



Training Workshop on Nuclear and Complementary Analytical Methods to Detect and Control Antimicrobial Residues and Antimicrobial Resistance in Aquaculture

Virtual Event
Via Microsoft Teams

26, 27, 30 and 31 March 2026

Ref. No.: EVT2504593

Information Sheet

Antimicrobial resistance (AMR) - the ability of microorganisms to resist pharmaceuticals - is a global threat, potentially causing 10 million deaths annually by 2050. In aquaculture, the rapid intensification of production has fuelled the widespread use of antimicrobials to combat diseases. This is associated with the emergence of resistant microorganisms that threaten not only aquatic animal health but also food safety and the environment. AMR can be accelerated from antimicrobial misuse, poor biosecurity, and weak regulations. Antimicrobial residues in aquatic food raise food safety concerns, potentially leading to import bans and economic losses. The presence of other residues or contaminants in the aquaculture environment, such as sanitizers, biocides, pesticides and heavy metals may contribute to or enhance AMR. Furthermore, AMR genes can spread to pond water and sediments (used as fertilizer), impacting environmental health and necessitating control measures.

Under the umbrella of the Atoms4Food initiative, the Food Safety and Control Laboratory (FSCL), the Animal Production and Health Laboratory (APHL), and the Soil and Water Management and Crop Nutrition Laboratory (SWMCNL) of the Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture work jointly since early 2025 on the Peaceful Uses Initiative project “*Integrated Strategies for Managing Antimicrobial Resistance in Western & Central African Aquaculture: A Cross-Disciplinary Approach to Enhancing Aquatic Animal Health, Food Security, Food Safety, and Environmental Sustainability*”. At the primary production level, the project aims to strengthen Member States’ laboratory capacity to provide high-quality data on pathogens and AMR, detecting bacterial pathogens thereby using science-based information in policy making. Additionally, to establish and validate novel technologies for detecting aquatic animal diseases and resistant genes using nuclear and biotechnology methods, ensuring sustainable aquaculture and food security. The environmental component of the project focusses on understanding the behaviour of

antimicrobials in the anaerobic sediments of aquaculture ponds. This will include investigating how these antimicrobials change their dynamics when the sediments are taken out of the pond and applied as fertilizer in agriculture. The project will address the critical unknown factor of how the transition from an anaerobic to an aerobic environment impacts the fate and potential risks of these compounds. It will provide crucial knowledge to inform the safe and sustainable use of pond water and sediments as irrigation water or agricultural fertilizer respectively, reducing potential environmental contamination and promoting responsible practices within the aquaculture sector. The food safety component will support Member States in using nuclear and complementary techniques to strengthen their analytical and monitoring capabilities regarding the determination of AMR-related antimicrobial residues in aquaculture products and associated matrices, along with the analysis of other co-occurrent chemical contaminants and residues, such as sanitizers, biocides, pesticide residues or heavy metals, thus safeguarding public health and addressing food loss and obstacles to trade, and contributing to strengthened capabilities for generating data to be used for the establishment of regulation, national food safety standards and maximum residue limits for antimicrobial residues in aquaculture products.

Objectives

The objective of this virtual training course is to raise awareness and enhance capabilities in the use of nuclear and complementary tools and techniques for analysing and monitoring the occurrence of antimicrobial residues and antimicrobial resistance in aquaculture. The course will focus on how advancements in laboratory analysis and field experiments can enable Member States to effectively respond to the global challenge of antimicrobial resistance within the One Health perspective.

Working Language

English.

Expected Outcome

The expected outcome of the course is well informed, trained personnel in the application of nuclear and complementary technologies for detecting, identifying and/or quantifying bacteria pathogens, antimicrobial residues and AMR in aquaculture systems, as well as in analytical tools for the determination of other contaminants and residues that may induce or enhance AMR.

Structure

The training programme will comprise four modules: (1) Understanding the Global Challenges Posed by Antimicrobial Resistance under the One Health Perspective; (2) Technological solutions for detection,

mitigation and control of bacteria and AMR in aquaculture systems; (3) Understanding the fate of antimicrobials and AMR in aquaculture; (4) Analytical approaches and considerations for monitoring key antimicrobial residues in aquaculture products.

The training will employ recorded lectures, video presentations of laboratory procedures and 'live' online question and answer sessions. Selected applications will be presented to provide the participants with basic to intermediate knowledge of techniques.

