



ALPHA CHITIN

MOLECULE FOR LIFE



MANUFACTURER OF CHITIN-CHITOSANS

BIOBASED CHEMISTRY

Alpha Chitin is a chemical company working from bioresources. All our products are from bioproduction. Our credo is the absolute traceability and repeatability of our chitosan. We quickly realized that in order to fully meet our objective, we needed to have total control over our bioresources, how they are grown and how they produce chitin. We are therefore vertically integrated, from the bioresource to the finally refined chitosan.



CHITOSAN INNOVATION

A Unique Process. Very innovative extraction and purification processes for chitin. Chitosan meeting the upmost criterion.



CHITOSAN QUALITY

Full Traceability. Our final products will absolutely match your own criteria for quality and manufacturing application.



CHITOSAN EXPERTISE

Bespoke specifications and final products. Bespoke products, any specification possible. The whole value chain can be audited.



For a better control
of your quality
& source of
CHITOSAN



A UNIQUE PROCESS

Alpha Chitin bioresources are grown on a diet (*Hermetia Illucens* larvae and fungi) developed by us or prepared specifically (Antarctic krill shell) to avoid seasonality and provide stability over composition and chitin content. Our extraction chemistry has been developed to remain simple, REACH compliant, compatible with an end-product that can be certified as "Natural".

To maximise this chemistry efficiency, Alpha Chitin has developed some specific process machines:

- A bioreactor for our larvae that can be built, operated and maintained in all places around the world, allowing the same control over diet and larvae growth,
- A production system for our fungi that provides a purer chitosan and a better control over its final molecular weight,
- Laminar flow reactors for a less damaging extraction process for our chitin,
- A very innovative rinsing system for our chitin that improves its purity by an order of magnitude,
- An extremely fast, very efficient endotoxin and allergens deactivation system coupled with a drying system
- A molecular weight adjustment device, purely mechanical, that enables us to propose the tightest specifications worldwide over control of molecular weight distribution. Allows us to go down to the oligosaccharide.
- A fast and less damaging system to deacetylate (transforming chitin into chitosan), providing a better control over deacetylation rate ranges.

All systems and chemistries are proprietary to **Alpha Chitin**. They are resulting from 6 years of development in larvae growth and maximization of chitin, 6 years of development to fine tune chemistries and the related chemical engineering, and nearly 3 years by now to optimize the growth of our fungi and its chitosan content and purity.

ALPHA CHITIN BIORESOURCES



INSECT *Hermetia illucens*
Non-invasive species
Present on all continents
Not vector of disease
No known pathologies
Very wide food spectrum



CRUSTACEAN Antarctic Krill
Wild animal
Innovative fishing method,
less invasive and monitored



PLANT Mycelium
Plant substrate breeding
Vegan

OUR NATURAL RESOURCES



Alpha Chitin, from the early stages of our existence, has always been keen on bringing to market a solution for chitosan production that can be sustainable and with a better overall environmental footprint. On top of this, we wanted to have a granular solution for us to propose a non-limited production capacity to bring chitosan to the top list of potential industrial molecules as a game changer. These are the reasons why we went for alternative solutions to shrimp shells for our chitosan processes.

Hermetia illucens larvae

They are grown on a specific diet for all cosmetic, pharmaceutical and medical grade chitosan. They can be grown on a diet issued from circular economy for industrial/agriculture, textile and food grade. Our diet is adjusted every day for our larvae to maximise their chitin content. Adjusting diet and growth control will also help us deciding whether we produce high or medium molecular weights. All larvae productions are maximised as we also value the oil and the frass produced, along with the chitin.



Antarctic Krill

Krill harvesting is a very controlled operation. Our supply partner has developed a harvesting technology that is very different from conventional trawling, and they only trap krill and not the fishes that are bigger than krill. Overall yearly capture is limited to 4% of the existing measured resource and the number of harvesting permits are limited. Krill shells used to be sent back to the sea after having taken the protein and the oil. They are now prepared specifically for us to provide a better chitin extraction stability over the harvesting season.



Fungi

Alpha Chitin has worked on developing a strain that allows sufficient chitosan production while minimizing other polysaccharides content. We have developed internally the growing process and its optimization. The diet we use to grow them is issued from circular economy for 2/3rd of its content. Fungi based chitosan is 100% vegetal and can be Vegan certified. Our fungi is grown specifically for chitosan production and is not issued from another manufacturing process, for a better traceability and control.



All our bioresources are medicine free, heavy metals free. All diets used for our pharmaceutical / medical / cosmetics and food grades are non GMO and are prepared for us under our control. These diets can be certified Organic on demand.

For a better control
of your source
& quality of
CHITOSAN

Very high to low MW
High purity endotoxin free
Total traceability of the batches
Repeatability of production
Formulation on demand



BESPOKE SPECIFICATIONS

Chitosan is biodegradable, bioactive, biocompatible and non-toxic. Its activities, microbiostatic, bacteriostatic, fungistatic and anti-oxidant make it useful in multiple biotechnological applications in human and animal health, cosmetics, industry and the environment. **Alpha Chitin** chitosans, from all 3 biore-sources, can undergo the molecular weight reduction and control program, adjustment of deacetylation rate, production of nanocrystals and nanofibrils, or basic functionalization in our premises.

LARVAE

Chitosans issued from larvae can reach very high molecular weight. We can typically produce 1400 kDa chitin if required. Larvae chitosan is mainly amorphous. It makes it perfect for some hydrogels or for all fiber applications. It is also the easiest to purify and the only one where we can reach purity levels above 98%. Colour is beige to very light brown, mainly due to its amorphous state that diffracts light differently from a crystalline chitosan.

KRILL

Krill chitosan is medium size molecular weight after extraction (between 400 to 650 kDa). Purity ranges between 95 to 98%. It is extremely white because its crystallinity index is around 95% (hence a particularly good light diffraction). This remarkably high crystallinity makes it perfect for all applications where nanocrystals are the best option (tissue engineering).

FUNGI

Fungi based chitosan is a 100% vegetal chitosan. It can be Vegan certified. Molecular weight below 150 kDa (we are working on an option to reach 200 kDa). Purity levels lower than animal based chitosan as mycelium produced is a mixture of polysaccharides, and they all react nearly equally to purification and separation processes. We reach higher than 90% chitosan content though and all impurities remaining are only polysaccharides. Slight yellow as final colour, as the crystallinity index ranges between the ones of krill and larvae chitosans.

Alpha Chitin has developed different biomasses to produce a wide range of chitosans with different specifications and applications. Thus we offer solutions adapted to medical, pharmaceutical, industrial and environmental applications.

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CHITOSAN

R&D RESEARCH AND DEVELOPMENT

CUSTOMER FOCUSED R&D

We will help you choose the product that is most suited to your application. We can even propose a final chitosan that is a simple functionalized product.

Alpha Chitin continuously works in improving our processes, or providing new solutions for our customers:

- We can propose "low-cost chitosan" solutions for specific agriculture applications or industrial grade products.
- We can investigate basic functionalization of our chitosan for applications in pharmaceutical, medical or cosmetics industries.
- We are undergoing a program development to provide solutions for fiber manufacturing with chitosan, either directly into the fiber or as function added.
- We keep on working on improving purity and molecular weight obtained from our fungi process.

«We are working with our customers in finding a technical and financial solution for you to use chitosans at a large scale. We are the world expert for chitosan as a resource. We propose chitosan solutions.»

Jerome DELAY
Co-Founder & CEO
Alpha Chitin



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