

Use of unicellular organisms (new feed resource)



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- **Type of challenge:** Environment.
- **Challenges:** Resource management (reduction of protein deficit).
- **Action:** Use of proteins and other nutrients from the cultivation of unicellular organisms (microalgae, yeasts, bacteria) in compound feed.
- **Animal category:** Fish, crustaceans.
- **Technique:** Incorporation in feed formulation of proteins and other nutrients (for example marine omega-3) derived from cultivation of microalgae, yeasts or bacteria.
- **Mode of action:** A large number of various species in all of these groups are cultivated in different kinds of bioreactors on various kinds of feedstocks from vegetable or mineral origin as growing substrates; the biomass thus produced proved to fit very well as ingredient in compound feed for aquaculture as source of protein and/or other nutrients such as omega-3.
- **Requirements / limitations:** Use of products from cultivation of unicellular organisms in feed requires compliance with the Feed Hygiene Regulation. Yeasts and bacteria shall be inactivated.
- **Economic consequences:** Currently products from cultivation of unicellular organisms are not widely available on the feed market and used for fish feed production due to higher costs of production vs. fish oil or protein ingredients such as soy protein concentrate. However, several products with significant content of specific nutrients such as marine omega-3 from microalgae are gaining economic interest.
- **Other considerations:** Cultivation of unicellular organisms for feed purposes on waste streams may in the future become an option to increase feed circularity, providing feed safety is ensured and the legal frameworks is reviewed in this sense.
- **References:**
 - Jones *et al.* (2020). *Recent advances in single cell protein use as a feed ingredient in aquaculture*. Current Opinion in Biotechnology, Vol 61, February 2020, 189-197 <https://www.sciencedirect.com/science/article/pii/S0958166919301648>
- **Other techniques:** Use of nutrients from other low trophic level resources such as insects, polychaetes, zooplankton, starfish, krill etc.

Charter Ambitions: 2, 5