

# Shark Cartilage Powder

*A natural product with anti inflammatory properties*

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## Quality & Safety profile

Waitaki Biosciences shark cartilage powder sets the standard for purity and quality. Every step of the production process is controlled from the source to the client.

### Source

Waitaki's pure freeze dried shark cartilage powder is derived from shark species caught in New Zealand waters, utilising a resource already harvested for its meat. New Zealand is recognised as a world leader in fisheries management, ensuring the long-term sustainability of this resource. No endangered species are harvested from New Zealand's coastal waters. All commercial fishing operations are managed under a quota management program.

### Standardisation

Conversion of the raw material occurs at our purpose built factory. Freeze drying retains the integrity of the product ensuring that the finished product retains all of the natural components less the water. . The superior handling and processing regime is reflected in the consistently low odour and microbial counts. It is therefore not necessary to employ microbial sterilization steps such as irradiation, chemical or heat treatments.

### Freedom from Contamination

Waitaki's shark cartilage powder is routinely tested for heavy metal residues by an independent accredited laboratory. Levels are consistently below the limit of detection and meet overseas regulatory standards. Low contaminants are indicative of the species of sharks from which Waitaki derives this product, the pristine coastal waters of New Zealand.

### Packaging

Waitaki's Shark Cartilage is packed into heat sealed laminated foil bags with an additional polythene liner that is all contained within an export grade corrugated cardboard carton. All cartons are appropriately labelled to meet regulatory requirements.

### Licensed Manufacturer

Waitaki factory is fully licensed with the New Zealand Food Safety Authority. As such, the facility complies with HACCP and ISO9002 quality systems The processing plant is subject to regular independent audits by NZFSA to verify compliance of premises and processes to meet overseas market access requirements.

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## Indications for use and supporting research

Shark cartilage has been in use since around 1950,s as a treatment of inflammation, as a natural analgesic and as a natural remedy for reduced mobility and discomfort of the joints. Anecdotal reports suggest consumers have derived relief from a wide range of other symptoms such psoriasis.

### 1. Shark Cartilage and Angiogenesis

The rationale behind the use of shark cartilage as a therapeutic agent is connected to its ability to inhibit angiogenesis.

Angiogenesis is a complex process of new blood vessel formation, which is central to normal development and homeostasis. However, uncontrolled angiogenesis plays a critical role in both inflammatory and neoplastic disorders.

In 1997, scientists working at the Wellington School of Medicine in New Zealand were able to show for the first time that not only did shark cartilage contain a factor that reduces new blood vessel formation, but that this factor can be absorbed in an active form when taken orally in the diet.<sup>1</sup>

In 1998, *DuPont et al* were also able to demonstrate anti-angiogenesis activity of a shark cartilage extract<sup>2</sup>. These researchers also found that the shark cartilage extract had anti-inflammatory properties when applied to the forearms of subjects.

It was not until recently however, those researchers were able to demonstrate this anti-angiogenic effect of shark cartilage in human subjects<sup>3</sup>. *Berberi et al (1999)*, were able to demonstrate an anti-angiogenic effect of orally administered shark cartilage extract as measured by mean endothelial cell density of perforated silicone tubing threaded with a polyvinyl alcohol sponge inserted subcutaneously on the anterior side of the arm of healthy male volunteers.

### 2. Further Research

The isolation and identification of the active compounds in shark cartilage is continuing in the scientific community. It is known however that both the protein fraction and the chondroitin sulphate have crucial roles in the control of inflammation and pain and the inhibition of blood vessel growth.

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*The information provided in this brochure has not been evaluated by the USA Food and Drug Administration.*

<sup>1</sup> Davis et al, *Inhibition of Angiogenesis by oral ingestion of powdered shark cartilage in a rat model*, *Microvascular Research* 54, 178-182 (1977)

<sup>2</sup> Dupont E et al, *Anti-angiogenic properties of a novel shark extract: potential role in the treatment of psoriasis*. *Journal of Cutan Med Surg* 2(3):146-152 (1998).

