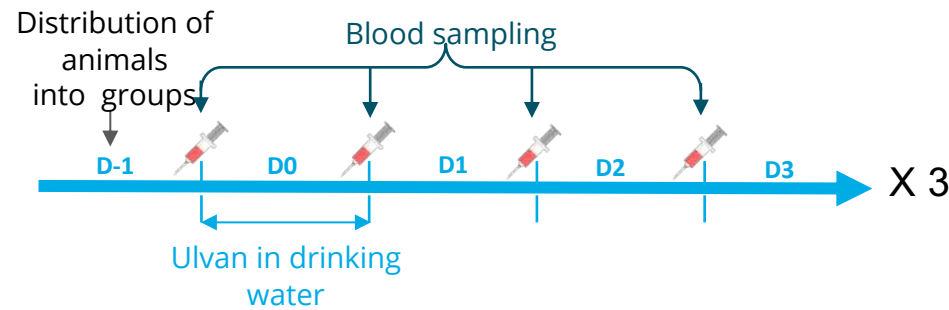
Performance demonstration

Strong collaboration with



Results

IN VIVO



Open Access Journal of Veterinary Science & Research
ISSN: 2474-9222

Activation of Heterophils and Monocytes in Chicken with a Formulation Containing a Seaweed Extract from *Ulva armoricana*

Guriec N¹, Bussy F^{2,4*}, Gouin C^{2,4}, Mathiaud O³, Le Goff M^{2,4}, Delarue J¹ and Nyvall Collén P^{2,4}

¹Department of nutritional sciences, University Hospital, Faculty of medicine, University of Brest, France

²Amadeite SAS, France

³R&D Breish, France

Research Article

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Performance demonstration of actives and products

In each target species



For each formulation

- Proof of concept
- Mode of action
- Stability of the activity
 - Over time
 - During heat treatment
 - In the formulation
- Analytical prediction of activity
- Microbiological stability
- Physicochemical stability

Agronomic efficacy and experimentation guidances

- **Biostimulant projet on finished products and active ingredients** since 2021 :
 - **267 GEP microplots trials** at EU level
 - **All crop groups**
 - **With GEP CROs** : Eurofins Agrosience Services, Staphyt...
 - **5 certifications already obtained** (first certifications and label extensions) on claims NUE, Quality traits and Abiotic stress tolerance



Cormin SW



SEADRY®

Focus on CORMIN SW certification :

- **22 GEP trials** since 2022
- **Claims NUE** and **Quality traits**
- France, Greece, Romania, Bulgaria and Hungary
- **Broadacre crop groups** : wheat, barley, and potato
- **Fisher design** with 4 to 8 replicates

R&D Selected Achievements

MSP® Technology & Biorefinery

Development of the unique extraction process for Marine Sulfated Polysaccharides (MSP®) from green (Ulvan), red (Carrageenans) and brown (Fucoidans) seaweeds.

Immunomodulation & Animal Health

Scientific proof that MSP® activates innate immunity (TLR2 / TLR4 pathways). Basis of the Algimun, Searup and ASEAD products. Published in partnership with INRA.

FOR VET

DigestSea®
Improves digestive functions



- Stimulates digestion
- Improves digestive and renal functions
- Protects the liver

Searup®
Reinforces natural defenses



- Improves resistance to stress
- Supports vaccination programs

SeaLyt®
Decreases digestive troubles and rehydrates



- Reduces digestive troubles
- Rehydrates
- Stimulates the water intake

SeaGut®
Ensures digestive welfare

SeaGut® Paste
For newborn piglets



- Limits digestive troubles

SeaGut® Powder
For suckling piglets



- Protects the digestive tract
- Increases weaning weight

SeaBiota®
Ensures digestive welfare of PW and finishing pigs



- Reduces digestive troubles

Diet
Naturally regulates the digestive system of young ruminants



- Reduces digestive troubles

DIGESTIVE EFFICIENCY

IMMUNITY

DIGESTIVE WELFARE

Plant Biostimulants

Scientific basis of Agroptim Lagoon. European biostimulant certification (PCF6, 2023). Yield gains of +5–13% (rapeseed / sunflower). Net farmer benefit: €60–80/ha.

Key figures: Plant Care



Turnover of
35M€



170
employees



5 patents



A worldwide company
presents in

40
countries:

Asia, Europe, and South
& Central Americas

Sales by market segment

81%

Agriculture

12%

Turf and
landscape

7%

Ingredients



More than **250**
customers
for 95% of sales

Certifications:



CERTIFICATE
of quality assurance of the production process according to Regulation 2019/1009 EU

Key figures: Animal Care



47 patents



Academic & scientific partnerships all over the world



Turnover of
100M€



500
employees



Worldwide presence
in over

100
countries:

Asia, Europe, MEA and
North & South
Americas



Dedicated offers in all species (swine, poultry, ruminants, aquaculture and pets)

Certifications:



FAMIQS

FSSC 22000





TEAM RESEARCH & SCIENCE



Thanks!



14 June 2026

pnyvall@olmix.com

