

# Reinventing the Whale

The whaling industry's development of new applications for whale oil and other products in pharmaceuticals, health supplements and animal feed



A report by WDCS, the Whale and Dolphin Conservation Society

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# Introduction

With commercial whaling in Norway, Japan and Iceland today focused on killing whales for human consumption, many people are unaware that the vast majority of the millions of whales killed since whaling became a global industry were hunted not for their meat, but their blubber and other fatty tissues, which were rendered down into oil.

Demand for oil to make candles and light lamps (as well as baleen for corsets) drove the early waves of industrial whaling but, as chemists learned to exploit the richness and chemical complexity of whale oil, it soon provided a veritable pharmacopeia of raw materials for a fast industrializing world. By the 1920s, whale oil fed increasing demand for animal feed, machine lubricants, glycerin-based explosives, soap, detergents and margarine; spermaceti from the sperm whale became a staple in cosmetics and, later, even as a lubricant for the aerospace programme. The potential uses of whale oil seemed infinite, even as the whales proved finite. Commercial whaling became an oil rush.

Although the international community eventually acknowledged the devastation that whaling had wrought on whales, and banned commercial whaling and international trade in the 1980s, the oil rush never ended. While the majority of commercial whaling nations abided by the 1982 whaling moratorium, Norway, Japan and Iceland used loopholes to continue hunting, seemingly just for meat. In fact, the whaling nations were quietly using the cover of their ongoing hunts to research and develop new uses for whale oil and other products to "reinvent" the whale for new markets.

Norway is leading the venture. Over the last two decades its declining whaling industry has benefited from both government and corporate investment into research, even clinical trials, of whale oil for pharmaceutical and health supplement ('nutraceutical') applications, as well as for animal feed. Norway's simple strategy is to overcome international aversion to killing and consuming whales by proving the efficacy of whale oil in treating some of the worst and most common human diseases and by creating desirable health products. Meanwhile, with ample raw materials from its scientific whaling programmes, Japan has continued to mine whales for cartilage to produce

chondroitin (used to treat osteoarthritis) and oligosaccharides (a common food additive). Iceland's ambitions are in the animal feed industry and recent events suggest that it may soon use stockpiles of whale products from its recently expanded whale hunts to resume the manufacture of whale meal to feed farmed fish and livestock -- if it has not already begun.

WDCS believes that restoring whale derivatives to global use and acceptability is a long term strategy for the whaling nations. The main impediment to their ambition is the Appendix I listing of whales by CITES, the Convention on International Trade in Endangered Species of Wild Fauna and Flora, which bans international trade in 'readily recognizable' whale parts and derivatives for primarily commercial purposes<sup>1</sup>.

Although the majority of nations still support the CITES ban, as evidenced by their rejection of Norway and Japan's fourteen attempts to overturn it since 1994, the whaling nations are counting on opposition to whale oil 'softening' over the next decade, especially if it can be shown to deliver tangible health benefits. A proposal currently before the IWC<sup>2</sup> - to suspend the whaling moratorium to legitimize commercial whaling for ten years - is therefore a gift to Norway, Iceland and Japan. A decade of legitimacy provides an incentive to keep their whaling industries afloat and gives them a deadline to complete their research and development of new whale products and use it to secure the support they will need to overturn the CITES ban.

The conservation and animal welfare community has argued consistently that any proposal to reform the IWC that contemplates any continuation of commercial whaling must require the whaling nations to lift their CITES reservations and cease all commercial trade in whale products. The proposal to be voted on at IWC62 in June 2010 does neither. Even in the unlikely event that Norway, Iceland and Japan agree to the inclusion of an IWC ban on non-domestic use of whale products in the proposal, it would expire in 2020. The door cannot be left open for commercial trade in whale oil and other commercially valuable products to resume and, in due course, expand. WDCS has produced this report to remind IWC members of the devastating impact that international trade in whale products, particularly oil, once had on whales, and to illustrate how this could happen again.

