IAEA
International Atomic Energy Agency
Atoms for Peace and Development

Regional Training Course on Strengthening the Use of Radiation Technologies in the Processing and Valorisation of Biomass Feedstocks

Hosted by

The Government of Poland

through the

Institute of Nuclear Chemistry and Technology

Warsaw, Poland

9 -13 June 2025

Ref. No.: TN-RER1024-EVT2500797

Information Sheet

Purpose

The purpose of this event is to train participants in the application of radiation technologies for processing and valorising of biomass feedstocks.

Working Language(s)

The working language(s) of the event will be **English.**

Deadline for Nominations

Nominations received after **4 April 2025** will not be considered.

Project Background

It is becoming increasingly evident that the environmental challenges facing humanity extend beyond local and regional scales, reaching a continental scope. Consequently, there is a growing demand for economically and technically viable pollution control technologies to address issues arising from gaseous emissions and liquid effluents. Radiation technologists, among other professionals, are actively engaged in the search for such solutions. In recent decades, extensive efforts have been dedicated to harnessing radiation technology for environmental remediation. These endeavours encompass a wide range of applications, including the simultaneous removal of SOx and NOx from flue gases, groundwater purification, wastewater treatment, and the hygienization of sewage sludge for agricultural use. Radiation processing has established its significance in diverse domains, spanning polymer modification, medical sterilization, and environmental protection. The IAEA plays a pivotal role in advancing the utilization of radiation processing. The agency facilitates the transfer of radiation processing technologies, encourages the sharing of knowledge and expertise, and fosters the development of a professional network dedicated to environmental protection and the sustainable utilization of resources as well as the quality assurance (QA) of radiation facilities. These endeavours are underpinned by the harmonized and safe implementation of radiation technologies through the RER1024 project.

Scope and Nature

The training course will include lectures, practical exercises, and discussions covering the following topics:

1. Biomass Feedstocks:
   - Discuss different types of biomass (agricultural residues, wood, algae, food waste, etc.) and their characteristics, highlighting their potential in a circular economy model where biomass waste is minimized, and materials are reused or repurposed.
   - Highlight the commercialization potential of each biomass feedstock for conversion into valuable products, and explore how radiation technologies can improve processing efficiency, making them more viable for industrial-scale applications and commercial markets.
2. Radiation-Based Biomass Processing:
   - Provide a comprehensive explanation of how ionizing radiation (gamma, electron beam, X-ray) modifies biomass, enhancing its properties (physical, chemical, and/or biological) for efficient reuse and recycling in a circular economy.
   - Discuss the role of radiation technologies in converting waste biomass into new, valuable products, contributing to the development of a closed-loop system that minimizes waste and environmental impact.
   - Explore the various stages of biomass processing such as pretreatment, breakdown of complex polymers, and conversion into biofuels, bioplastics, and other high-value products.
3. Practical Exercises on Process Design:
   - Hands-on exercises on designing irradiation processes, including choosing the appropriate type of radiation, simulating/determining the correct dosage, and optimizing processing parameters.
   - Practical demonstrations of radiation-induced modifications in biomass, showcasing their potential for scaling up to industrial levels and forming the foundation for industrial partnerships in biomass valorisation.

4. Process Control and Optimization:
    - Train participants in how to design, scale, and control radiation processes, and how to assess the impact of various irradiation parameters on the final biomass products, with an emphasis on optimizing processes for commercial viability and industrial collaboration.

Participation

The training course is open to RER1024 participating member states. Each country is invited to nominate a maximum of two participants that meets the qualifications as described in the Participants' Qualifications below.

Participants' Qualifications and Experience

The participants should be professionals, researchers, engineers, or graduated students with backgrounds in material science, environmental technology or industrial processing oriented for processing and/or valorisation of biomass. Participation of young professionals are highly recommended. Preference is given to applicants working directly in biomass processing by radiation technologies.
For this event, the target member states are those involved in RER1024 where radiation processing technologies are established or soon to be introduced.

Expected Outputs

The expected outputs of the training course include among others:

- Understanding of biomass feedstocks, their characteristics and how radiation can enhance the conversion of these feedstocks into valuable products.
- Increased knowledge into radiation-based biomass processing: better understanding of ionizing radiation (gamma, electron beam) can be used to alter biomass at the physical, chemical, and biological levels; and key stages of biomass processing, including pretreatment, polymer breakdown, and conversion into biofuels, bioplastics, and other high-value products.
- Increased process design skills, supported by simulation tool of dose distribution to optimize the processing parameters.
- Be introduced to the idea of a circular economy and how it relates to valorisation of biomass feedstocks.

