

# INNOVATIVE PROCESS OF INTEGRATED CULTURE OF MARINE SPECIES

**P** PATENTED TECHNOLOGY

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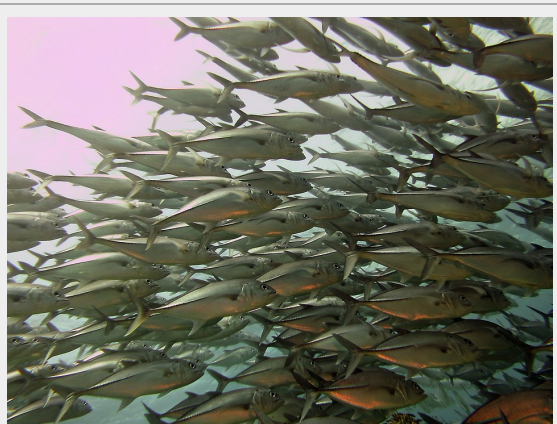
## ABSTRACT

Researchers at the University of Alicante have developed a procedure that combines the culture of several marine species in the same place in offshore areas, as part of an integrated multi-trophic aquaculture (IMTA) system. The main culture may be any of the species commonly used in marine aquaculture as fed fish or shellfish, and the second one involves the culture of amphipods that feeds on organic waste generated by the main culture and has an important commercial potential as food resource.



The main advantage of this technology is the cost-effectiveness of implementing this procedure in sea cages because with the same investment and infrastructure is raising an additional species reusing existing waste and diversifying production. Thus, it can be used in the industrial sectors of aquaculture.

The research group is looking for companies acquiring this invention for: commercial agreement or technical assistance or manufacturing agreement or technical cooperation or a combination of some of these services.



## INTRODUCTION

The culture of amphipods and their use as potential trophic resource for other marine species, both as live prey and in the form of flour, has been widely studied because of a high commercial potential.

However, commercialization of amphipods has not become popular yet due to the management costs related to its development on land tanks and the costs of cleaning and maintenance that it implies. To achieve adequate levels of profitability is necessary to collect large quantities of amphipods and reduce costs. The procedure proposed by researchers solves these problems and increases the profitability of this product.

## TECHNICAL DESCRIPTION

The proposed procedure is based within the concept of Integrated Multitrophic Aquaculture (IMTA). This aims to combine the culture of a main species with other species capable of exploiting the waste generated by the main culture.

The main species may be any of those typically grown on marine aquaculture facilities which are fed with feed pellets. Part of these pellets is not totally consumed and is lost through fish cages to the marine environment.

The innovation driven by the researchers lies in the use of natural production, favoring the growth of other species such as amphipods which take advantage of this food that is lost.

This requires finding native species capable to adapt to local conditions in offshore facilities, as those forming the so-called fouling (marine organisms developed on artificial surfaces such as concrete, wood, plastic etc. when they are submerged in the sea). Amphipods have been selected as the most appropriate organisms for their use in this IMTA system since they meet the established requirements and have an appropriate commercial value.

The culture system of amphipods is very easy. It is based on a series of structures with specific characteristics placed outside the sea cages. Amphipods are set naturally on these structures and develop their populations feeding on surplus feed (used to feed the main species). These structures are removed periodically from the cages, and amphipods are extracted following a specific protocol on the platform or once on land.

Amphipods are part of the natural diet of fish, both those of aquaculture interest such as sea bream and sea bass, and aquarium hobby interest such as Mandarin fish or seahorses. Moreover, their nutritional values make it an interesting product as a nutritional supplement, for example as a supplement in omega 3. Thus, the product can be marketed as unprocessed feed (aquarium, food for juveniles cultured fish, etc.) or be processed to be used for human consumption.

## TECHNOLOGY ADVANTAGES AND INNOVATIVE ASPECTS

### MAIN ADVANTAGES OF THE TECHNOLOGY

Among the numerous advantages of this IMTA system, the most noticeable is the cost-effectiveness of the culture of several marine species in the same place. Additionally, no increase of quantity of food is necessary since amphipod species feeds on the waste of the first species.

Moreover, the culture of amphipods coupled to the main culture has the following advantages:

- Production of a new marine product with high nutritional value and low cost, which is suitable for feeding fish, domestic animals and humans.
- Higher use of the existing marine infrastructure because the new procedure can be implemented in conventional cages incorporating some minor adaptations.
- Reduction of the environmental impact as it is integrated into the marine environment in a natural way
- The species are perfectly adapted to offshore conditions because they are naturally present and the culture is carried out in the same marine environment
- Saving in energy costs, since previous pilot culture of amphipods have been made in tanks on land, which implies a considerable reduction of maintenance, oxygenation and water purification costs.
- Diversification of the production and extraction of a second product with high nutritional value and great commercial potential, developing a multi-trophic culture as is promoted by the EU.
- Diminution of the need for new licenses for aquaculture activities in the marine environment.
- Simplicity of the collection system which does not require major infrastructure or complex treatments.

### INNOVATIVE ASPECTS

The main innovation is the use of a relatively simple procedure to achieve other marine product at the same time than traditional cultured species, using the same aquaculture facilities and without additional feeding.

The design of the collector created by researchers allows that amphipods settle and grow on them and facilitates the subsequent removal of amphipods.

#### CURRENT STATE OF DEVELOPMENT

At present, this technology has been tested in marine aquaculture facilities with optimum results.

#### MARKET APPLICATIONS

The present invention is mainly of interest to companies operating in marine aquaculture sector.

#### COLLABORATION SOUGHT

Companies interested in acquiring this technology for **commercial exploitation** through licensing agreement of the patent are required.

#### INTELLECTUAL PROPERTY RIGHTS

This technology is protected by **granted patent**:

- Application number: 201531543
- Application date: 28/10/2015

#### MARKET APPLICATION (4)

Agri-food and Fisheries  
Biodiversity and Landscape  
Pollution and Environmental Impact  
Marine Studies