## Patents

As part of our research we searched patent registries in a number of countries for inventions listing whale oil, spermaceti, whale cartilage etc. We were surprised to find thousands of approved patents for products or processes listing whales as a possible ingredient - from golf balls to hair dye; eco-friendly laundry detergent to confectionaries/candy; and health drinks to bio-diesel. Many were for international use and approved recently. This does not mean that the patented product is currently in production using whales; in most cases, the inventors will probably have replicated a list of potential ingredients from an earlier patent of a similar product without having tested whale oil themselves and with no plan to use it. However, in light of our other findings, we are concerned that in some cases the patent is a place-holder pending the resumption of international trade in whale products. We include details of a mere fraction of the patents we found to illustrate what WDCS believes to be significant potential for the re-establishment of whales as an industrial ingredient. We provide the number, date and country of issue of each patent noted in this report, but more details of all patents identified in our research can be found at [www.wdcs.org](http://www.wdcs.org)

# Pharmaceuticals, nutraceuticals and functional foods

The Soviet Union developed several medical uses for whale products in the 1960s, including whale liver to treat anemia, pancreas to make insulin, pituitary gland to treat arthritis and gout, and collagen from flukes to make a temporary replacement for skin in the treatment of burns<sup>3</sup>. These Soviet products never reached an international market, and synthetic or other animal-based treatments for each condition have been found since the whaling ban was adopted. During the moratorium, however, Norway and Japan have continued to research the potential of whale oil and other products in pharmaceutical treatments of common diseases, as well as nutraceuticals (nutritional supplements, such as fish oil capsules, marketed to improve human health) and 'functional foods' (food fortified with additives like Omega-3 that are claimed to have a specific health-promoting or disease-preventing property).

*“There are many reports, both old (back to the factory ship whaling period) and new, which claim beneficial effects on skin diseases (especially eczema and sore skin) of topical applications of whale oil.”*

NAMMCO Expert Meeting on Potential Positive Health effects from Consuming Whale and Seal Oil, October 2007.

increasingly lucrative, nutraceutical and functional food industries (see box on page 4), as well as aquaculture. For example, a 2005 government-funded study of the commercial possibilities of whale blubber and oil concluded that purified whale oil should have a very good future in the dietary supplements market, and cited several Norwegian companies<sup>5</sup> as having the experience and the expertise needed to take products to market, nationally and internationally. A clearly stated goal of that report was to conquer the Japanese market where consumers are "already positive for whale products."<sup>6</sup>

*“Recent research indicates that the oil in whale meat and blubber contains substances which have a preventive effect on cardiovascular diseases, among others.”*

Facts about Whales in Norwegian Waters. Brochure published with support from the Ministry of Fisheries, the Ministry of Foreign Affairs and the North Atlantic Marine Mammal Commission (NAMMCO), 2000.

This strategy has already been effective with seals. In 2001 the Norwegian Ministry of Fisheries outlined an ambitious plan to develop a global seal oil industry. Using generous government subsidies, it supported peer-reviewed research demonstrating the health benefits of seal oil and created a strong domestic market for seal-based health products.<sup>7</sup> Built on those foundations, Norwegian production of seal oil products is today a multi-million dollar industry with a wide range of seal oil nutraceuticals exported to more than 90 countries. Using the same business model and funding sources, and with strong links to several of the original seal research "pods", research into the medical efficacy of whale oil is progressing swiftly in Norway.

## Clinical trials of whale oil

Although Norwegian researchers began testing whale oil (including comparing its efficacy to seal and fish oil) for use in treating many common medical conditions as early as 1992, the work has gathered pace in recent years.

Today Norwegian researchers are studying the effects of whale oil on rheumatoid arthritis, Crohn's disease, psoriatic arthritis, diabetes, irritable bowel syndrome, and cardiac disease, among others.

