



## A history of the New Zealand CO<sub>2</sub> supercritically extracted green-lipped mussel oil

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*In the 1960s, NASA commenced investigating and then analysing foods which had been surrounded by folklore and myths. NASA was searching for foods that may also have nutritional and medical benefits for the astronauts during their space missions. The diet of the coastal Maoris, the original Pacific Islanders of New Zealand, had already been observed to include green-lipped mussels and was thought to contribute to their low incidence of inflammatory disorders. This initiated the first mussel powder products produced from the variety, *Perna canaliculus*, to appear on the nutritional supplements shelves during the 1970s.*

Before going further, let us establish why the oil from the NZ *Perna canaliculus* is so unique. Firstly, the mussels are harvested from ocean fed pristine waterways which are protected under Marine Nature Park Regulations. Secondly, the lipids found in the green-lipped mussel are especially rich and efficacious due to the combination of mussel “genetics” and

“diet”. The mussels in the NZ waterways feed on a special variety of subarctic plankton which is rich in antioxidants designed for protection against the extremely high levels of ultraviolet radiation. The ozone holes above NZ have forced the plankton aquaculture to evolve to protect themselves with powerful anti-inflammatory compounds. The mussels, in turn absorb these protective mechanisms when they ingest the plankton. The mussel becomes a storage location of these unique protective fatty acids.

Today, we have a significant body of scientific evidence including 26 clinical trials, to show that the oil of the New Zealand green-lipped mussel is safe, free of any known side effects and among the most researched anti-inflammatories known to natural medicine. The *Perna canaliculus* has many nutritional benefits including glycosaminoglycans, minerals, amino acids and a unique synergy of fatty acids associated with anti-inflammatory responses. Unfortunately, like all foods containing fatty acids, they tend to oxidise

rapidly and turn rancid with subsequent deterioration of the total food. In 1982, the company MacLab from Melbourne, Australia, commenced research to solve this problem as doctors were observing that mussel supplements had varying degrees of success. This was because the fragility of the medicinal properties of the mussel oil was not understood and, as a result, early mussel powder products varied considerably in effectiveness. This was first noted when researchers tried to duplicate the 1978 clinical work by Drs. R. G. and S. L. M. Gibson, showing positive improvements for Arthritis Patients in Glasgow, Scotland at two major public hospitals, the results of which were published in a peer reviewed journal in 1980.

In 1982, the Royal Melbourne Institute of Technology, Natural Products Chemistry Unit of Department of Applied Biology received private and government funds to seek and identify the active component or components which was believed to exist in the N.Z. green-lipped mussel. This work was planned to cover an initial two-year period but has continued to this day.

In 1983, the research team at RMIT was joined by a Japanese research group headed by Professor Takuo Kosuge, head of the Shizuoka College of Pharmacy at Shizuoka University, Japan and one of Japan's most respected research chemists. In early 1984 Professor Kosuge determined that mussel powder was extremely unstable and lacking in potency due to rapid oxygen degradation (oxidation). Professor Kosuge determined that unless some method could be developed to stabilise the mussel powder and prevent its oxidation, it would be of little or no value for use as a serious natural treatment for arthritis, which was the commercial aim of the investors known today as MacLab Ltd and Pharmalink International Ltd.

After testing all known antioxidants without success, Professor Kosuge turned to research that he had conducted twenty years

earlier on a traditional method used by Japanese fisherman to preserve their stored fish for future consumption. As a result of this work MacLab patented and developed a natural stabilisation process for green-lipped mussel powder which prevented its oxidation and allowed it to be studied by researchers without degrading in potency. During this work, the rare combination of fatty acids had also been identified as the most significant active component in the mussel. The low levels of these active components necessitated their extraction to enable a functional daily dosage regime.

In 1992, MacLab turned to the pioneers of Supercritical Extraction, Dr Karl Werner Quirin and Dr Dieter Gerard who established and commercialised the CO<sub>2</sub> Supercritical Extraction technology at their company Flavex GmbH in Germany. An extraction protocol was developed to remove the non-polar lipids from the stabilised *Perna canaliculus* powder. After 12 years of research and development, the new generation of stabilised fatty acids were ready for commercialisation and encapsulation for the convenience of consumers. It should be noted that CO<sub>2</sub> extraction not only protects the active fatty acid fractions but also eliminates harmful heavy metals and pesticides which may have entered the food chain.





To date, only one manufacturer has managed to extract and package the oil in a form that maintains its natural anti-inflammatory properties. This product, Lyprinol, is the result of the above patented extraction process which stabilises the mussel material (to prevent oxidation), then uses liquid carbon dioxide in a supercritical extraction to remove the active non polar lipid fractions. Stability trials, safety trials and low peroxide values guarantee effectiveness.

Today, the NZ CO<sub>2</sub> Supercritically Extracted Oil of the *Perna canaliculus* is sold in most countries throughout the world and hundreds of millions of capsules have been produced for the ever growing number of our aging population needing relief from inflammation induced pain.

The following is a list of some of the published research that supports the effectiveness of the CO<sub>2</sub> extracted oil of the New Zealand green lipped mussel:

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