



## SUMMARY

This output describes the use of LSAqua Suspro, containing Single Cell Protein, as an alternative feed source for rainbow trout (*Onchorynchus mykiss*). Alternative feed sources are currently an important topic in aquaculture due to the limited availability of fish meal. There were no palatability issues, or negative effects on growth parameters or feed efficiency detected in the trout when LSAqua was used as a fish meal substitute. This study will be of particular interest to trout farmers who wish to use alternatives to fish meal for their stock.

## KNOWLEDGE NEED

One of the aquaculture industry's major challenges is the availability of fish meal and fish oil, which have fluctuating costs and sustainability issues. There is a substantial need for alternative fish feed ingredients that do not deplete marine resources, and which result in healthy fish. Another related challenge is the limited knowledge of the nutritional requirements of most cultured fish species. Alternative ingredients in the fish's diet can lead to adverse effects, such as decreased digestion efficiency and increased susceptibility to diseases and stress. Further work is needed to ensure that aquafeeds utilising alternative ingredients can supply the same benefits as fish meal and fish oil. Alternatives must have high biological value and low competitiveness with human food, with established optimum substitution levels for each fish species. One such alternative is LSAqua Suspro, which is unique due to the addition of Single Cell Protein (SCP). LSAqua has been found to be effective in shrimp diets, but its optimal use in diets for other species, such as trout, needs to be determined.



## POTENTIAL IMPACT

- Substituting trout diets with LSAqua Suspro will reduce the need for fish meal, which is costly, volatile and unsustainable. This could contribute to a more sustainable aquaculture sector.
- The establishment of the optimum level of fish meal substitution with LSAqua for trout opens the door for further research into its applicability for other aquaculture species.
- The findings contribute towards improving ecological and social sustainability of fish feeds, especially if applied to multiple species.

**EATiP - Strategic Research and Innovation Agenda (SRIA)** Thematic Area 4 - Sustainable Feed Production; Goal 3. To see the full list and descriptions of the thematic areas and goals, please visit: [eatip.eu/?page\\_id=46](http://eatip.eu/?page_id=46)

## UNDERLYING SCIENCE

The research underlying this output tested the partial (50 %) and total (100 %) replacement of fish meal in trout diets with LSAqua Suspro. LSAqua Suspro is a mix of byproduct materials and novel protein resources. It is unique due to the addition of Single Cell Protein (SCP). SCPs are dried cells of microorganisms such as bacteria, yeasts, fungi and algae, which are valuable protein sources for the feed industry. They are rich in protein content (60 - 80%) and their biomass also contains vitamins, minerals, lipids and carbohydrates.

## RESULTS

- Partial replacement of fish meal with LSAqua Suspro (containing Single Cell Protein (stemming from bacteria)) showed similar results to control feed in feed efficiency and growth parameters and is deemed good, safe and sustainable.
- The control diets showed better results in feed efficiency and growth parameters than total replacement of fish meal with LSAqua Suspro. LSAqua Suspro cannot totally replace fish meal in trout diets in terms of growth and feed efficiency.
- No negative effect on palatability was detected when the partial and total replacements by LSAqua Suspro were carried out.

## END-USERS & POTENTIAL APPLICATIONS

### END-USER 1: Trout feed producers

**APPLICATION:** Developing and producing novel feed formulations for trout (and potentially other species) based on alternative, effective, safe and sustainable feed sources with high biological value and low competitiveness with human nutrition.

### END-USER 2: Trout farmers

**APPLICATION:** Feeding of aquaculture trout stocks with more sustainable (and potentially cheaper) fish feeds while keeping good production levels, leading to higher profits and reduced environmental impact.

### END-USER 3: Aquaculture marketing and lobby groups

**APPLICATION:** Supporting a sustainable and dynamic image of the aquaculture sector, working towards improving global food security while decreasing environmental impact.

### END-USER 4: Aquaculture research community

**APPLICATION:** Furthering knowledge relating to fish meal replacement and its effect on many aspects (such as growth, digestibility, and flesh quality) in trout and other species. This will support development of the aquaculture sector and contribute to increased levels of Technology Readiness, and progression towards commercialisation.

## STATUS

### Technology Readiness Level (TRL) 3 – experimental proof of concept

- More research, such as microbiota or digestibility analysis, will complement these results on using LSAqua Suspro as a feed source for trout.
- LSAqua aquafeed innovators continue to analyse the results from this research (i.e. fatty acid analysis and whole-body composition).
- LSAqua Suspro needs to be trialled in other fish species.
- LSAqua Suspro is currently on the market for shrimp production. To view the product, visit [lsaqua.be/en/industry/fish-meal-replacement](https://lsaqua.be/en/industry/fish-meal-replacement)

## AT A GLANCE

**TITLE:** LSAqua Protein Source for Rainbow Trout Diets

**KNOWLEDGE TYPE:** Report

**WHERE TO FIND IT:** Contact the researcher (details below)

**STATUS:** In progress

**TNA FACILITY USED:** Institut National de la Recherche Agronomique (INRAE), France

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**PATENTS OR OTHER IPR EXPLOITATIONS:** N/A