Several of the studies have now reached clinical trial stage and at least one, conducted at the University of Bergen in conjunction with Haukland University Hospital in 2009, has concluded that whale oil is "more effective than other Omega 3s (such as cod liver oil) in reducing the severe inflammation associated with Rheumatoid Arthritis" (RA).<sup>8</sup> Like Norway's seal oil research, the study (which was open to patients from the USA<sup>9</sup>) was funded by various Norwegian government agencies such as the National Institute of Nutrition and Seafood Research (NIFES) as well as the GC Rieber Foundation, part of GC Rieber, a leading global supplier of Omega-3 oils, cod liver oil and animal feed.



Norway is a major player in the world Omega-3 market, supplying about 40% of the oils used in nutraceuticals and functional foods today.

## Norway

The Norwegian government's objective is to prove the pharmaceutical efficacy of whale products and, "once armed with internationally accepted results from its research", to seek to overturn the trade ban in western Europe and the USA<sup>4</sup>. Its ambition extends beyond pharmaceuticals into the less strictly regulated, but

## Nutraceuticals and functional foods - new markets for whale products?

Whale oil and other products are not only of interest to the pharmaceutical industry but also to the less regulated, but increasingly lucrative, nutraceutical and functional food sector in Norway and Japan.

Norway is a leader in the research, development and production of marine oil-based ingredients for nutraceuticals and functional foods and supplies about 40% of the oils used globally today. OliVita is a Norwegian manufacturer of blended seal, fish and olive oil health supplements. Although none of its products claim to contain whale oil, a United Nations University report on "Bioprospecting in the Arctic," refers to OliVita products and research areas as being, "PUFA [polyunsaturated fatty acid] Omega 3 based on whale, seal and fish oil". Some of the OliVita researchers who developed and sought an international patent for its seal oil/olive oil blended product undertook clinical research on whale oil in 1992, 1994 and 2000.

For decades, Japan has dominated research, development and production of other food additives including oligosaccharides. These naturally occurring carbohydrates (such as inulin) are used as food stabilizers, agents to improve the taste, quality and texture of food and a partial substitute for sugar as well as fat. Japanese scientists and companies hold patents related to the production of oligosaccharides for use in food products as well as cigarettes, pet foods, cosmetics, and pharmaceuticals.

Government-funded research of oligosaccharide sources has included whale milk sourced from Japan's scientific whaling programmes; papers were published as recently as 2008 examining whale milk from Bryde's and sei whales. At least two recent patents related to oligosaccharide production granted in the USA to Japanese authors mention sperm and Baird's beaked whale oil as a potential source of usable waxes.<sup>10</sup>

Japanese researchers have also examined minke whale blubber as a source of collagen<sup>11</sup>, claimed by the functional food movement to fight aging, reduce inflammation and help with weight loss<sup>12</sup>.

Numerous other patents issued in Japan for food products, or food production processes, refer to whales as a possible source of ingredients. These include 'whale gelatin' for health drinks (patent approved in 1999) and products to relieve pre-menstrual symptoms (2003); 'whale wax' for jelly candy (1999); hydrogenated whale oil for breads (1991); and whale oil for confectionary coatings for ice cream and doughnuts (2000), melt-resistant chocolate (2008), as well as for use in conjunction with Coenzyme Q10 in dairy and a wide range of other products (2010). Several of these inventions have also received patents in the USA. Indeed, despite the fact that the USA prohibits the sale, import, and export of any marine mammal part or product, the US Food and Drug Administration continues to list whale products, such as hydrogenated sperm oil, and spermaceti wax, as safe and allowable food additives and lubricants in bakery pans.

## Japan

Chondroitin sulfate is an important structural component of cartilage and a widely used dietary supplement for treatment of joint pain. Chondroitin 4 sulfate (otherwise known as chondroitin sulfate A or S-4 sulfate) is extracted from whale cartilage in Japan where it has been developed for medical use. It is also used as a humectant (for moisturizing effect) in cosmetics and eye lotions and as a gelling agent in food.