Topics

Module 1. Understanding the Global Challenges Posed by Antimicrobial Resistance under the One Health Perspective

Module 2. Technological solutions for detection, mitigation and control of bacteria and AMR in aquaculture systems

- Basic sampling method for detecting bacterial pathogens and AMR in aquaculture with a focus on freshwater fish and shrimp
- Introduction of sample processing and analytical method for detecting major fish disease and AMR characterisation
- Technologies to reduce the use of antimicrobials in aquaculture

Module 3. Understanding the fate and mitigation of antimicrobials and AMR in aquaculture environment

- Analysis of antimicrobials and AMR in soil, sediment and water
- Nuclear and complementary techniques for evaluating effects of antimicrobials on aquaculture
- Isotopic and complementary techniques to understand the fate and dynamics of antimicrobials and AMR in aquaculture and agriculture
- The nexus between antimicrobials and AMR in aquaculture and agriculture
- Mitigation of antimicrobials and AMR in aquaculture environment

Module 4. Analytical approaches and considerations for monitoring key antimicrobial residues in aquaculture products

- Classification, use and toxicity of antimicrobial residues
- Regulatory provisions and standards
- Sampling requirements and sample preparation techniques
- Principles of liquid chromatography and mass spectrometry
- Multi-analyte determination of antimicrobial residues in food with liquid chromatography-tandem mass spectrometry (LC-MS/MS) with isotope dilution
- Rapid screening methods, i.e., radiometric assays and sensors

Participation and Registration

This training course will be open for remote access **on 26, 27, 30 and 31 March 2026** using the virtual platform Microsoft Teams. All persons wishing to participate in the event must be designated by an IAEA Member State or should be members of organizations that have been invited to participate.

Each country is entitled to nominate up to **six (6) candidates** in line with the requirements described in the Participants Qualification and Experience.

Participants' Qualifications and Experience: Countries are invited to nominate candidates in the fields of expertise below for the consideration of the Joint FAO/IAEA Centre's selection committee. (Please note: A total of maximum six candidates per country can be nominated, with two candidates per field of expertise).

Field of Expertise 1 - Animal disease detection and AMR characterisation

Eligible candidates are representatives of veterinary/aquatic animal disease laboratories (laboratory managers/laboratory professionals) in charge of bacteriology or AMR surveillance plans, or from research laboratories in the field of detecting bacteria pathogens and related AMR.

Field of Expertise 2 - Soil and Water Management and Resource Use Efficiency

Eligible candidates are representatives of scientists and technicians in charge of or interested in soil science, agricultural water management or any related discipline and experience in mitigation of antimicrobials and AMR in aquaculture and agriculture.

Field of Expertise 3 - Food Safety Laboratory Analysis

Eligible candidates are representatives of analytical laboratories (laboratory managers/analysts) in charge of national food safety monitoring plans, or from research laboratories in the field of testing for food safety.

Registration through the InTouch+ platform:

In order to be designated by an IAEA Member State or invited organization, participants are requested to submit their application via the InTouch+ platform (<https://intouchplus.iaea.org>) to the competent national authority (Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority) or organization for onward transmission to the IAEA by **6 March 2026**, following the registration procedure in InTouch+:

1. Access the InTouch+ platform (<https://intouchplus.iaea.org>):
 - Persons with an existing NUCLEUS account can [sign in here](#) with their username and password;
 - Persons without an existing NUCLEUS account can [register here](#).
2. Once signed in, prospective participants can use the InTouch+ platform to:
 - Complete or update their personal details under 'Basic Profile' and upload supporting documents;
 - Search for the relevant event (EVT2504593) under the 'My Eligible Events' tab;
 - Select the Member State or invited organization they want to represent from the drop-down menu entitled 'Designating Authority' (if an invited organization is not listed, please contact InTouchPlus.Contact-Point@iaea.org);
 - Based on the data input, the InTouch+ platform will automatically generate Participation Form (Form A).
 - Submit their application.

Once submitted through the InTouch+ platform, the application, together with the auto-generated Form A, will be transmitted automatically to the required authority for approval. If approved, the application, together with the Form A, will automatically be sent to the IAEA through the online platform.

For additional information on how to apply for an event, please refer to the [InTouch+ Help](#) page. Any other issues or queries related to InTouch+ can be sent to InTouchPlus.Contact-Point@iaea.org.

Selected participants will be informed in due course on the procedures to be followed to access the course.

Candidates who successfully complete the virtual training course will receive a certificate.

No registration fee is charged to participants.

Participants are hereby informed that the personal data they submit will be processed in line with the [Agency's Personal Data and Privacy Policy](#) and is collected solely for the purpose(s) of reviewing and assessing the application and to complete logistical arrangements where required. The IAEA may also use the contact details of Applicants to inform them of the IAEA's scientific and technical publications, or the latest employment opportunities and current open vacancies at the IAEA. These secondary purposes are consistent with the IAEA's mandate.

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Subsequent correspondence on scientific matters should be sent to the Scientific Secretaries and correspondence on other matters related to the event to the Administrative Secretary.