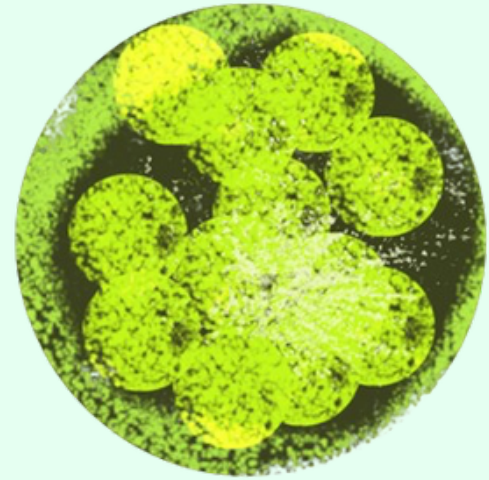
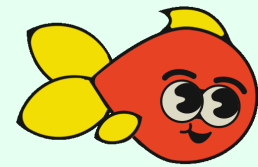


COURSE 23-24

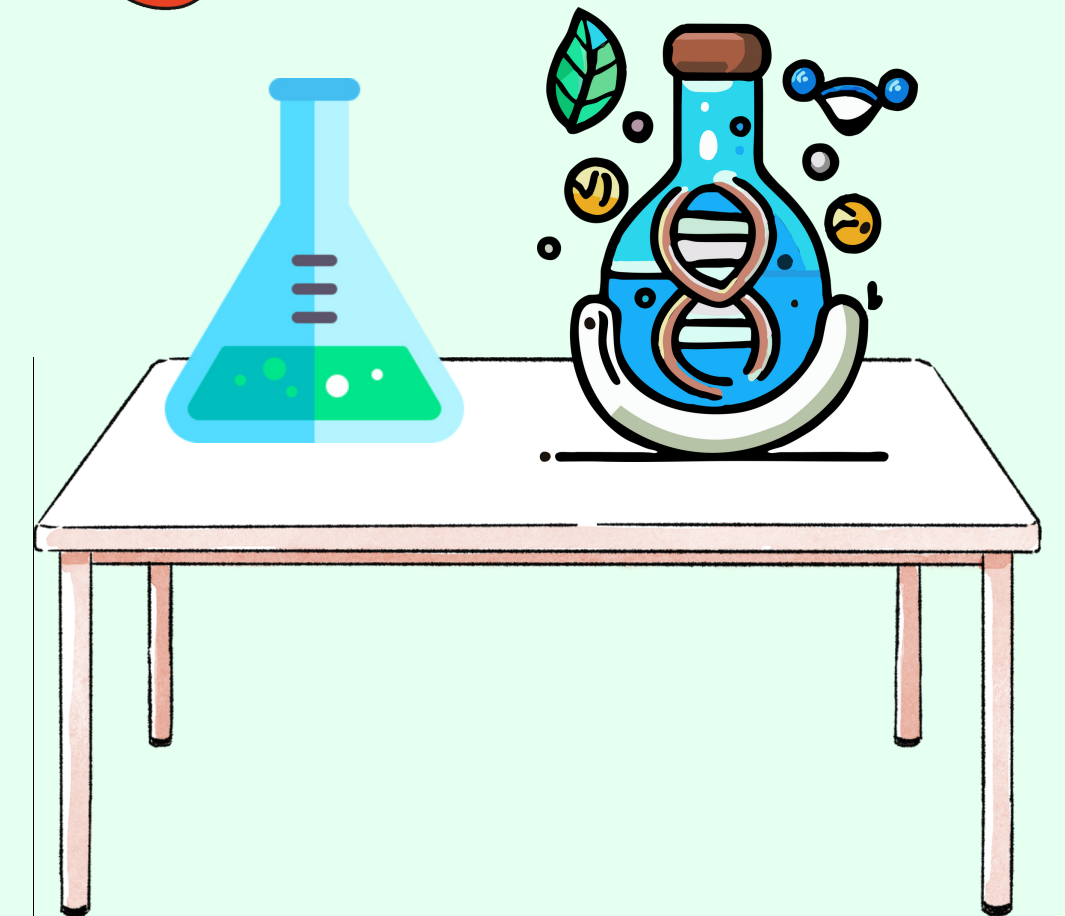
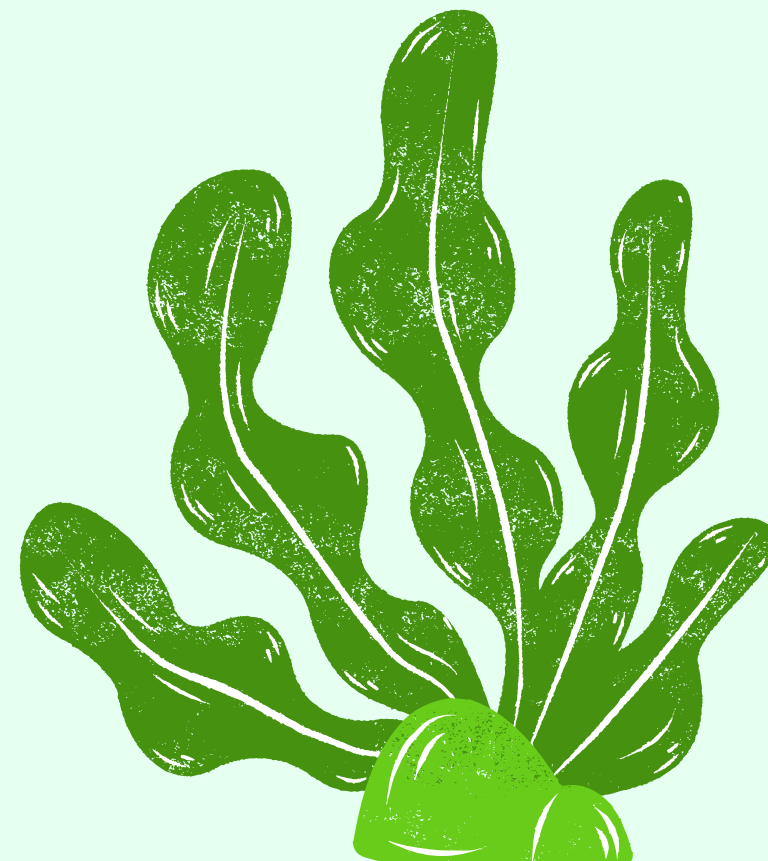
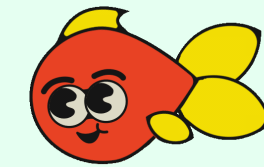
1º LACQ



