CODIF
Technologie naturelle

# EARLY BOOST

## SOURCING & PROCESS

# MANUFACTURING FLOW CHART

Culture of Jania rubens in photobioreactor

Harvest and drying of Jania rubens

Extraction in water

Filtration

Addition of glycerin

Addition of preservative

Sterilizing filtration

Addition of hydrolyzed sodium carrageenan

## HTAC

PATENTED TECHNOLOGY

Sodium carrageenan

Controlled depolymerization by HTAC (HydroThermolysis ACcelerated by supercritical CO2)

Patent application number: 1656186 30 June 2016

Obtention of hydrolyzed sodium carrageenan.

### EARLY BOOST PE

49.2% glycerin
48.7% water
0.5% jania rubens extract
0.6% sodium carrageenan
0.9% phenoxyethanol
0.1% ethylhexylglycerin

### EARLY BOOST PA

49.2% glycerin
48.7% water
0.5% jania rubens extract
0.6% sodium carrageenan
1% phenethyl alcohol

# STARTING MATERIAL: JANIA RUBENS

Scientific name: jania rubens
Part used: whole alga
Is it a protected specie? no
Country of origin: France
Area of origin: Brittany

## HISTORICAL SOURCING

First harvest/identification: isolated and purified by E.Gasparotto (Codif International) in 2006
Specific story linked to its identification: cultivation method initiated from 1mm purified fragment
Is the specie concerned by Nagoya? no

## CULTIVATED RAW MATERIAL

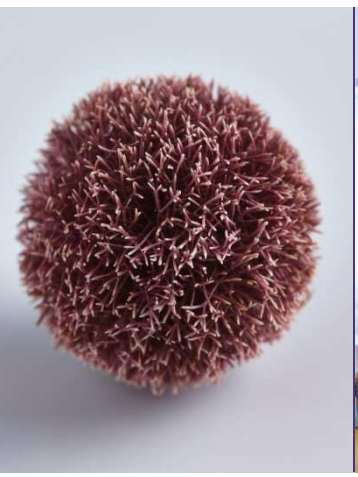
Cultivation method: culture in photobioreactors
Exclusive to Codif? yes
Cultivation surface area: photobioreactors capacities from 500L to 750L
Periodicity of the culture: all year long
Seasonality of culture and number of harvest per years: all year long
Harvest method (handmade, specific tools?...): not relevant
Is there a control of waters or ground quality? Culture medium mainly composed of filtered seawater
Conditioning after harvest: drying
Any certification linked to the grower: ISO14001

## TRANSFORMATION TECHNOLOGY

Fed-batch cultures in photobioreactor with daily supply in specific nutriments. After extraction with water, the extract is supplemented in glycerin to stabilize the complex during the addition and the solubilisation of the carrageenan.

### Benefits of the culture in photobioreactors

- Preservation of the perenity of the alga Jania rubens in nature
- Preservation of the ecosystem supported by Jania rubens in nature
- Constant quality and purity of the raw material
- Management of secondary metabolites production like taurine



## ORIGIN OF SODIUM CARRAGEENAN

Obtained from the alga Furcellaria lumbricalis

Scientific name: Furcellaria lumbricalis
Part used: whole alga
Is it a protected specie? no
Country of origin: Estonia coast-Scandinavian surrounding sea area
Area of origin: near Saaremaa Island

### HARVESTED RAW MATERIAL

Harvested method: gill-netting
Exclusive to Codif? no
Seasonality and number of harvest per years: variable
Is there a control of waters or ground quality? Harvest authorization delivered by Estonian Environment Minister and quality of algae controlled by the National Health Department.
Conditioning after harvest: natural drying (air and sun)
Any certification linked to the grower: authorization delivered in accordance with preservation of natural resources.

### OBTENTION OF SODIUM CARRAGEENAN

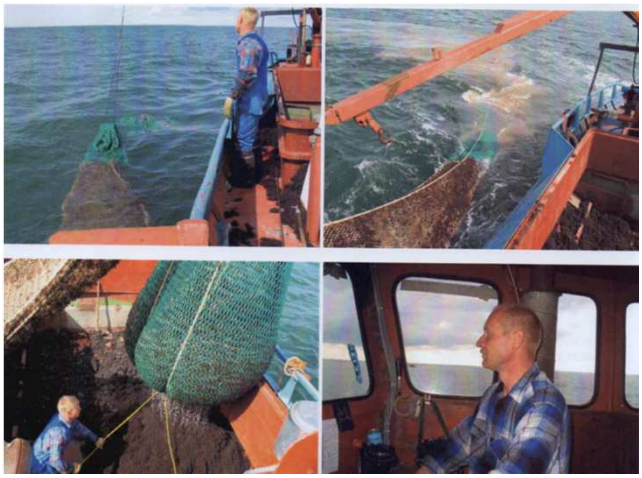
Water extraction

Quality control: the supplier is audited by Estonian Veterinary and Food Office http://www.vet.agri.ee/?op=body&id=315 according to HACCP.

## TRANSFORMATION OF SODIUM CARRAGEENAN

PATENTED TECHNOLOGIE HTAC: HYDROTHERMOLYSIS ACCELERATED BY SUPERCRITICAL CO2,
Sodium carrageenan is added to subcritical water enriched with supercritical CO2,
Supercritical CO2 gives subcritical water acid characteristic. Once acidified by supercritical CO2, subcritial water promotes the depolymerization of sodium carrageenan.

This technology ensures fine depolymerization, with very high reproducibility rate, and without any wastes rejected in environment.



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