Proteoglycan (PG), extracted from the nasal septum cartilage of whales, is the subject of recent Japanese research into megakaryocytes, bone marrow cells used in the production of platelets necessary for normal blood clotting. The research concluded that whale-PG is an "attractive molecule" for future research.<sup>13</sup>

Research into medical uses of whale cartilage is a focus of Seikagaku Corporation, an R&D oriented pharmaceutical company whose wholly owned subsidiary, the Seikagaku Biobusiness Corporation, supplies raw materials, including chondroitin sulfate, for pharmaceutical products and cosmetics. Seikagaku Biobusiness Corporation advertises "Chondroitin Sulfate A, Na Salt Special Grade (Whale Cartilage)" on its website for in vitro use at US\$ 130 for 20mg.<sup>14</sup> Seikagaku and its subsidiary

hold numerous patents for pharmaceutical products, in particular "Hyaluronan", a type of glycosaminoglycan, that "is primarily used as a raw material of ophthalmological medicines (eye medicines), cosmetics and health foods". Seikagaku's English website lists numerous sources of Hyaluronan, among them "cockscorns, shark skin and whale cartilage"<sup>15</sup>

Countless articles published in scientific journals over the past decades refer to researchers having purchased whale cartilage/whale chondroitin from Seikagaku, even in some cases from its US based company, Seikagaku America (now known as Associates of Cape Cod<sup>16</sup>). Other research papers refer to purchases from Sigma-Aldrich. Although Sigma-Aldrich's various national websites do not currently reference whale cartilage/chondroitin, they do offer recombinant sperm whale myoglobin for sale at US\$ 283 per mg, shipped from local supplies (for example, St Louis in the USA and Schnelldorf in Europe).<sup>17</sup>

Japanese researchers have publicly noted the difficulties that the whaling moratorium caused for production of whale-based chondroitin sulfate and the resulting switch from ChS-A to ChS-C, which is derived from shark cartilage.<sup>18</sup> However, the cost of using shark cartilage has risen due to high prices for shark fins for food in China, leading Japan to look again for alternative sources.

## A Proliferation of Patents

In addition to current research and development of whale oil and cartilage, hundreds of patents are held worldwide for pharmaceutical inventions that already specify whale products as an ingredient. Despite the bans on commercial whaling and trade, patents have continued to be sought and approved, even in the European Union and the USA where the use of whale products would be illegal. Examples from the whaling nations include:

- In 2009, a U.S. patent was issued to aRigen Pharmaceuticals, Inc. of Tokyo for the topical treatment and prevention of herpes zoster (shingles) which refers to the use of animal waxes, "including whale wax".
- Ono Pharmaceuticals of Japan, a leader in "bioactive lipid" research, has received a US patent for "absorption accelerators" and "rash preventing agents" used in the treatment of neuronal diseases (such as Parkinson's Disease or Alzheimer's) that refers to the possible use of minke whale oil "to reduce negative reactions to ointment."
- Regenics AS of Norway filed a patent application (WO/2009/136291) in 2009 for "Cellular extracts" that mentions whale wax as one possible ingredient for the treatment of scar tissue"

