Green Pasture

Traditional Fermentation, Natural Nutrients and the History of Fish Liver Oil



Illustration – does not necessarily depict Green Pasture's actual raw materials or production conditions.

An examination of the background, raw materials, production methods, nutrients, scientific criticism, and questions that remain unresolved.

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Green Pasture is an American family-owned business that produces traditionally made nutritional supplements based on marine oils and milk fat. Its products are founded on a philosophy of preserving and concentrating nutrients that occur naturally in the raw materials, rather than adding synthetic vitamins to achieve specific standardized nutritional values.

The product range includes fermented cod liver oil, fermented skate liver oil, concentrated butter oil, and combination products in which fish liver oil is blended with butter oil.

Behind these products is an interest in traditional nutrition, older production methods, and the work of the American dentist and nutritional researcher Weston A. Price. At the same time, some of the products have been the subject of scientific criticism and public discussion.

In this article, we look at the background, raw materials, production methods, and nutrients. We also discuss the criticism and the questions that remain insufficiently resolved.

Green Pasture – From Family Farm to Producer

Green Pasture was founded by Dave and Barbara Wetzel in Nebraska, USA. The starting point was a grass-based dairy farm and an interest in traditional nutrition.

The company began developing concentrated butter oil after the family became familiar with the work of Weston A. Price. The first product was launched in 2003. Work on fermented cod liver oil began around 2007, and skate liver oil and combination products were later added to the range.

Green Pasture describes its philosophy as a continuation of traditional production methods combined with modern quality control. The company highlights small-scale production, raw materials from selected suppliers, and third-party testing.

A consistent principle is that the nutrients should come from the raw materials themselves. The producer states that it does not add synthetic vitamins to standardize the products' nutritional content.

Weston A. Price and Traditional Nutrition

Weston A. Price (1870–1948) was an American dentist who studied the diets of various population groups, including communities that still maintained traditional food practices.

He was particularly interested in the differences between traditional diets and the modern diet that emerged with industrialization. In his work, he placed great emphasis on nutrient-dense foods, animal fats, and fat-soluble vitamins.

Price described, among other things, a particularly valuable butter oil from cows that grazed on rapidly growing green grass. He referred to a fat-soluble factor that he called "Activator X." This factor has since been associated with vitamin K2, particularly MK-4, but Price did not chemically identify the substance. The connection should therefore be understood as a later interpretation of his work, not as an analysis he himself carried out.

Price was also interested in the combination of butter oil and cod liver oil. Green Pasture's blended product is based on this historical inspiration.

Cod Liver Oil – A Long Norwegian Tradition



Illustration: Wooden barrels representing the historical handling of fish liver. This image is not documentation of Green Pasture's actual raw materials or production.

The production of fish liver oil has a long history in Norway. F. Peckel Möller's book *Cod-Liver Oil and Chemistry*, published in 1895, provides a detailed account of older Norwegian methods.

In the traditional barrel process, fish livers were collected in barrels throughout the fishing season. Over time, the liver tissue underwent extensive decomposition, and the oil separated and collected at the top. It could then be drawn off or skimmed away. The process continued as long as more oil was released from the liver tissue.

It is important to understand that this historical method was not identical to modern, controlled fermentation. Möller himself used the term putrefaction to describe the older process. It could produce oils with very different colours and qualities, depending on how far the decomposition had progressed.

In 1853, Peter Møller introduced a new method in which oil was extracted from fresh liver using steam. This was a significant technological advance. The method made it possible to produce a lighter and more uniform cod liver oil with a milder taste and smell.

The transition to steam processing became an important part of the development of modern Norwegian cod liver oil production.

There are also historical accounts of fish fermentation and preservation in other cultures, including Roman garum. Garum was a fermented fish sauce, not cod liver oil. We can therefore describe it as a parallel to older traditions of preserving fish, but we cannot claim that the Romans produced cod liver oil in the same way as Green Pasture.

Green Pasture’s Method – The Liver Is Fermented, Not the Oil



Illustration: Cod in cold marine waters. This image is not documentation of Green Pasture’s actual raw materials or production.

Green Pasture uses the term *Fermented Cod Liver Oil*. It is important to understand what this means.

It is not the oil itself that is fermented. It is the fish liver that undergoes a fermentation process, in which natural enzymatic and microbial processes help release the oil from the liver tissue. The collected oil is therefore the result of the fermentation of the liver.

The producer describes the method as a continuation of older production principles, but with its own production procedures and quality controls.

This differs from modern industrial cod liver oil production, in which oil may be extracted from liver using heating, pressing, and other industrial processes. There are several industrial methods, and modern cod liver oil production should not be treated as one single process.

The main difference lies in how the raw material is processed and how the oil is released and extracted.

Butter Oil – Milk Fat from Milk Produced by Cows on Green Pasture



Illustration: Cows grazing on green pasture. The butter oil is made from milk fat obtained from milk produced by grazing cows. This image is not documentation of Green Pasture's actual raw materials or production.

