EASYTRAIN ESR PROFILE

ESR 3

1) RECRUITING AND PhD ENROLMENT

- **Host institution (beneficiary):** Landing Aquaculture BV (Boxtel, the Netherlands)
- **Supervisory committee:** Carlos Espinal (LANDING)**,** FJ Sánchez Vázquez (UMU) and M Vidal (TILAMUR)
- **PhD awarding entity:** University of Murcia - UMU (Spain)
- **Duration**: 36 months

2) DESCRIPTION OF PhD RESEARCH PROJECT

- **Title:** Engineering aquaculture wastewater biorefineries to improve the combined production of fish and algae
- **Objective:** The future of the EU food production sectors will be driven in part by circularity principles. The EU Circular Economy Action plan – Part of the EU Green Deal considers resources such as food, water, and nutrients to be of high potential for circularity.

  Recirculating aquaculture systems (RAS) are candidates for circular food production. The effluents from freshwater RAS can be safe and efficient sources of nutrients for agriculture, while aquaponics have been demonstrated to produce fish a vegetable with minimal nutrient and water wastage. Seawater RAS however, must be linked to other forms of nutrient upcycling, such as marine algae.

  The research approached by ESR3 is aimed at discovering novel methods of combined fish and algae production. In particular, ESR3 will develop their research project around refining seawater RAS effluents so these can be used as replacements (total or partial) of commercial microalgae stock solution recipes. ESR3 will conduct the work around topics such as:

  - Sludge digestion processes and nutrient solubilization
  - Proximate analysis of aquaculture water and aquaculture sludges.
  - Proximate analysis of microalgae cultures
  - Proximate analysis of treated sludges subject to activated sludge treatment
  - Proximate analysis of microalgae culture mediums and nutrient solutions
  - Methods to treat effluents in aquaculture.
  - Performance of commercial algae growing systems.
  - Performance of algae-based wastewater systems
  - Technical and economic feasibility of microalgae production technologies: SOTA and existing bottlenecks

- **Expected results:**

  The ESR 3 will seek to answer the following research questions, tentatively:

  Q1: What sequence of aerobic / anaerobic steps can we put together to increase nutrient solubilization?

  Q2: What other financially viable methods can we use to improve the performance of aquaculture effluent (UV, pH control, BOD removal, TSS removal)

  Q3: Does treated effluent improve algae growth compared to commercial solutions?

- **Secondments*:*** 6 months in UMU (Spain) and 6 months in TILAMUR (Spain)

3) REQUIREMENTS AND SELECTION CRITERIA

- *MSc-degree in Biotechnology, or a MSc degree in environmental, wastewater or process engineering*
- *Background knowledge of the aquaculture sector*
- *Knowledge of AutoCAD applications will be considered favourably.*
- *Practical laboratory experience*
- *Affinity and preferably experience with the cultivation of microorganisms and running bioreactor experiments.*
- *English conversation, writing skills, and presentation skills (B2 language level at least). Additional valuable skills are referring to the scientific communication of results, including reading and comprehension of scientific papers, co-authoring of papers and abstracts presented at Congresses, oral communication of scientific results at Meetings.*
- *Social skills: ability to work independently. Additional social skills include communication ability in small teams, capacity to adapt to changing work environments.*
- *Affinity with or general interest in land-based aquaculture*
- *Other: capacity to relocate and travel for short stays. The ESR will be expected to do secondments in two institutions in Spain.*

4) ADDITIONAL INFO

The PhD programme at Universidad de Murcia

The normal duration of a PhD in Spain is 3 years. The recruited candidate will be enrolled in the PhD Programme of "Molecular Biology and Biotechnology" *of the International School of Doctoral Studies of the University of Murcia". During this 3-year period, the candidate will reside mostly at Landing Aquaculture, with secondments in two other project partners in Spain and Italy.*

About Landing Aquaculture BV

Landing Aquaculture BV is a Dutch aquacultural engineering company specialised in land-based aquaculture technology, recirculating aquaculture systems, aquaponics, and aquaculture wastewater treatment. Landing aquaculture strives to translate science into practice and to solve the aquaculture sector's future challenges with creativity, good knowhow, and rigor. Landing

Aquaculture's activities include R&D projects on waste valorisation, circular production, multitrophic aquaculture and novel water treatment methods.

Landing Aquaculture has been involved in publications including papers in aquacultural engineering, MDPI water and BMC microbiology. Landing Aquaculture was also involved in the creation of the book "Aquaponic Food Production Systems" (Springer).

For more information about Landing Aquaculture:

- *Website: www.landingaquaculture.com*
- *Profile at LinkedIn:* https://www.linkedin.com/company/landing-aquaculture