MICROALGAE IN



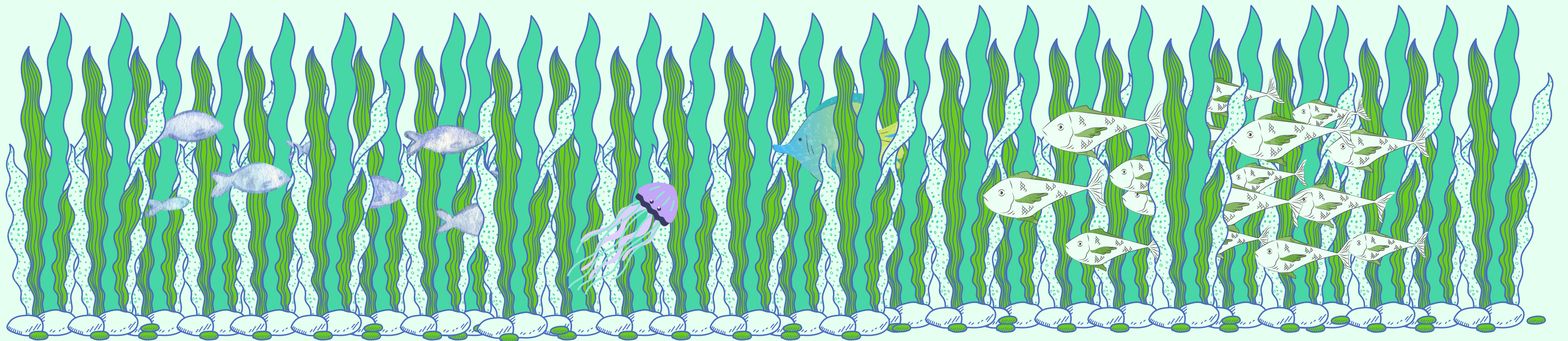
FISH FARM



PABLO, GABRIELA
AND ERICK

What are we going to talk about?

- Introduction
- Benefits
- Spirulina
- Chlorrella vulgaris
- The digestibility of microalgae
- Companies
- Conclusion

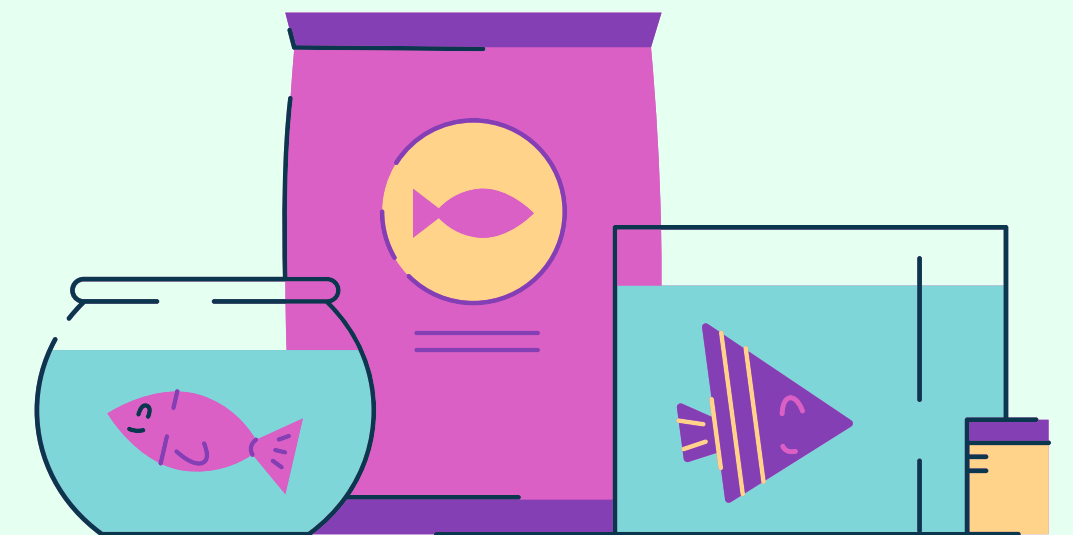
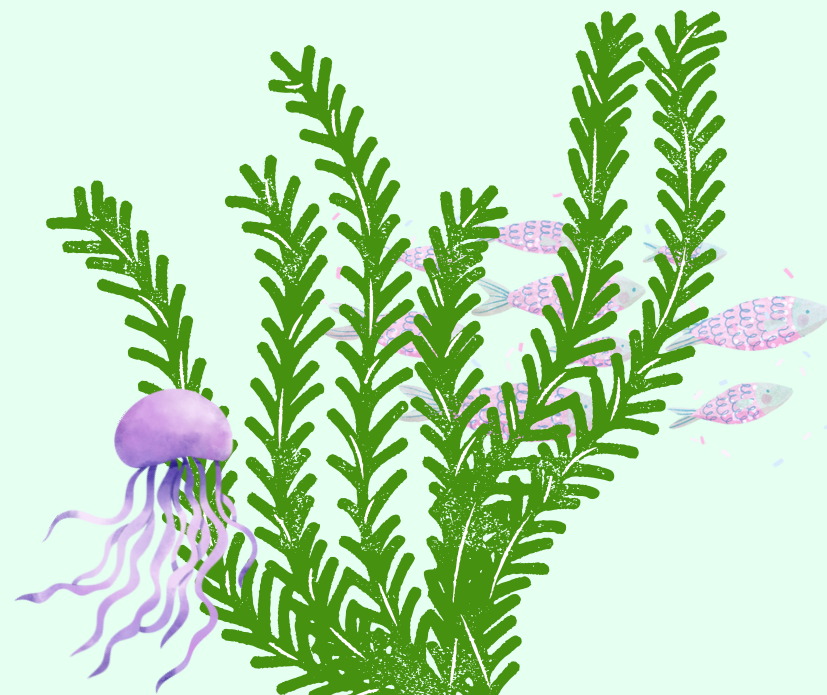
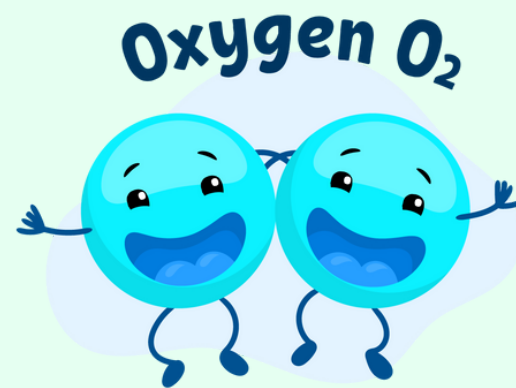




Introduction

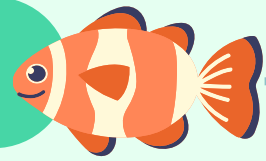
Microalgae and cyanobacteria convert CO₂ and light into biomass, vital for aquatic ecosystems.

