

Effective Joint Nutrition from Pure  
New Zealand Greenshell™ Mussels

**PernaTec**™  
GREENSHELL MUSSEL POWDER



**WAITAKI  
BIOSCIENCES**  
A DIVISION OF PHARMAZEN LIMITED

**PernaTec™**

powder is made using sustainably farmed New Zealand native Greenshell™ mussels.

## Naturally Occurring Bioactives

PernaTec™ stabilised Greenshell™ mussel powder from Waitaki Biosciences is a rich source of naturally occurring bioactive compounds. These bioactives provide the combined benefits of anti-inflammatory, chondroprotective and gastroprotective properties for effective, natural joint nutrition, without side effects.

Harvested from the pristine New Zealand marine environment, this totally natural ingredient utilises the goodness of the whole mussel.

Stabilisation of PernaTec™ with a proprietary anti-oxidant blend ensures maximum efficacy is achieved and maintained in the finished product

## Marine Omega 3 Fatty Acids

The lipid portion of Greenshell™ mussels is rich in polyunsaturated fatty acids (PUFA) particularly the long chain Omega 3 fatty acids EPA and DHA.

Omega 3's from marine sources have been extensively researched and have been found to be effective in a range of conditions including inflammatory disorders such as arthritis and in helping to reduce cardiovascular disease risk factors. Freeze drying the mussel flesh to create PernaTec powder concentrates the naturally present omega 3 oils, creating a product with anti-inflammatory activity that helps to alleviate joint pain and discomfort in a totally natural way.

**10% TOTAL FAT**

## PernaTec™ Manufacture

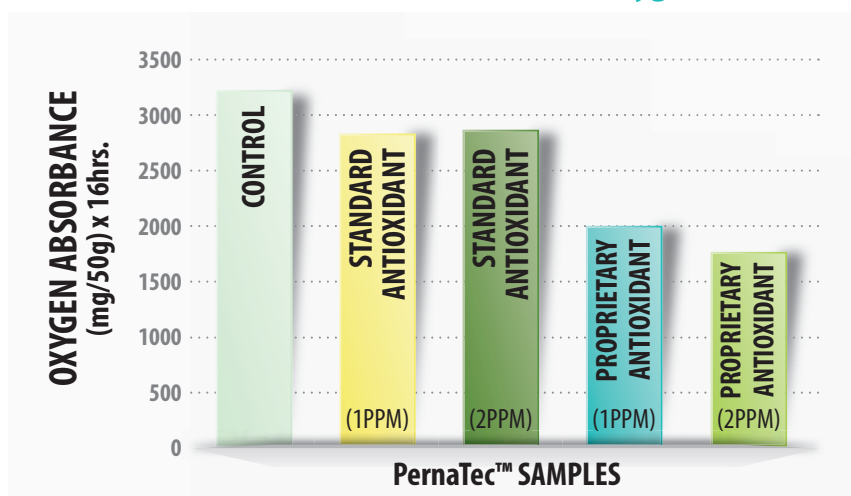
PernaTec™ is made using a 100% New Zealand natural raw material source, Perna canaliculus, a New Zealand native shellfish species which is sustainably farmed by sophisticated aquaculture techniques.

PernaTec™ is manufactured in New Zealand at Waitaki Biosciences purpose built, fully export licensed processing facility. It is here that the stabilisation of PernaTec™ is achieved through a combination of low temperature freeze drying and specialised pre-processing application of a highly effective proprietary anti-oxidant blend. Unlike other stabilisation techniques, which tend to take place later in the production process, this approach protects sensitive Omega 3 oils throughout manufacture and storage of PernaTec™ powder, ensuring maximum efficacy is maintained in the finished product.

## PernaTec™ Oxidative Stability

To help us confirm the effectiveness of our stabilisation process we evaluated both stabilised and non-stabilised material using specialised equipment to perform an oxygen bomb test. In addition we tested the efficacy of the material in an anti-inflammatory assay.

