

INAPRO Project Partners



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Contact

Project Coordinator
Prof. Dr. Werner Kloas

Scientific Coordinator
Dr. Daniela Baganz

Leibniz-Institute of Freshwater Ecology and Inland Fisheries in the Forschungsverbund Berlin e.V. (IGB)

Public Relations
AliénorEU

inapro@igb-berlin.de

www.inapro-project.eu



Improved concept

Higher productivity

Reduced emissions



Innovative Aquaponics for Professional Application

Efficiency and Emission Improvements with the Double Recirculation System

Key Benefits

INAPRO Aquaponics features a new water-saving combination principle of aquaculture and hydroponics providing optimal production conditions both for the fish and the plant units. The INAPRO technology sets a new standard in sustainable food production and thus encourages consumer acceptance.

Aquaponics = aquaculture + hydroponics

Aquaponics is a food production technology that couples aquaculture (production of fish) and horticulture as hydroponics (soilless production of vegetables) in one system. Fish and plant production mutually benefit from each other in an environmentally friendly way.

What is the innovation?

The INAPRO aquaponic system enables a cost-saving and nearly emission-free food production. It enhances conventional single recirculation aquaponic systems by separating the water recirculation between the fish and the plant units.

INAPRO provides a model-based concept and fully functional demonstration objects. Optimised production conditions for fish and plant units (concerning pH values and nutrient composition for the plants etc.) are monitored and adjusted by a sophisticated automated management system.

The nutrient-rich water from the fish system is used as fertiliser for the plants. While reducing the costly disposal of contaminated sewage, secondary nutrient additions can be shortened exceedingly.

How does the system work?

The recirculating water from the fish unit passes through a multistage system: a mechanical filter removing solid particles is followed by an efficient biofilter with specific bacteria that converts the metabolism end products of the fish into an excellent plant fertiliser.

This nitrate-rich waste water from the fish unit is transferred to the hydroponic greenhouse section buffered by a storage tank. In contrast to conventional aquaponics the amount of transfer water is automatically adjusted to the plants' actual water requirements. Extra fertilisers are added to reach optimum nutrient concentrations for the plants.

Evaporated water in the greenhouse is regained via cooling traps and returned into the fish tanks – this reduces the daily need for freshwater to less than three percent of the system's total volume.

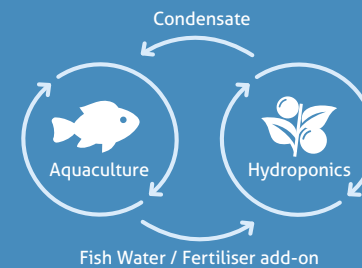
The CO₂ exhaled by the fish is directed to the plants – thus increasing the crop productivity.

Scalability in different climate conditions

The INAPRO system has been conceived to be scalable and adaptable to different sizes and locations from rural large-scale agricultural facilities to small urban farming installations.

INAPRO is proving its technical feasibility on a larger scale in different geographical and climate conditions – demonstration facilities are being built in Spain, Germany, Belgium and China.

Improved productivity



The double recirculation system provides optimised conditions for the fish and plant units independently from each other to increase the productivity of both.

Saving costs and resources

Conventional system water consumption



INAPRO system water consumption



INAPRO aquaponics saves resources by

- doubling the use of water, energy and nutrients
- reducing sewage and the amount of fertilizer for the plants
- regaining evaporated water.

Competitive advantages

Fish and plants produced with the INAPRO aquaponic system are high-value products for consumers who are concerned about the environmental impact.

Greenhouse operators and fish farmers can build up highly efficient production systems offering sustainably produced goods achieving higher retail prices.