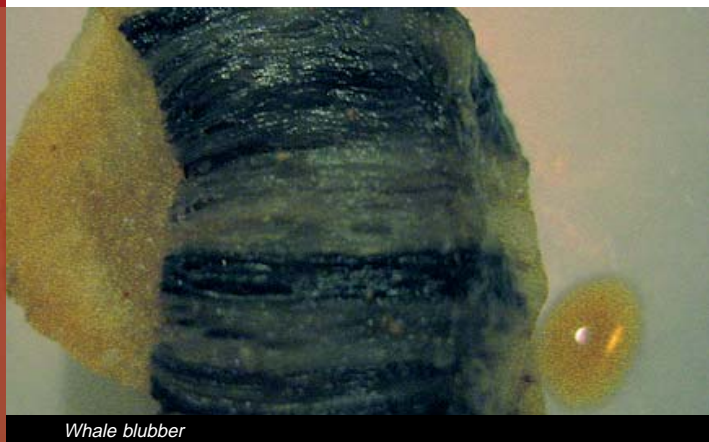
## Iceland

Matis, an Icelandic food and biotech research and development institution that was formerly the Icelandic Fisheries Laboratory, has undertaken analyses of the fatty acid content of minke meat, whale meat and whale blubber,<sup>19</sup> and the Minke Whalers' Association is using the results to promote its product as a "pure natural product that is probably the healthiest red meat available, extremely rich in Omega 3 fatty acids."<sup>20</sup> Hvalur hf., Iceland's fin whaling company, is listed as a Matis partner, along with the Norwegian fisheries research institute, NOFIMA.<sup>21</sup>

The Icelandic Ministry of Fisheries is also participating in a project funded by NORA, a committee of the Nordic Council of Ministers, that is looking into the development of marine mammals as food products. The NORA-funded project relates to a series of workshops organised by the North Atlantic Marine Mammal Commission (NAMMCO) on the utilization of marine mammals as foods, in particular addressing "innovations in new products from marine mammals." Greenland, the Faroe Islands and Norway are also participating, via their respective Fisheries Ministries.<sup>22</sup>

## Canada

Seal oil is already widely marketed by Canadian companies and patents are held by Canadians for the processing of marine mammals, including whales, for the production of oil.<sup>23</sup> Ocean Nutrition Canada Limited (ONC) is the world's largest supplier of Omega-3 EPA/DHA ingredients. Although ONC states clearly on its website that it sources its oil from the Peruvian anchovy and sardine fisheries, since the mid-2000s it has made numerous international patent applications related to the processing of marine oils which refer to whale oil as a potential ingredient in the manufacturing of "microcapsules" that keep marine oils from oxidizing.<sup>24</sup>



Whale blubber

## Whale oil - new value for Norway's unwanted whale blubber

Norwegian whaling is dependent on substantial government subsidies. Finding new commercial uses for blubber, which is not eaten in Norway, would help restore the industry to profitability. High levels of contaminants have prevented Norway from exporting whale blubber on a significant scale to Japan (just over five tonnes were exported in 2008) and it is worth so little on the domestic market (around US\$ 0.00169 per kilogram) that, in recent years, many Norwegian whalers have dumped whale blubber at sea rather than pay storage or incineration costs. However, Norwegian and other scientists have now developed methods to 'rinse out' toxins and remove unpleasant taste compounds from oil on a commercial basis without affecting its biological efficacy.

With whale oil production still at R&D phase, Norway does not yet need commercial facilities to smelt and refine whale blubber into oil on a large scale. But when it does reach production stage, several existing marine oil (including fish and seal oil) factories could easily be used without the need for conversion; in fact, some of the companies currently processing marine oils actually started as whale oil facilities. In the meantime, Norway has been importing small amounts of whale oil from Iceland on a regular basis over the last four years, perhaps to compare the properties of different species or because it is less contaminated.

# Animal Feed

At the peak of the commercial whaling industry, whales were widely used in the production of animal feeds. Today, despite dwindling global fish stocks, meal and oil from wild fish are the main source of protein for terrestrial livestock as well as the rapidly growing global aquaculture industry. As the fishmeal/oil industry seeks stability in the price, quality and availability of raw materials, references to whale products in Norwegian, Japanese and Icelandic research publications and patents illustrate a resurgence of commercial interest in sourcing from whales. Whale products, especially oil, are referenced not just as an ingredient in meal and oil for livestock and fish feed, but also agents in the production of specialized, value-added, products such as feed for larvae and juvenile fish, that the industry is keen to develop.