### Oxygen bomb test

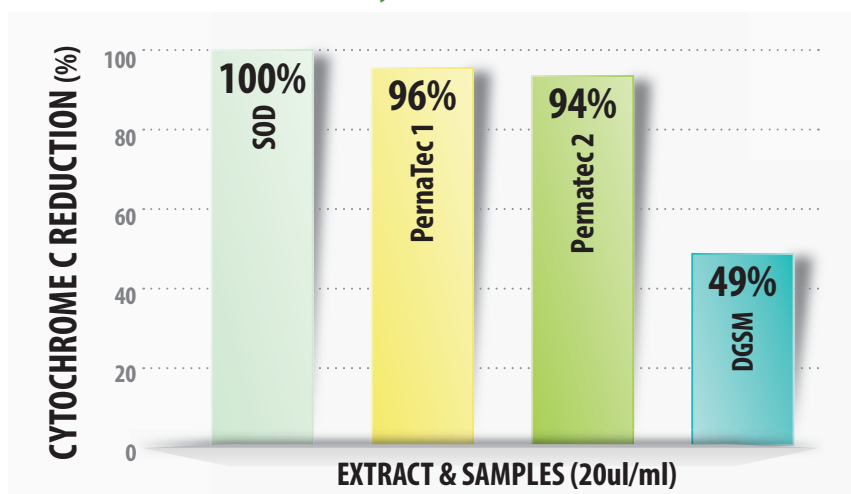


Measurement of oxygen absorbance in the Oxygen bomb test demonstrated a 42% improvement in oxidative stability, as measured by reduction in oxygen absorbance of PernaTec™, compared to the non-stabilised control Greenshell™ mussel powder. PernaTec™ also showed superior oxidative stability compared to mussel powders stabilised with standard anti-oxidants.

### Anti-inflammatory testing in the human neutrophil activation assay

To demonstrate the anti-inflammatory activity of PernaTec™, product samples were tested in an in-vitro model of inflammation.

#### PernaTec™ shows superior levels of anti-inflammatory activity (Inhibition of Cytochrome C reduction)



In this assay, the level of superoxide production, is measured by Cytochrome C reduction during the human neutrophil respiratory burst (inflammatory response).

In the presence of PernaTec™, cytochrome C reduction is inhibited (relative to the controls) demonstrating that PernaTec™ has an anti-inflammatory effect by inhibiting cellular superoxide production.

PernaTec™ was also found to be superior in its superoxide inhibition to a mussel powder sample with the lipid fraction removed (DGSM).

# Greenshell™ Mussel Powder Research

Supported by over 30 years of research, Greenshell™ mussel (GSM) powder has come to be recognised as one of the most effective natural anti-inflammatory agents available on the market today. This is due to the combination of several bioactives working synergistically together in naturally occurring quantities.

Essential Omega 3 fatty acids naturally present in GSM and a unique phosphorylated glycogen inhibit the formation of pro-inflammatory compounds, helping to reduce inflammation and providing a degree of pain relief<sup>1,2</sup>.

Glycogen has also been shown to inhibit the mobilisation of neutrophils to the site of inflammation<sup>3</sup>.

The glycosaminoglycans, including chondroitin sulphate, contained in genuine GSM powder play a role in cartilage regeneration by increasing synthesis of structural proteoglycan. Clinical studies have demonstrated that GSM has beneficial effects on people with both rheumatoid and osteoarthritis following oral consumption and there is also evidence that GSM may contribute to the growth of new cartilage in damaged joints<sup>4,5</sup>. Studies have also shown the benefits of GSM supplementation in improving clinical signs of arthritic disease in dogs and horses.

## PernaTec™ Profile

<b>Raw Material:</b>	New Zealand native Greenshell™ mussels (Perna canaliculus)
<b>Physical Characteristics:</b>	< 1000 and < 200 micron tan to green coloured powder
<b>Total Fat:</b>	10%*
<b>Total Omega 3 Fatty Acids:</b>	3%*
<b>Total Protein:</b>	≥45%
<b>Packaging:</b>	25kg net weight foil laminate bag in lined carton

\*Typical Values

## PernaTec™ Advantages

- Natural anti-inflammatory and anti-oxidant ingredient
- Omega 3 oils in PernaTec™ powder are protected with a carefully selected anti-oxidant blend
- Suitable for a range of human and pet nutraceutical formulations
- Raw material is sustainably farmed using sophisticated aquaculture techniques
- Non GMO

1. Slim G., Health effects of mussel extracts. Proceedings of the NZ Mussel Industry Council Ltd. Research Workshop. 1999;4-11.

2. Miller TE., et al., In vivo evidence for prostaglandin inhibitory activity in New Zealand greenlipped mussel extract. New Zealand Medical Journal. 1984;97(755):355-357.

3. Miller TE., Anti-inflammatory activity of glycogen extracted from perna canaliculus (NZ green-lipped mussel). Agents Actions 38, 1993, Special Conference issue:139-142.

4. Gibson, R., et al., Perna canaliculus in the treatment of arthritis. The Practitioner Clinical Trials, 1980; 224: 995-958.

5. Kendall RV., New research and a clinical report on the use of perna canaliculus in the management of arthritis. Townsend Letter for Doctors and Patients. 2000; July; 99-111.