Fish farm feed, made of small fish flours and oils, impacts ecosystems and food security. Microalgae are researched as alternative due to fish flour depletion.



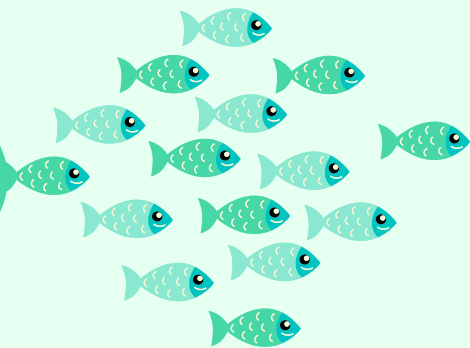
Benefits

NUTRIENT-RICH FEED



RICH IN PROTEINS, LIPIDS, VITAMINS, AND ESSENTIAL MINERALS CRUCIAL FOR THE HEALTHY GROWTH OF FISH AND SHRIMP.

GROWTH STIMULANT



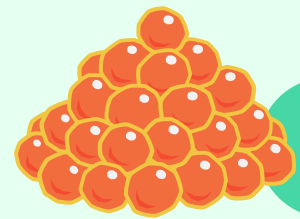
PROMOTES RAPID AND HEALTHY GROWTH IN AQUATIC SPECIES, ENHANCING FEED CONVERSION RATES.

HEALTH BOOSTER



BOOSTS THE IMMUNE SYSTEM OF FISH, REDUCING DISEASE INCIDENCE AND ENHANCING RESILIENCE TO STRESSFUL CONDITIONS.

More Benefits



REPRODUCTION SUPPORT

SUPPORTS OPTIMAL REPRODUCTIVE DEVELOPMENT IN FISH, LEADING TO HIGHER SURVIVAL RATES OF LARVAE AND FRY.

ENVIRONMENTAL SUSTAINABILITY



REDUCES RELIANCE ON CONVENTIONAL FEED SOURCES, ALLEVIATING PRESSURE ON NATURAL ECOSYSTEMS.

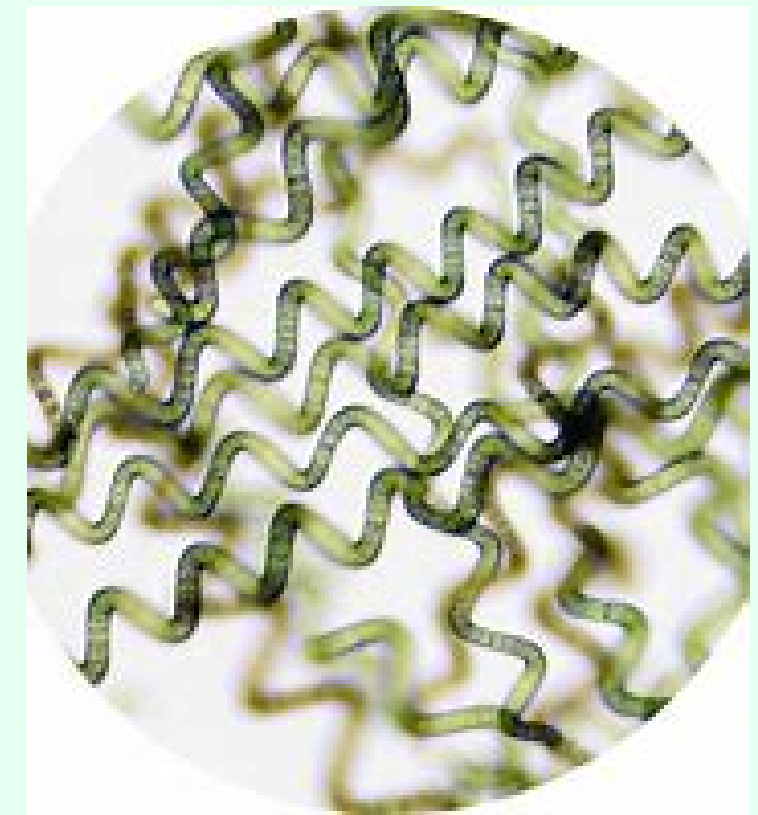
WATER QUALITY CONTROL



SOME MICROALGAE SPECIES PRODUCE ANTIOXIDANTS AND PIGMENTS BENEFICIAL FOR FISH HEALTH AND FOR THE PHARMACEUTICAL AND FOOD INDUSTRIES.

Spirulina

SPIRULINA, A BLUE-GREEN MICROALGAE, IS A "SUPERFOOD" WITH A HIGH PROTEIN CONTENT (60%) AND CAN REPLACE ANIMAL PROTEINS IN FISH FEED. IDEAL FOR FEEDING FISH, ITS DIGESTIBILITY IS 83-84%. IN ADDITION, IT PROVIDES NATURAL CAROTENOIDS THAT INTENSIFY THE COLOR OF FISH FILLETS.