## Iceland



The Hvalur whaling station in Hvalfirði, Iceland

Iceland was an exporter of whale meal and oil as well as meat and blubber through the 1980s<sup>25</sup>, including meal for use as animal feed produced by Hvalur hf, Iceland's fin whaling company.<sup>26</sup> Considering that Iceland's population is less than 318,000, and whale meat is consumed on a limited basis, its whaling industry must have stockpiled thousands of tonnes of meat and blubber from the recent expansion of its whale hunts (quotas increased to 200 fin and 200 minke whales a year from 2009), even taking into account its growing exports under its CITES reservation (see box).

Iceland's whaling industry still has the knowledge and infrastructure needed to manufacture animal feed from whale products and its ambition to find global markets, for fin whale products in particular, is actively supported by the government. An April 2010 presentation on regional development by the government to a town meeting in Akureyri (a fisheries port and processing center) which refers to whaling as a regional industry and resource, suggests developing "whale products," including whale meat, meal, oil and blubber<sup>27</sup> and recommends the formation of an industrial park in Hvalfirði, where the fin whaling station is located. WDCS is concerned that whale meal may already be in production in Iceland; not just for its own livestock and aquaculture industry, but for export.

Iceland's Statistical Bureau reported two exports of almost 23 tonnes of whale meal to Denmark in 2009. Although the Fisheries Ministry swiftly characterized the report as a clerical error<sup>28</sup>, Iceland's fin whaling company expanded its whale meat processing facilities in 2007 and its Managing Director has told the Icelandic press in March, 2009 that he hopes to process both whale oil and ground bone into meal.<sup>29</sup>

*“It is therefore clear that there will be a serious shortage of raw material for fish meal and fish oil to meet future aquaculture demands. This calls for the catching of new marine species that could be used to produce fishmeal and fish oil.”*

Icelandic Parliamentary discussion, 2002.<sup>30</sup>

## Norway

Norway is the world's leading manufacturer and exporter of both fishmeal and fish oil for farmed fish and livestock<sup>31</sup> and a leading exporter of farmed salmon. Its surfeit of whale products would provide an ample supply of raw ingredients for the manufacture of meal and oil and Norway's seafood research and aquaculture feed industries may already be considering this possibility. For example, Blue Limit A/S, a feed producing company for larval shrimp and mollusks established by researchers from Fiskeriforskning, the Norwegian Fisheries and Aquaculture Institute, recently studied the production of specialized feed for sensitive organisms, such as larvae or juvenile forms of farmed aquatic organisms. Blue Limit's 2008 patent application states that various marine oils, including whale oil, may be used when producing the feed.

Similarly, the National Institute for Nutrition and Seafood Research (NIFES) has collaborated with the Norwegian School of Veterinary Medicine, the University of Bergen, the fish feed suppliers EWOS (a division of the Norwegian company Cermaq A/S), Marine Harvest and Nutreco, to study various aspects of fish farming, including the refining of fish oils, and health aspects of seafood consumption. NIFES, which was part of the 2005 study that looked at ways to promote the use of whale products, continues to fund research on whale oil.<sup>32</sup>



Tanks in a larval shrimp hatchery aquaculture facility

Whale products are known to have been processed into pet food in Norway and in January 2009 more than four tons of frozen whale meat was discovered at a Vom og Hundmat pet food factory in Trøgstad.<sup>33</sup>

## Japan

Although whale materials have been prohibited in Japanese animal feed since October 2001 to prevent the spread of bovine spongiform encephalopathy (BSE), a 2009 publication by researchers from Japan's National Food and Agricultural Materials Inspection Center and the University of Tokyo, suggests that the practice of feeding whale products to livestock and fish in Japan may have continued illegally. Their paper in the Journal of Food Protection states that "there is a possibility that the whale materials are being used for feed for pigs, poultry, and fish" and reports the development of new, highly sensitive genetic techniques to detect heat treated whale materials in processed feed products.<sup>34</sup>