These outputs aim to equip participants with a solid understanding of radiation technology applications in biomass processing and valorisation, enabling them to design, optimize, and apply radiation techniques effectively in various industrial contexts.

Application Procedure

Candidates wishing to apply for this event should follow the steps below:

1. Access the InTouch+ home page (https://intouchplus.iaea.org) using the candidate's existing Nucleus username and password. If the candidate is not a registered Nucleus user, she/he must create a Nucleus account (https://websso.iaea.org/IM/UserRegistrationPage.aspx) before proceeding with the event application process below.

2. On the InTouch + platform, the candidate must:
    a. Finalize or update her/his personal details, provide sufficient information to establish the required qualifications regarding education, language skills and work experience ('Profile' tab) and upload relevant supporting documents;
    b. Download and complete the Designation of Beneficiary and Emergency Contact Form, and upload to InTouch+ ('Profile' tab under the personal section) specifying the document name. If already provided, kindly discard this step; and
    c. Search for the relevant technical cooperation event (EVT2500797) under the 'My Eligible Events' tab, answer the mandatory questions and lastly submit the application to the required authority.

NOTE: Completed applications need to be approved by the relevant national authority, i.e. the National Liaison Office, and submitted to the IAEA through the established official channels by the provided designation deadline.

For additional support on how to apply for an event, please refer to the InTouch+ Help page. Any issues or queries related to InTouch+ can be addressed to InTouchPlus.Contact-Point@iaea.org.

Should online application submission not be possible, candidates may download the nomination form for the training course from the IAEA website.

NOTE: A medical certificate signed by a registered medical practitioner dated not more than four months prior to starting date of the event must be submitted by candidates when applying for a) events with a duration exceeding one month, and/or b) all candidates over the age of 65 regardless of the event duration.

Administrative and Financial Arrangements

Nominating authorities will be informed in due course of the names of the candidates who have been selected, and will at that time be informed of the procedure to be followed with regard to administrative and financial matters.

Selected participants will receive an allowance from the IAEA sufficient to cover their costs of lodging, daily subsistence and miscellaneous expenses. They will also receive either a round-trip air ticket based on the most direct and economical route between the airport nearest their residence and the airport nearest the duty station through the IAEA's travel agency AX Travel Management, or a travel allowance, or they will be reimbursed travel by car/bus/train in accordance with IAEA rules for non-staff travel.

Disclaimer of Liability

The organizers of the event do not accept liability for the payment of any cost or compensation that may arise from damage to or loss of personal property, or from illness, injury, disability or death of a participant while he/she is travelling to and from or attending the course, and it is clearly understood that each Government, in approving his/her participation, undertakes responsibility for such coverage. Governments would be well advised to take out insurance against these risks.

Note for female participants

Any woman engaged by the IAEA for work or training should notify the IAEA on becoming aware that she is pregnant.

The Board of Governors of the IAEA approved new International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources. The Standards deal specifically with the occupational exposure conditions of female workers by requiring, inter alia, that a female worker should, on becoming aware that she is pregnant, notify her employer in order that her working conditions may be modified, if necessary. This notification shall not be considered a reason to exclude her from work; however, her working conditions, with respect to occupational exposure shall be adapted with a view to ensuring that her embryo or foetus be afforded the same broad level of protection as required for members of the public.

IAEA Contacts

Programme Management Officer (responsible for substantive matters):

Ms Meng Li
Division for Europe
Department of Technical Cooperation
International Atomic Energy Agency
Vienna International Centre
PO Box 100
1400 VIENNA
AUSTRIA
Tel.: +43 1 2600 26442
Fax: +43 1 26007
Email: Me.Li@iaea.org

Administrative Contact (responsible for administrative matters):

Ms Alexandra Morscher
Division for Europe
Department of Technical Cooperation
International Atomic Energy Agency
Vienna International Centre
PO Box 100
1400 VIENNA
AUSTRIA
Tel.: +43 1 2600 26036
Fax: +43 1 26007
Email: A.Morscher@iaea.org