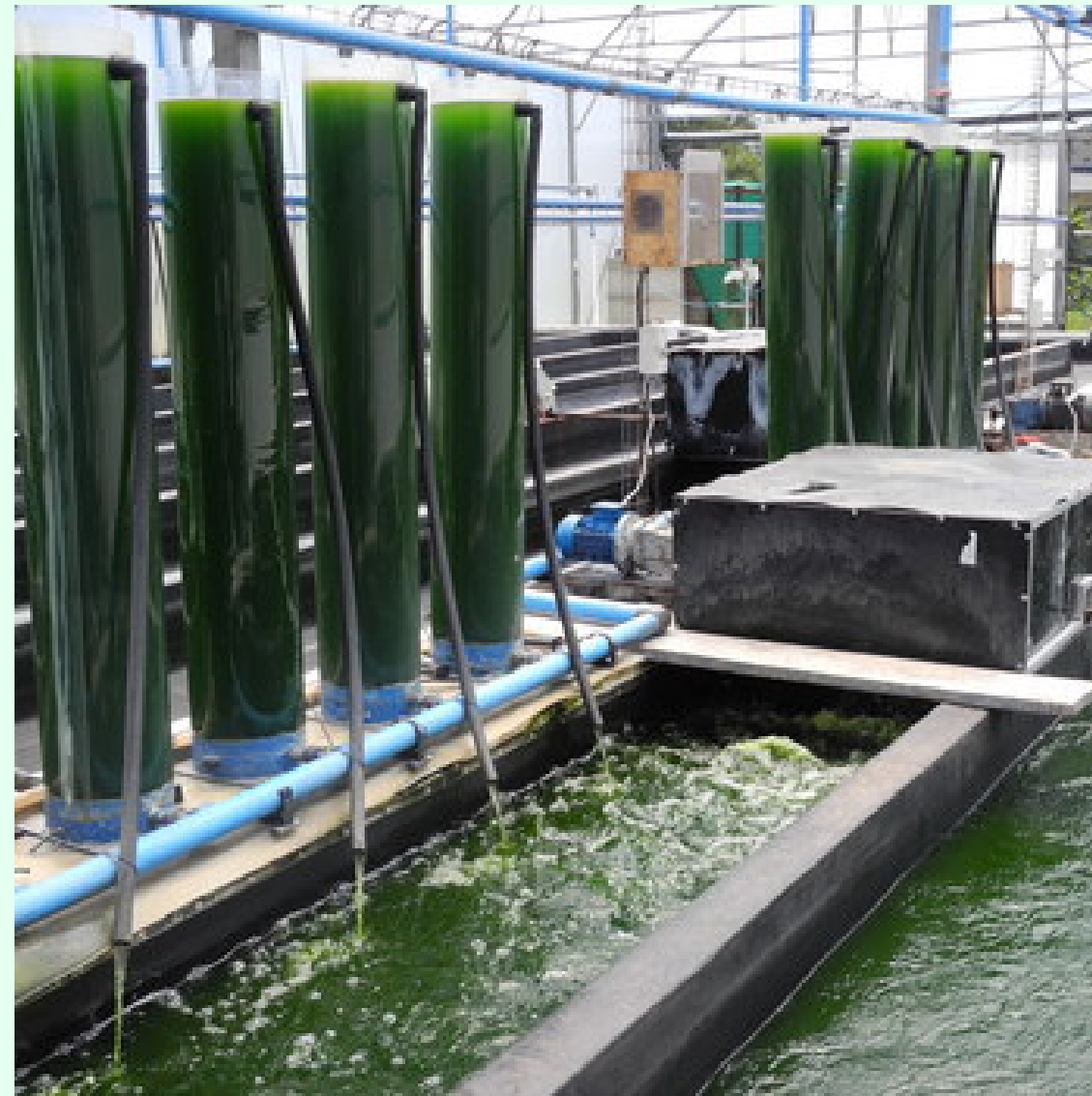


Chlorella vulgaris

- CRUCIAL ROLE IN AQUACULTURE: SINCE THE GROWTH OF FISH OCCURS IN THE SO-CALLED "GREEN WATERS" HAVING THE FOLLOWING BENEFITS:

NUTRITION AND NATURAL FOOD:

1. Improves larval survival by optimising nutrition.
2. It contains (DHA), nutrients, and proteins.
3. Natural food as part of the diet