Green Pasture's concentrated butter oil is based on a different raw material from the fish liver oils. The starting point is milk fat obtained from milk produced by cows grazing on pasture.

Weston A. Price placed particular emphasis on milk from cows that grazed on rapidly growing green grass. Green Pasture also describes its raw-material philosophy with reference to the growing period, pasture conditions, and the characteristics of the grass.

This does not necessarily mean spring milk in a specific geographical sense. The essential point is the period when the grass grows rapidly and the cows have access to fresh, green pasture. The growing season naturally varies with climate and geographical location.

Research on milk fat shows that feed affects the composition of milk and butter. Pasture-based feeding can influence, among other things, the content of carotenoids, fatty acids, and vitamin K compounds.

Green Pasture describes its current production method as follows: the cream is gently heat-treated at a low temperature, cultured through fermentation, and then concentrated by centrifugation.

The finished product is concentrated milk fat, not ordinary butter. It contains naturally occurring fat-soluble compounds from the milk fat.

Activator X and Vitamin K2

The most important historical argument for butter oil is its connection to Activator X, as described by Weston A. Price.

Today, Activator X is often associated with vitamin K2. Vitamin K2 is a collective term for several menaquinones, including MK-4. These compounds have biological functions in the body, including roles in processes related to blood coagulation and bone metabolism.

Research on milk and butter shows that feeding practices and pasture conditions can affect the content of vitamin K compounds. A study published in the International Dairy Journal in 2025 found that pasture-based feeding could increase vitamin K content in butter.

This supports the importance of the raw materials' feed sources, but it does not provide a basis for establishing a specific K2 content in Green Pasture's butter oil. We do not have access to sufficient analyses of individual production batches to state such quantities.

The butter oil also contains other naturally occurring fat-soluble nutrients. Green Pasture's particular positioning of the product is nevertheless linked to the tradition surrounding Activator X and vitamin K2.

Three Product Categories

Green Pasture's range has three main product categories within marine oils and milk fat.

Fermented Cod Liver Oil

Cod liver oil is the producer's principal marine product. It is made by fermenting the liver of wild-caught fish.

Green Pasture states that its current cod liver oil comes from wild-caught Alaska cod and that the supply chain is MSC-certified. This is the producer's current statement. We have not independently verified the documentation for each individual production batch.

Cod liver oil is traditionally known as a natural source of vitamins A and D, in addition to the omega-3 fatty acids EPA and DHA.

Butter Oil and Fish Liver Oil – Formerly Blue Ice Royal

Green Pasture also developed a combination product in which fermented cod liver oil is blended with concentrated butter oil.

The product was previously marketed under the name Blue Ice Royal. Green Pasture now uses the name *Fermented Cod Liver Oil & Concentrated Butter Oil Blend*.

The combination is based on Weston A. Price's interest in the relationship between cod liver oil and butter oil. The products contain the naturally occurring nutrients from both raw materials.

Fermented Skate Liver Oil



Illustration: Skate in its natural marine environment. This image is not documentation of Green Pasture's actual raw materials or production.

Skate liver oil is made from the liver of skate, a cartilaginous fish closely related to sharks. Green Pasture states that the skate is wild-caught in the Bering Sea and the Aleutian Islands off Alaska.

Skate liver oil undergoes the same basic fermentation principle as cod liver oil. It has its own fatty acid profile and contains naturally occurring vitamins and omega fatty acids.

Green Pasture presents skate liver oil as an alternative to cod liver oil, and some customers prefer it in particular because of their interest in joint health. However, it has not been documented that the oil builds cartilage or treats joint problems.

The fact that skate is a cartilaginous fish does not automatically mean that its liver oil contains specific amounts of the components found in cartilage. Claims about chondroitin, squalene, and alkylglycerols

should therefore not be made without analyses of the finished product.

Natural Nutrients and Variation Between Production Batches

An important characteristic of Green Pasture's product philosophy is that the nutrients should occur naturally in the raw materials. The producer states that it does not add synthetic vitamins to achieve specific standardized levels.

This has an important consequence: the nutritional content may vary from one production batch to another.

The species, age, diet, and living conditions of the fish can affect the composition of the liver. Similarly, grass growth, pasture conditions, and feeding practices can affect the composition of milk fat.

The marine oils are particularly associated with naturally occurring vitamins A and D and the omega-3 fatty acids EPA and DHA. The butter oil is particularly associated with fat-soluble compounds from milk fat, including forms of vitamin K.

We believe it is more honest to state which nutrients occur naturally in the products than to provide specific quantities that cannot be guaranteed for every production batch.

Natural variation is not, however, proof of quality in itself. Nor is it a substitute for analysis and quality control.

Taste, Smell, and Consistency

The sensory characteristics of the products may also vary between production batches. This applies to taste, smell, colour, and consistency.

