OPEN LAB HOURS COURSE INFORMATION

Title: “Fish feed raw materials for sustainable Aquaculture”

Academic Year 2023/2024

Lecturers	Emmanouil Malandrakis	Assistant professor (Agricultural University of Athens)
	Arkadios Dimitroglou	Assistant professor at Agricultural University of Athens
	Shikha Ojha	Assistant Lecturer at South East technical University
	Tomislav Šarić	Associate professor at University of Zadar
	Harry Palm	Professor at University of Rostock
First day of the course	03/06/2024	
Last day of the course	07/06/2024	

Title	Date	Time (CET)	Contents	Implementation	
				On site	*On-line*
Introduction to Fish rearing	*03/06/2024*	*10.00-13.00*	Introduction to Recirculating Aquaculture Systems (RAS) How to set up a fish rearing experiment in RAS. Monitoring water quality parameters (physical, chemical)	**AUA**	**FredU KU LRUniv UCV SETU UNIZD UROS UTCB**
Aquafeed production/ *Utilization of yeasts in fish feed Preparation of fish feed with the use of yeast ingredients*	*04/06/2024*	*10.00-13.00*	Introduction to aquafeed production methodology. Familiarization with feed ingredients. Preparation of fish feed yeast additive formulation of feeds for fish.	**AUA**	**FredU KU LRUniv UCV SETU UNIZD UROS UTCB**
Production and incorporation of insect meals as protein sources in fish feed	*05/06/2024*	*10.00-13.00*	Edible insects can represent a sustainable and protein-rich feeds ingredient for aquaculture. In recent decades, eight species of insects including silkworms (Bombyx mori), black soldier fly (Hermetia illucens), housefly (Musca domestica), yellow mealworm (Tenebrio molitor), lesser mealworm (Alphitobius diaperinus), house cricket (Acheta domesticus), banded cricket (Gryllodes sigillatus) and Jamaican field cricket (Gryllus assimilis) have been tested and used for industrial aquafeed production. These insects are approved for the production of feed in aquaculture under EU legislation. When insect meal is used as fishmeal replacement, growth performances, as well as haematological parameters and healthy status of fish could be affected. These results are strictly dependent on insect species, aquatic species and percentage of inclusion. The scale of insect farming and the volume of insect meals production are on rise, and it is expected that insects as a fish feed ingredient will substantially impact aquaculture, making it more profitable and sustainable.		**SETU AUA FredU KU UCV LRUniv UNIZD UROS UTCB**
Microalgae production in bioreactors	*06/06/2024*	*10.00-13.00*	Aquaculture feeds are one of fish culture's main inputs and cost factors. Concerns regarding the economic and environmental sustainability of feeds are mainly based on ingredients of marine	**UNIZD**	**AUA FredU KU**

			feed-grade fisheries origin and have steered significant EU support towards exploring and utilizing alternative nutrient sources. In aquaculture, microalgae are primarily associated with nutrition for fish larval rearing or as food additives to essential nutrients as a provider of DHA and EPA. Microalgae cultivation in photobioreactors has emerged as a promising and sustainable approach to address various environmental and energy challenges, offering many benefits across diverse applications. In this lecture, critical factors in microalgae cultivation, such as preparation of nutrients for algae cultivation (vitamins, macronutrients and micronutrients), photobioreactor design, light-dark (L-D) cycles, CO2 concentrations, mass transfer, hydrodynamics behaviour, and pH, will be reviewed. Also, the production of algae in large-scale industrial photobioreactors will be demonstrated as well as the control of the population of cultivated algae.		**LRUniv** **UCV** **SETU** **UROS** **UTCB**
Research and Development of sustainable aquaculture practices	*07/06/2024*	*10.00-13.00*	Sustainable aquaculture practices require a better use of the natural resources as well as the minimal production of effluent waters and wastes. One possibility is the combination of fish and plant production, or aquaponics, where the plants utilize the water and nutrients from aquaculture and the clarified water returns to the fish. However, this process is complex and requires thorough research and a deeper understanding of the underlying processes. This lecture demonstrates the strategy behind the research activities in the FishGlassHouse at Rostock University for the further development of aquaponics and its integration into the circular economy.		**UROS** **AUA** **FredU** **LRUniv** **KU** **UCV** **SETU** **UNIZD** **UTCB**