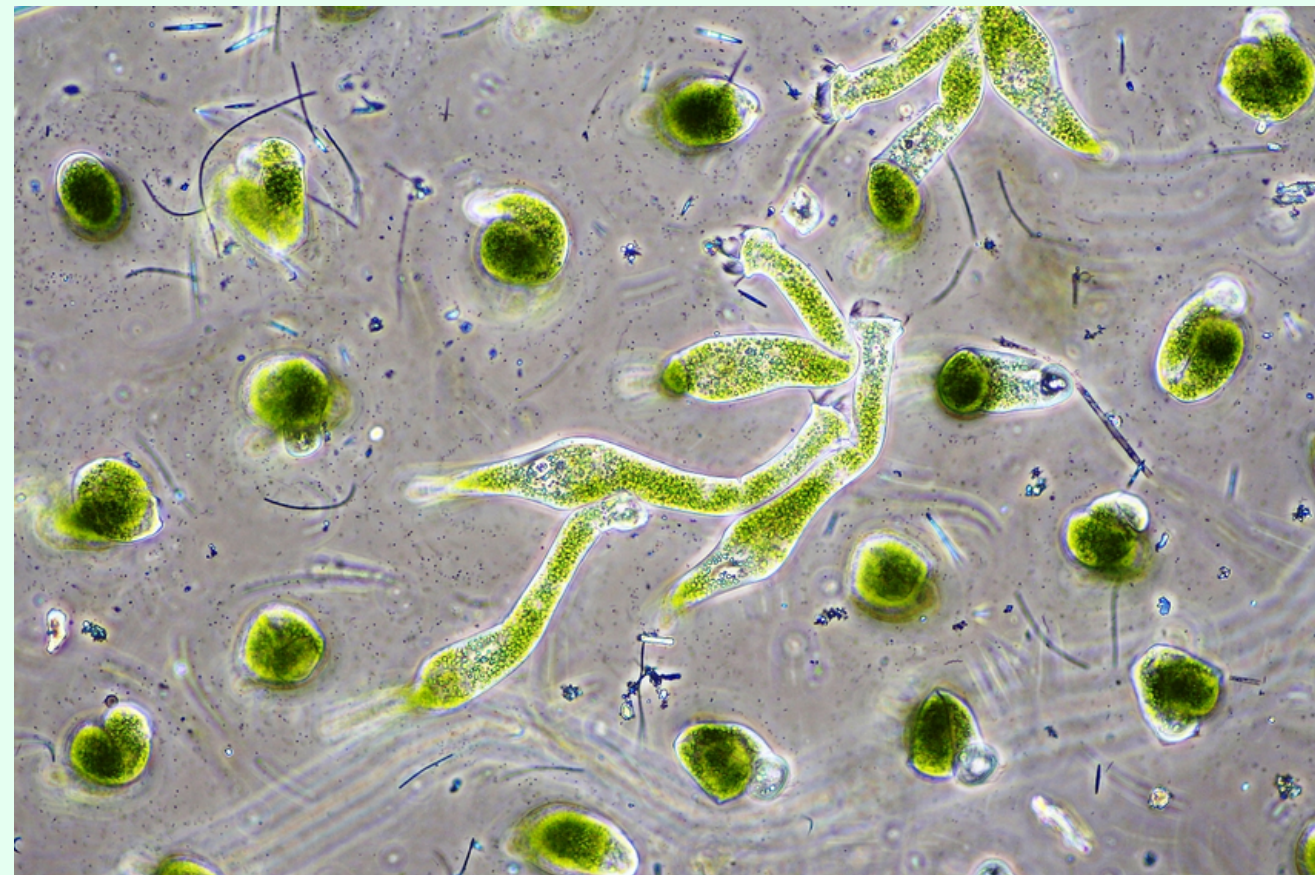


WATER QUALITY IMPROVEMENT AND CONSERVATION:

1. It acts as a biological filter, recycling excess nutrients, especially nitrogenous compounds.
2. Maintaining a healthy environment for fish.

ANIMAL WELFARE:

- 1. Fish are healthier and more resistant to disease.**
- 2. They experience optimal growth.**

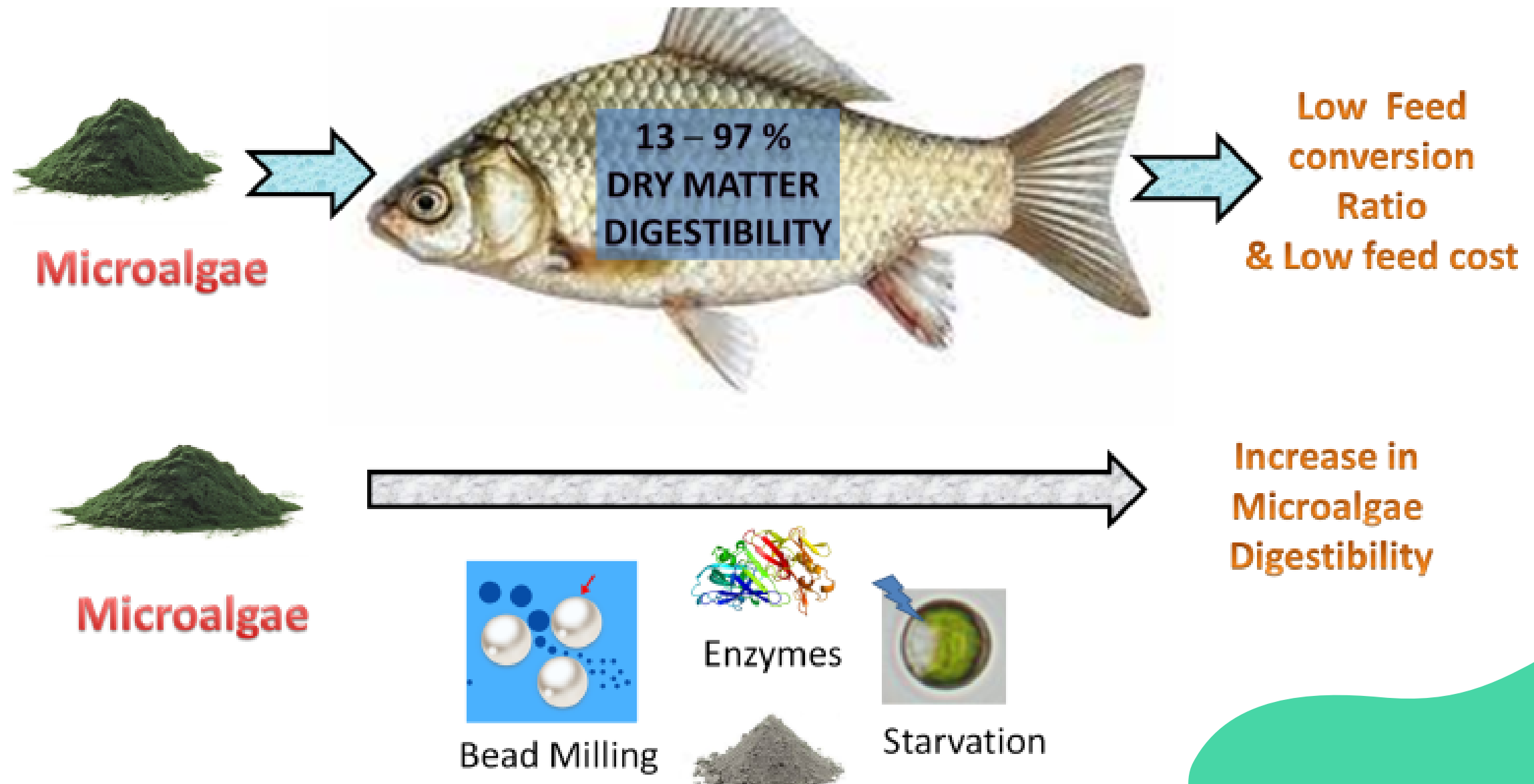


REDUCTION OF COMMERCIAL FEED LOSS:

- 1. It's a natural alternative**
- 2. Both economic and environmental benefit by reducing dependence on manufactured feed.**

The Digestibility of Microalgae Biomass for Fish Feeding.

