

# Sustainable aquaculture development in Sweden:

## An assessment of novel feed in the aquaponic cultivation of Nile tilapia

### CONCLUSION

Blue mussel and pea protein are supported as sustainable alternatives to fishmeal and soy in aquafeeds. Combined with circular systems such as aquaponics, these ingredients can reduce dependence on imported resources, helping to make aquaculture more resilient, eco-friendly, and regionally adapted.

### Turning “waste” into a resource

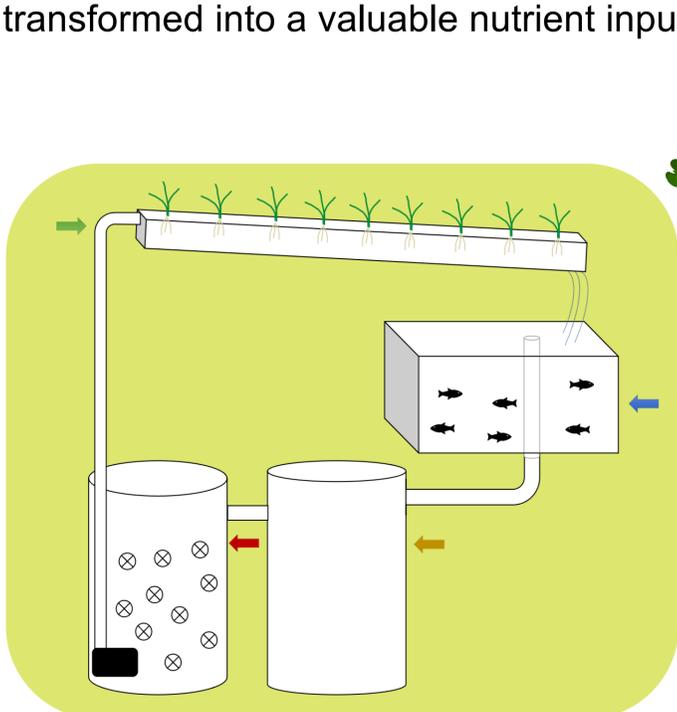
Aquaculture is the fastest-growing food sector, but nutrient loss remains a key challenge, contributing to environmental pollution and the depletion of valuable resources. Aquaponics offers a solution through its closed-loop design, promoting efficient resource use, nutrient recycling, and the dual production of fish and vegetables. What is traditionally considered “waste” is transformed into a valuable nutrient input.

### Regional Food & Feed Security

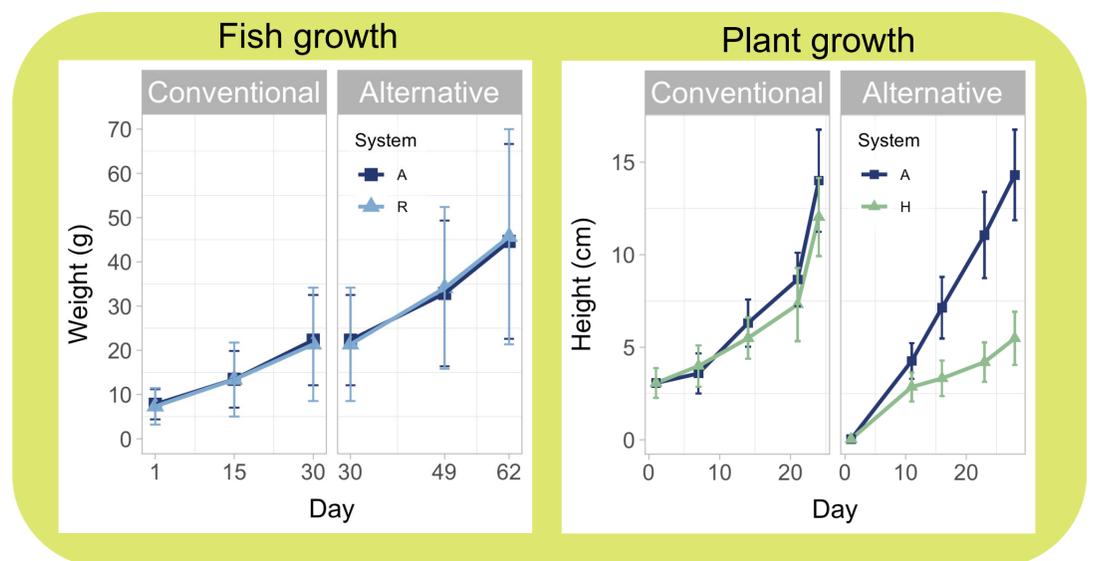
This study evaluates the potential of blue mussel meal and pea protein as regionally sourced alternatives to traditional fishmeal and soy protein in aquafeeds for Nile tilapia cultivated in aquaponic systems with Tatsoi as crop plant.

### Method

Experimental trials were conducted to compare conventional and alternative feeds in aquaponic systems, evaluating their effects on fish performance, plant growth, and water quality in comparison to hydroponic and RAS control systems.



Schematic of the aquaponic system utilizing the Nutrient Film Technique (NFT). Blue arrow: fish tank, yellow arrow: sump tank, red arrow: biofilter, green arrow: hydroponic unit, and black box: water pump.



Line plots showing fish growth in aquaponic systems and RAS under conventional and alternative feeds, alongside plant growth in aquaponic and hydroponic systems over the same periods.

### RESULTS

In the alternative feed trial, fish in aquaponic systems demonstrated high growth and feed efficiency (FCR: 1.03), slightly lower than in the conventional trial (FCR: 0.62), which may be attributed to the life stage of the fish. Fish reared in RAS showed marginally better growth overall, but the difference remained within acceptable limits. Throughout the trial, aquaponic systems maintained stable water quality and consistently supported healthy, and superior plant growth compared to hydroponic systems.



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