

VERAMARIS® – Transforming Aquaculture using Biotechnology

Submission from Evonik Operations GmbH and dsm-firmenich



The innovation.

The omega-3 fatty acids eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) are essential for human and animal health. They are known to support many body functions, including heart health, brain development, the nervous system, and the immune system. As the human body does not naturally produce omega-3s, they must be obtained through diet or supplements. Oily fish, such as Atlantic salmon - primarily sourced from aquaculture - is an excellent source of both EPA and DHA. Even though EPA and DHA are equally important for fish health, they are not produced in sufficient quantities by the fish themselves and need to be supplemented in aquaculture feeds. Traditionally, the fatty acids added to aquaculture feed have come almost exclusively from marine sources such as fish oil and fishmeal from catches of wild fish, which is a finite resource.

In 2019, Veramaris introduced an alternative source of omega-3s from the natural marine microalgae *Schizochytrium*. The algal strain originates from the North Pacific. This microalgae has been brought to the industrial environment by an innovative approach in a state-of-the-art, world-scale facility in Blair (Nebraska, USA). In this plant, the marine protist is fermented under controlled conditions in large bioreactors, similar to a brewing process.

The microalgae convert sugar, oxygen, and other nutrients into oil, rich in EPA and DHA, with high efficiency. The innovative and waste-free fermentation and oil separation processes allow the production of an oil which has the highest available concentration of both EPA and DHA on the market.

The Veramaris process was developed by a joint biotechnology team, consisting of dozens of experts from different disciplines: biologists, engineers, technologists – from dsm-firmenich and Evonik Operations GmbH. The algal oil is separated from the algae cells by a solvent free process in a mild approach, which allows high isolation yields while ensuring the highest oil quality and stability. Since the tailor-made industrial fermentation process is waste-free, every ton leaving the plant can be used for nutritional purposes. The efficiency of the production process was improved significantly in the last years by a combination of improving the microalgae itself by natural selection and screening, as well as by continuous optimization of the fermentation and downstream process.



The benefits.

This biotech innovation helped to develop a product for Veramaris that is ideal for the growth of healthy animals as it fulfils the key criteria of feed safety, sustainability, nutritional value, and functionality:

- It is the world's first ASC-MSC-certified microalgae oil.
- It provides access to the healthy omega-3 sources EPA and DHA, which are critical for animal welfare.
- It has the highest concentration of EPA and DHA of comparable sources of omega-3 fatty acids and is up to four times more potent than fish oil.
- Due to its oily nature, it is the ideal product formulation for the feed industry and can be applied 1:1 in modern feed formulations. Furthermore, it allows flexible adaption of diets for the purpose of different live stages of fish.
- It promotes growth of a sustainable aquaculture industry without making higher demands on marine resources.

·Veramaris is committed to the SBTi initiative and reduced scope 1 and 2 emissions by 27% between 2022 and 2024. It has now taken a step further and announced that it aims to reduce scope 3 greenhouse gases (scope 3 emissions) by 22.5% by 2030, compared to 2021. All this will be driven forward by continued joint biotechnology support by Evonik Operations GmbH and dsm-firmenich.



Additional materials:

Mueller, Jakob J., and Hans H. Wenk. "Biosurfactants–Nature’s Solution for Today’s Cleaning Challenges." *Chimia* 75.9 (2021): 752-752.

[Biosurfactants by Evonik - Entering a new era of surfactants](#)

[A new dimension in sustainable cleansing - Glycolipids by Evonik](#)