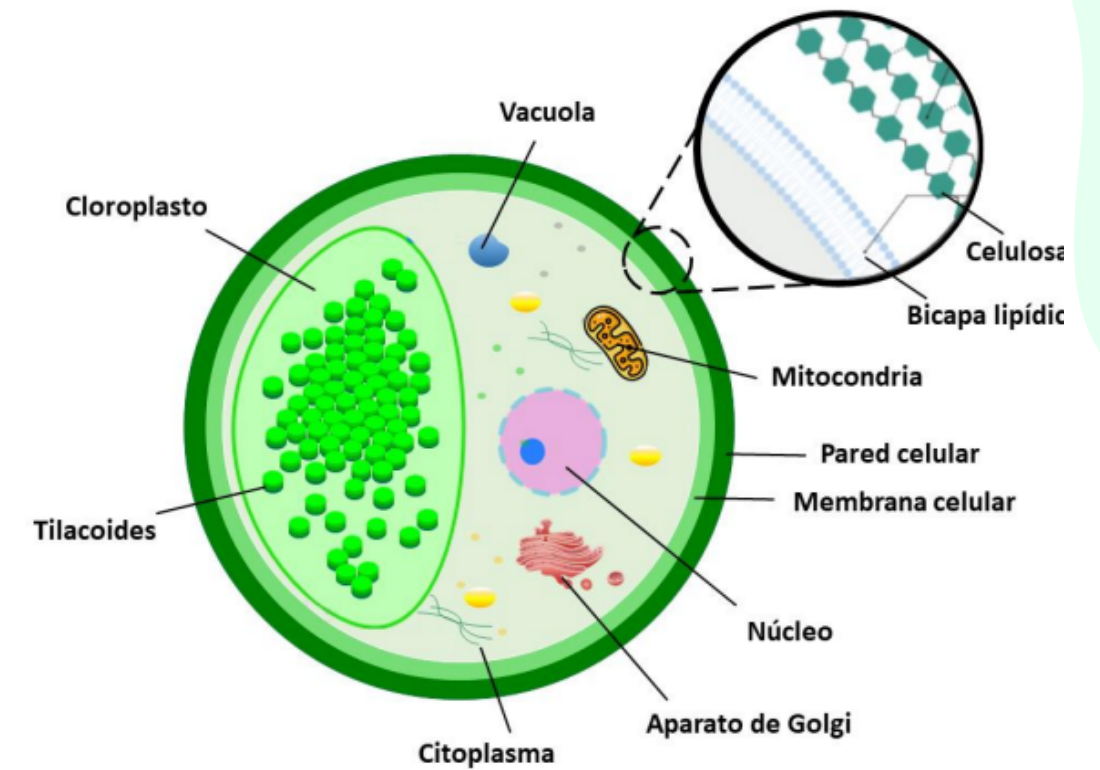
WE WILL LOOK AT THE FACTORS THAT AFFECT THE DIGESTIBILITY OF MICROALGAE BIOMASS, METHODS FOR EVALUATING DIGESTIBILITY IN FISH, AND RECOMMENDATIONS FOR FEEDING FISH WITH MICROALGAE BIOMASS.



The Cell Wall.

PRESENCE

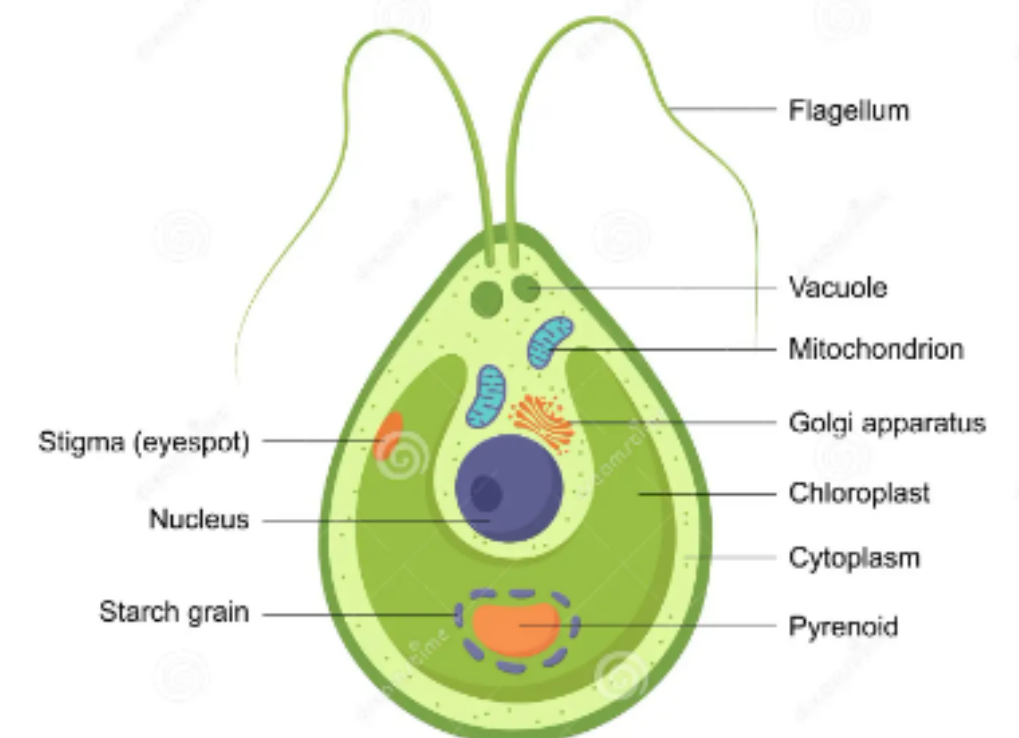
REDUCES THE DIGESTIBILITY OF MICROALGAE BIOMASS DUE TO THE CELLULOSE AND LIGNIN PRESENT