<sup>3</sup> Berbari P et al, *Anti-angiogenic effects of the oral administration of liquid cartilage extract in humans*. *Journal of Surgical Research* 87(1):108-113 (1999).

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## Technical & Manufacturing profile

Waitaki's pure freeze dried shark cartilage powder is derived from shark species caught in New Zealand waters, utilising a resource already harvested for its meat and fins.

### 1. Typical Specification

- Description	Free flowing fine white powder
- Purity	100%
- Mesh (US Standard)	80 mesh
	<i>(Other mesh sizes can be manufactured to order)</i>

### Proximate analysis

- Loss on drying	1 - 5%
- Fat	1 - 2.5%
- Protein	35 - 45%
- Ash	45 - 52%
- Carbohydrate	7 - 15%

### Specialised analysis

- Glycosaminoglycan <i>(as chondroitin sulphate)</i>	4-12%
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### Microbiological analysis - Total aerobic count

- (cfu per gram @35°C for 48 hrs)	NMT 5.0x10 <sup>4</sup>
- Escherichia coli (mpn / gram)	< 3
- Clostridium perfringens (cfu / gram)	< 10
- Staphylococcus aureus (cfu / gram)	< 10
- Salmonella (per 25 gram)	Absent

### Heavy Metals

- Mercury	< 5 ppm
- Arsenic	< 10 ppm
- Lead	< 5 ppm
- Solvent residue	No solvents used
- Shelf Life	3 Years. Store at room temperature (+10°C to +30°C) in sealed containers. Once opened use immediately or reseal.

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### Technical & Manufacturing profile (cont.)

#### 2. Manufacturing Waitaki Shark Cartilage Powder

Manufacturer	Waitaki Biosciences International Ltd. 320 Port Hills Road Christchurch New Zealand
Licensing / certification body	NZ Food Safety Authority (NZFSA)
NZ Food Safety Authority license number	PH3
Approved Supply Premise for Export	Yes

#### Method of Preparation

- Process description for shark cartilage powder
- Shark cartilage raw materials sourced from export licensed commercial fishing company (fish is kept under refrigeration / ice prior to landing at a licensed fish processing premises)
- Fish meat is removed for commercial use and cartilage is then block frozen in cartons at a minimum of -18°C
- Non-cartilage proteins removed.
- Particle size reduction.
- Freeze drying under a 24 hour cycle until less than 5% moisture remains.
- Product unloaded from dryers into airtight bags
- Product is milled to <150 microns using filtered air to keep the product flowing and cool

All processing is carried out in accordance with HACCP principles and under an approved process by the NZ Food Safety Authority (NZFSA). All processing parameters are maintained at levels to prevent microbial contamination. The final product is tested for microbial contamination on a batch by batch basis to ensure product complies with health standard. All commercial shipments of product are accompanied by NZ Food Safety Authority (NZFSA) signed health certificates. Trade samples may not need to be accompanied by a health certificate.

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### Nutritional profile

Shark cartilage powder been widely used as a natural anti-angiogenic. It is also a rich source of minerals and collagen. It contains appreciable levels of a range of bio-molecules and minerals making it an ideal product to address a range of health concerns

#### Active Ingredients

Shark cartilage is comprised primarily of proteins and complex carbohydrates known as glycosaminoglycans (GAG's). It is one of these GAG's, chondroitin sulphate, the predominant GAG in shark cartilage that is responsible for its health benefits.

One of the other major constituents of shark cartilage powder is the collagen protein, which is also the subject of further research to understand its role in the activity of the product in conjunction with the GAG.

About 40% of the powdered product is made up of proteins, with GAG's from 4% - 12%. Levels are dependant on the species harvested under sustainable quota managed fishing program.

The third major constituent of shark cartilage powder is the ash component (about 45% - 52%). Calcium which comprises about 15% of the dry powder and phosphorous, which is about 8%. This product has been utilized extensively as a source of minerals.