The fish liver oils have a characteristic fish taste. Some people find it strong and unfamiliar, and some may perceive the taste as rancid. The taste experience alone, however, cannot establish whether the oil is oxidized or rancid.

Likewise, an unusual smell or taste cannot automatically be dismissed as natural variation. Oxidation and quality must be assessed through appropriate analyses, not by taste alone.

We believe it is important to be open about these characteristics so that customers know the products will not necessarily have identical taste, smell, and consistency every time.

The Criticism of Green Pasture – An Open Discussion

Green Pasture's fermented cod liver oil has been the subject of extensive public discussion, particularly after nutritional researcher Kaayla T. Daniel published the report *Hook, Line and Stinker!* in 2015.

The report raised serious questions about product quality, oxidation, nutritional content, and the identity of the raw materials. Daniel argued that some analyses showed signs of rancidity and that vitamin levels were lower than had previously been claimed.

Green Pasture responded through a technical assessment carried out by chemist Jacob Friest, who was given access to samples and laboratory results on behalf of the producer. The Weston A. Price Foundation also published its own responses and analyses.

The parties disagreed about how the results should be interpreted. Among other things, they discussed which analytical methods were suitable for a fermented oil with a complex chemical profile.

A study published in 2020 examined the oxidative stability of several cod liver oils, including a Green Pasture product. The study showed interesting results under the conditions examined. However, it does not document that all production batches are free of defects or that the product produces better health outcomes in humans. The study was also connected to Green Pasture and received funding from the Weston A. Price Foundation, which is relevant when assessing the results.

Questions About Fish Species

Questions were also raised about whether all the liver used in earlier production batches came from cod.

A public question-and-answer document from the Weston A. Price Foundation in 2015 stated that Green Pasture used mainly Pacific cod, but also some Alaska pollock, depending on availability.

Alaska pollock is scientifically classified as *Gadus chalcogrammus*, but is generally known by its own commercial name. This information is therefore relevant to the discussion about the identity of the raw materials and how the product was presented to customers.

This is a serious issue. When a product is marketed as cod liver oil, customers should be able to trust that the product name describes the actual origin of the raw material.

However, we have no basis for concluding that the producer deliberately misled customers, or that current production uses the same distribution of species as in the past. Green Pasture's current product information states that the fish is wild-caught Alaska cod, but we have not received independent documentation for current production batches.

What Do We Know About Current Quality Control?

Green Pasture states that its products are tested by third parties at several stages of production. We have not been given access to recent, complete analyses that would allow us to verify all these statements ourselves.

We therefore cannot conclude that current products are rancid, but neither can we use older analyses as proof that all current production batches are free of defects.

This is a discussion we believe customers should be aware of. Transparency about the criticism is more important than trying to give a simple answer to questions that the documentation does not fully resolve.

Tidsporten's Assessment

Tidsporten sells Green Pasture products and therefore has a commercial interest in this product category. Nevertheless, we believe it is important to provide customers with information that is as accurate and balanced as possible.

Our interest in the products is based on the raw materials, production methods, and philosophy of naturally occurring nutrients. At the same time, we do not want to pass on the producer's marketing claims uncritically.

We therefore distinguish between the producer's own statements, historical documentation, independent research, and matters that remain disputed.

We have tried to obtain direct clarification from Green Pasture, but have not received sufficient answers to verify all the questions discussed here. We purchase the products through our Dutch supplier, Holomed.

We believe customers should know what the product is, where the raw materials come from, how it is produced, and which questions have not yet been conclusively resolved.

It is also important to be clear that natural origin does not automatically mean higher quality, and that traditional methods do not exempt a producer from requirements for documentation and quality control.

Our principle is simple: customers should receive information that enables them to assess the product for themselves.

Sources and Further Reading

Green Pasture

Green Pasture – Company History

Green Pasture – About the Company and Its Philosophy

Green Pasture – Product Questions and Answers

Green Pasture – How the Butter Oil Is Made

Green Pasture – The Combination of Cod Liver Oil and Butter Oil

History and Tradition

F. Peckel Möller, *Cod-Liver Oil and Chemistry*, 1895.

Historical Account of Traditional Cod Liver Oil Production

The 2015 Criticism

Kaayla T. Daniel, *Hook, Line and Stinker!* The Truth About *Fermented Cod Liver Oil*, 2015.

Jacob Friest's Technical Response Published by Green Pasture

Weston A. Price Foundation – Discussion of the Criticism

Questions and Answers About *Fermented Cod Liver Oil* and the Identity of the Raw Materials

Research and Regulations

Zhou et al., The effect of bovine diets and stages of lactation on vitamin K content in butter and Cheddar cheese, International Dairy Journal, 2025.

The Norwegian Food Safety Authority – Nutrition and Health Claims in the EEA

Note: Sources concerning the producer's own methods and raw materials report the producer's statements. They are not independent verification of each production batch. Historical analyses and reports relate to the samples and production batches examined at the time.