ABSENCE

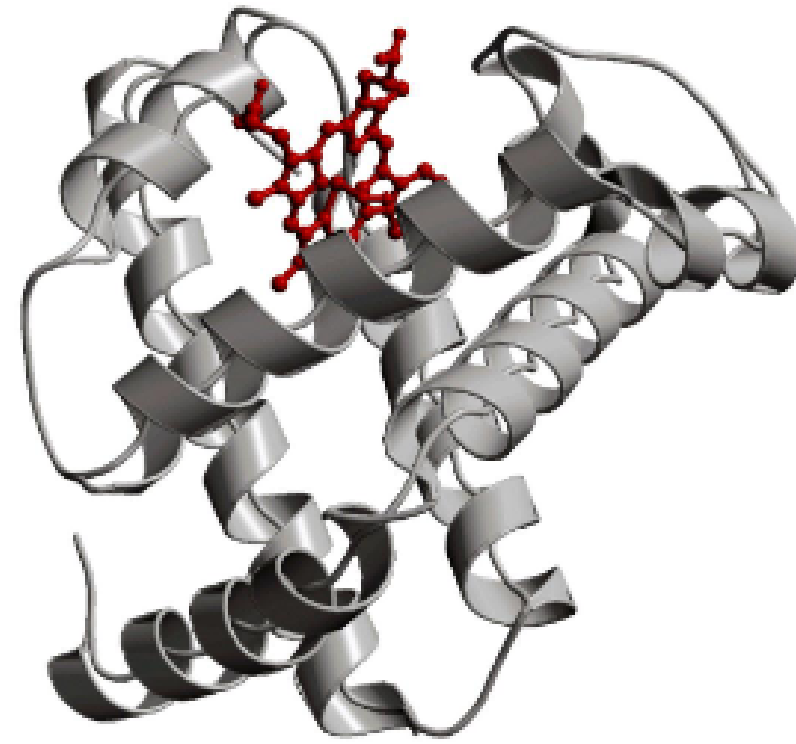
INCREASES DIGESTIBILITY BY ALLOWING GREATER ACCESS TO INTRACELLULAR NUTRIENTS

CHLAMYDOMONAS



Proteins and Digestibility

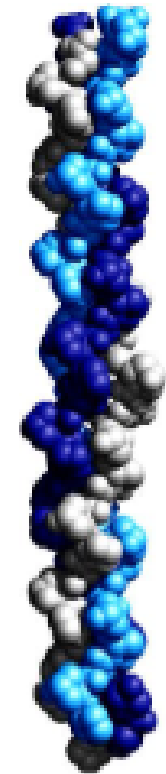
Proteínas globulares



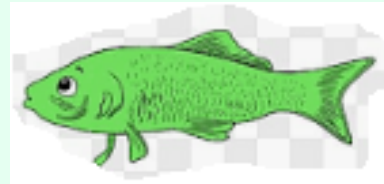
GLOBULAR PROTEINS
THEY FACILITATE
DIGESTIBILITY.

FIBROUS PROTEINS
THEY REDUCE
DIGESTIBILITY DUE
TO THEIR
STRUCTURE

Proteínas fibrosas



Digestibility Evaluation Methods in Fish



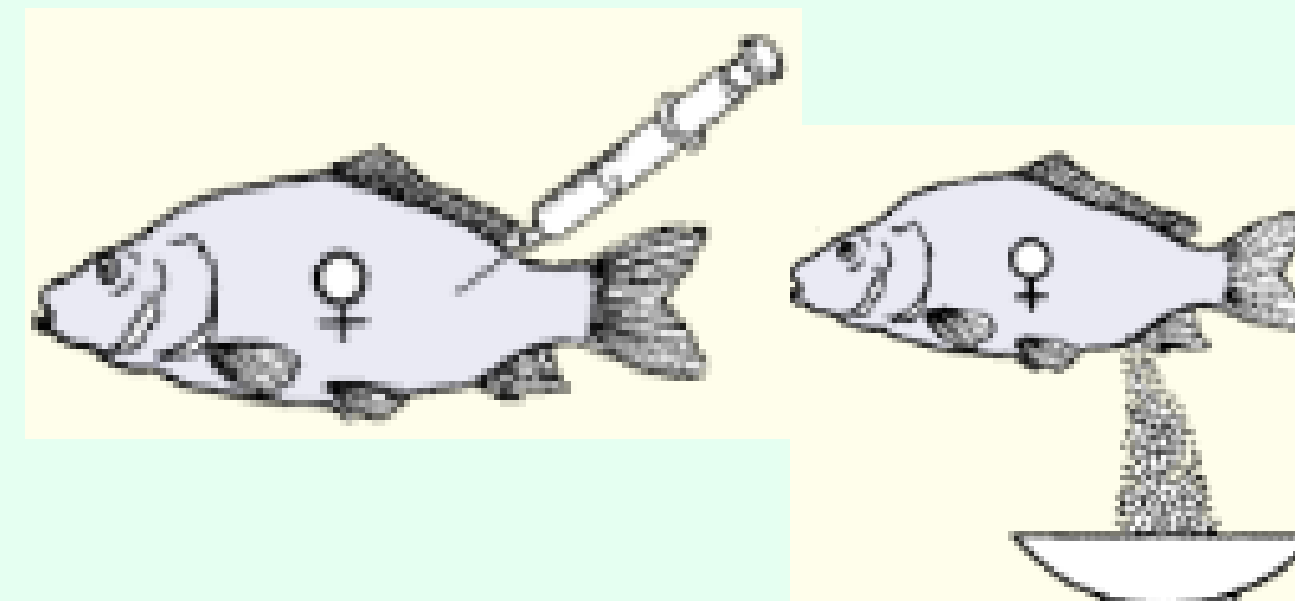
IN VITRO ASSAY

EVALUATES THE DIGESTIBILITY OF FISH FEED INGREDIENTS IN A REDUCED MODEL.



IN VIVO ASSAY

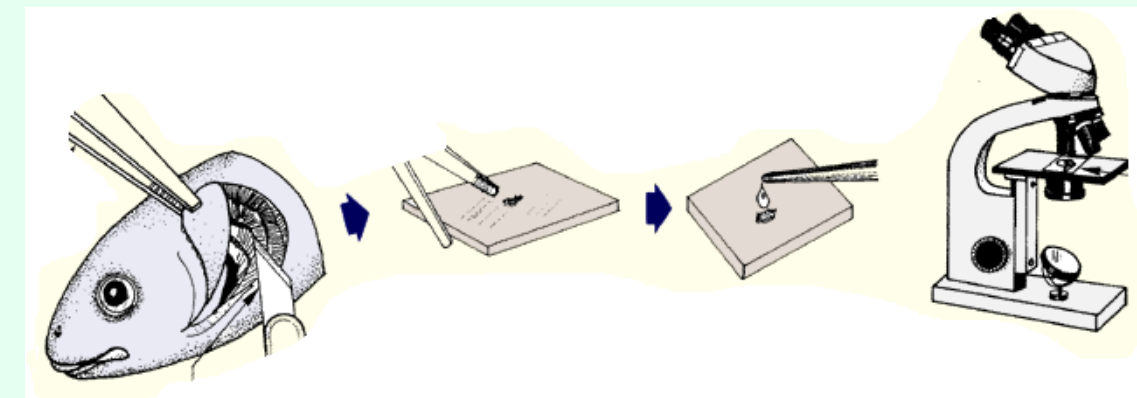
EVALUATES THE DIGESTIBILITY OF FISH FOOD INGREDIENTS IN A FISH TANK ENVIRONMENT



EVALUATES THE DIGESTIBILITY OF FISH FOOD INGREDIENTS IN A FISH TANK ENVIRONMENT

ON-SITE TESTING

Evaluates the digestibility of fish food ingredients in the intestine of the fish itself.