Like Norway, Japan has invested heavily in research into uses of marine bi-products in fish feed. A 1996 study published in the Japanese Journal of Aquatic Food Production references the use of whale oils, including, "sperm oil, sei whale, humpjack [sic] whale, fin whale and blackfish [pilot whales]" in fish feed, and recommends mixing dry pellets with oils in order to administer drugs for fish disease.<sup>35</sup> A patent for the feed was sought by Takeda Corporation's animal health division in 2001, and a US patent was issued in 2003.<sup>36</sup>



Japanese whale ice cream containing "5mm X 5mm whale meat pieces"

## International trade in whale products since 2006

Iceland's exports under reservation to Norway (total Free on Board (FOB) value: US\$16,789)

- Total 2006: 300 kg of whale oil
- April 2008: 15 kg of whale oil
- September 2008: 60 kg of whale oil
- November 2008: 30 kg of whale oil
- March 2009: 24 kg of whale oil
- September 2009: 60 kg of whale oil
- October 2009: 90 kg of whale oil
- November 2009: 129 kg of whale oil

Iceland's exports under reservation to Japan (total FOB value: US\$ 4,308,496)<sup>37</sup>

- June 2008: 81,774 kg of frozen whale meat (FOB Value US\$ 746,374)
- January 2010: 134,026 kg of "other frozen whale products" (FOB value US\$ 2,396,140)
- March 2010: 88,191 kg of "other frozen whale products" (FOB value US\$ 1,165,922)

Iceland's exports under reservation to a non-Party (Faroe Islands) (total value: US\$ 5,732)

- July 2008: Iceland exported 909 kg of whale meat to the Faroe Islands.

Iceland's illegal exports to Belarus, Latvia and Denmark

- 2006: 1.8 tons of whale oil to Belarus (FOB value US\$ 37,748)
- January 2009: 775 kg of whale meal to Denmark
- March 2009: 22,750 kg of whale meal to Denmark<sup>38</sup>
- January 2010: 250 kg of whale meat to Latvia

Norway's export under reservation to Japan (valued at point of export ~US\$ 89,140)

- May 2008: Norway exported 5195 kg of whale meat to Japan (value 519,500 NOK)

Norway's exports under reservation to a non-Party (Faroe Islands (valued at ~ US\$ 27,621)

- April 2006: 30 kg of whale meat (value 2,760 NOK)
- June 2006: 50 kg of whale meat (value 2,760 NOK)
- July 2006: 50 kg of whale meat (value 4,600 NOK)
- October 2006: 140 kg of whale meat (value 12,880 NOK)
- April 2009: 720 kg of whale meat (value 55,840 NOK)
- July 2009: 1200 kg of whale meat (value 82,200 NOK)

# And the rest...

Whale oil (derived from rendering blubber) is a complex mixture of wax esters and triglycerides. At the peak of industrial whaling, it served as a major source of industrial ingredients, including for the manufacture of soap, margarine, explosives and insecticides. Our analysis of approved patents held around the world, many of which are granted for international use, underscores that whale oil and its derivatives would be viable ingredients in a vast array of common products if international trade in whale oils and waxes were permitted again.

Whale oil was considered an effective, simple and cheap insecticide by both farmers and gardeners through the 20th century, as it dissolves readily in water and spreads easily.<sup>39</sup> Numerous patents listing whale products as a possible ingredient continue to be sought and approved for insecticides aimed at a variety of pests including mites and cockroaches, as well as fungicides<sup>40</sup>. Their applications range from household uses to the agro-chemical industry.<sup>41</sup>

Given the exceptional lubricant properties and stability of whale oil and spermaceti (which can be extracted from whale oil) even at extremely cold temperatures, they were used extensively by both the submarine and aerospace industry; NASA even used whale oil-treated tapes to record data and images from its space missions.<sup>42</sup> Kodak, Konica and Fuji Film all hold current patents related to image recording using whale oil<sup>43</sup> and whale oil appears, even today, in patents for engine transmission fluids<sup>44</sup> and hydraulic lubricants<sup>45</sup>. Thanks to its softening properties, whale oil was also added to rubber, to improve shock absorption and add traction. Today, patents/applications for rubber products as diverse as golf balls<sup>46</sup> and tires<sup>47</sup> still reference the use of whale oil.