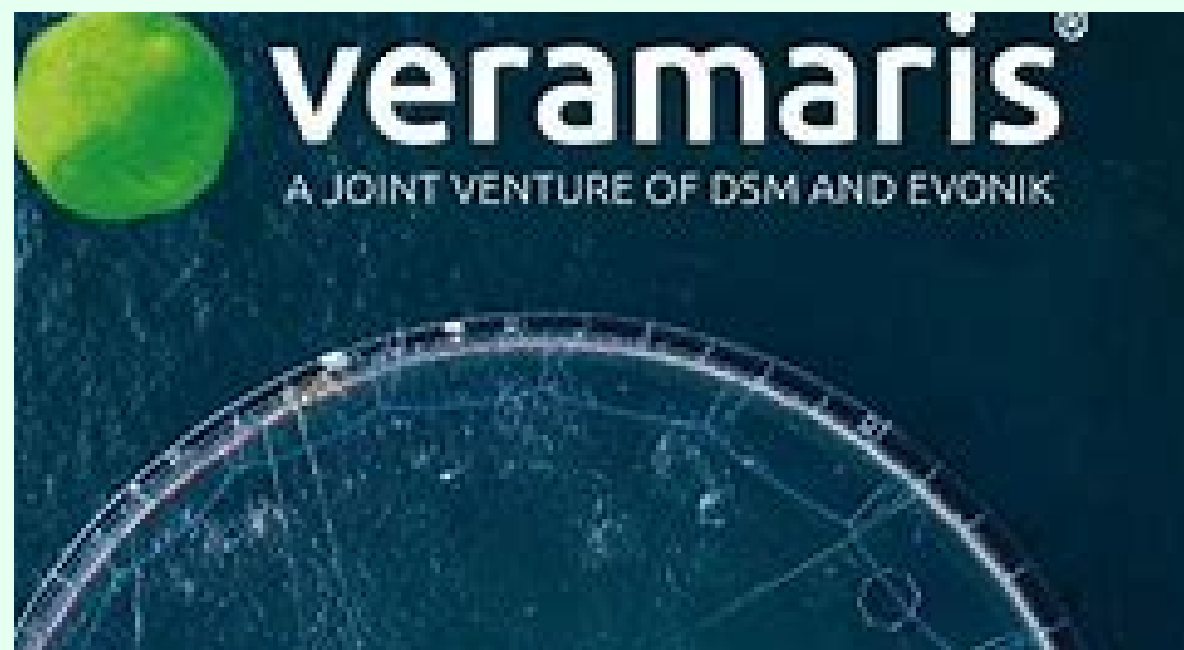
Companies

THERE ARE COMPANIES THAT ARE WELL AWARE OF THE USE OF MICROALGAE IN THE FOOD INDUSTRY FOR AQUACULTURE:

-Skretting, is a leading company in its manufacturing providing an innovative solution to increase protein production



- Veramaris, a joint venture between DSM and Evonik, in the production of the first seaweed oil containing omega-3 fatty acids

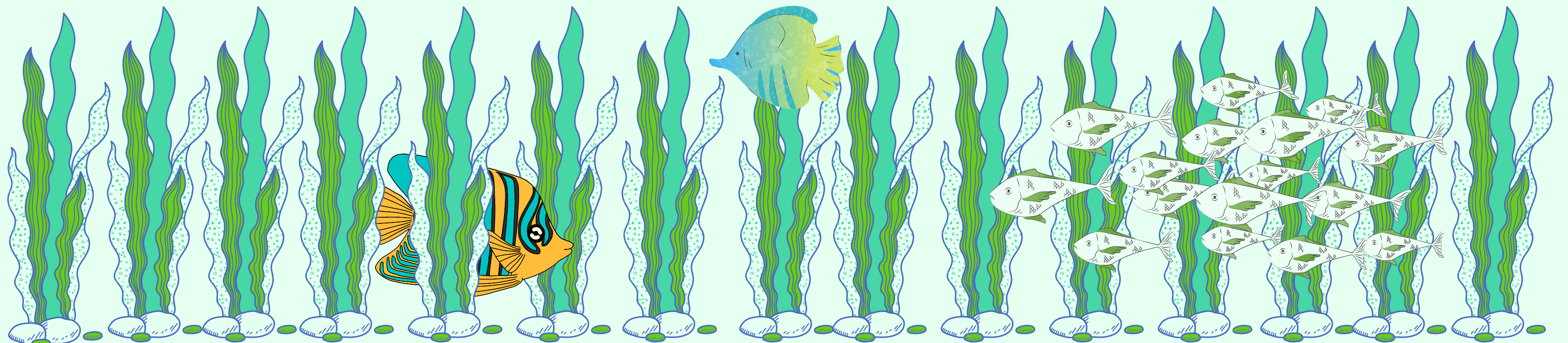
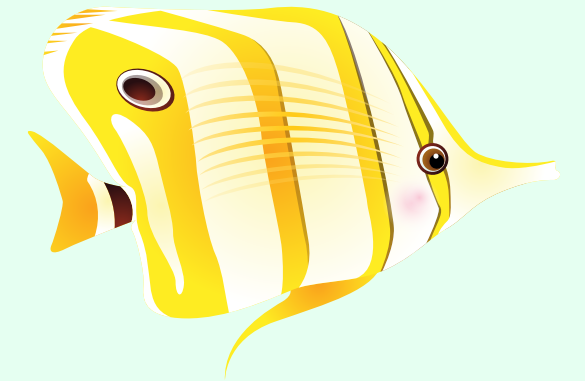


-Algaenergy is a company specialized in microalgae and its application in nutrition and aquaculture. Focusing on the optimization of photosynthesis



Conclusion

MICROALGAE REPRESENT A SOURCE OF OPPORTUNITY AND SOLUTION IN THE FIELD OF FISH FARMING. DUE TO ITS ABILITY TO PRODUCE ESSENTIAL NUTRIENTS, ITS SUSTAINABILITY AND EFFICIENCY IN PHOTOSYNTHESIS, MAKE IT A PROMISING ALTERNATIVE IN GLOBAL FOOD SECURITY, GIVING WAY TO A HEALTHIER AND MORE SUSTAINABLE FUTURE



ii I THANK YOU
VERY MUCH
FOR YOUR
ATTENTION!!