Whale products were once used extensively in commercially produced cleansers and detergents. Today, leading corporations such as Proctor & Gamble still hold patents that cite whale oil as a possible ingredient. Dial even lists whale oil as a possibility for "eco-friendly laundry detergent compositions."<sup>48</sup>

Our patent search also revealed dozens of references to whale oil as a potential ingredient in biodiesel fuel, with applications filed by inventors from Japan, Korea and the U.S, among others.



Courtesy of the New Bedford Whaling Museum

## Spermaceti and cosmetics

Spermaceti oil, an amber fluid produced by the tonne in the head cavity of a sperm whale (or isolated from whale oil by refining) is not technically oil at all, but mostly wax esters with a smaller fraction of triglycerides. It hardens on contact with air to provide a firm wax. Spermaceti was originally a source of candle wax and became a staple of the cosmetic industry in the early 20th century due to its similarity to human skin sebum. It also became a core ingredient in industrial lubricants (including in space exploration technology). The sperm whale paid a heavy price for its utility to man. In just twenty-five years between 1951, when Japan joined the IWC, to 1976, Japan and the Soviet Union killed over 220,000 sperm whales.



Courtesy of the New Bedford Whaling Museum

In the 1980s, the cosmetics industry began using alternatives to spermaceti, most notably jojoba oil, also not technically an oil, but a liquid wax that is very similar in structure to spermaceti. Jojoba oil is pressed from the seeds of the desert shrub jojoba (*Simmondsia chinensis*). Today, over 5,000 tonnes of jojoba oil are used annually in personal care products.<sup>49</sup>

WDCS is concerned that, despite the use of jojoba and synthetic substitutes, unscrupulous or unwitting manufacturers of topical preparations may still be using spermaceti as an ingredient, whether sourced from ongoing hunts in Japan and Indonesia, stockpiles or extracted from whale oil. Using simple internet searches, WDCS identified more than 20 cosmetic or personal care products manufactured in China, Iran, the Russian Federation, Romania and the Dominican Republic that claim to contain spermaceti. Several are available in the USA and European Union although their import would violate CITES.

In addition, hundreds of patents have been approved in the USA, Europe and Asia for a wide range of makeup, cleansing, moisturizing and rejuvenating products, as well as hair dyes and fragrance enhancers, that include whale oil (including specifically sperm whale oil) or whale waxes as a possible ingredient.

# Conclusion

WDCS hopes that this summary of the commercial ambitions of the whaling nations will provide a sobering context to the IWC's discussions of reform, including the proposal to be voted on at IWC62 to legitimize commercial whaling for ten years.

It is clear that Norway, Iceland and Japan are intent on reinventing the whale for the twenty-first century

and will use any hunts permitted by the IWC to continue developing new industrial uses for whales, including pharmaceuticals, health supplements, animal feed and even cosmetics. To prevent another "oil rush" on whales, it is imperative that any proposal to reform the IWC include a swift phase-out to zero of all commercial, including scientific, whaling, backed by a permanent ban on international commercial trade in whale parts and derivatives and the immediate removal of all CITES reservations relating to whales.

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鯨肉の価値の再構築を実現します  
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鯨肉について -利用部位-

古来から欧米の捕鯨は、主に鯨油を目的に行われていたのに対し、日本では肉は皮はもとより骨や内蔵まで余す所無く完全に有効利用してきました。現在では食用以外に利用されることは少なくなりましたが、それでも骨や内蔵の一部を除いて、鯨を最大限に有効利用しています。

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A "map" of products that can be derived from whales, from the Geishoku-Labo [whale diet laboratory], which was set up by the Japanese Fisheries Agency and the Institute for Cetacean Research in May of 2006 to promote whale sales

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