

Summary

Overview of the Joint Webinar

Core Focus: The interface of animal health, environmental sustainability, and drug-related challenges concerning vector-borne infections and anthelmintics.

Participating Actions:

OneHealthdrugs (OHD): Focused on coordinating the discovery of drugs against vector-borne parasitic diseases in human and veterinary settings with a minimal environmental footprint.

ENVIRANT: Focused on advancing knowledge on the environmental occurrence and ecological impact of anthelmintics administered to livestock, proposing sustainable mitigation practices.

OneHealthdrugs (CA21111) Progress & Achievements

Action Structure & Goals: Running from November 2022 to October 2026 under the chair of Maria Paola Costi, OHD connects 34 member countries and hundreds of participants. Its main goal is to enrich the drug pipeline with high-quality, cost-effective leads targeting Neglected Infectious Diseases (NID) while incorporating One Health principles.

Key Scientific Outputs & Platforms:

Virtual Chemotheca Database: A repository storing 12,398 compounds (with more than 10,000 specific antiparasitic compounds) equipped with predicted physico-chemical, ADME, and ecotoxicological properties.

AI and Ecotoxicity Tools: Development of computational tools such as the **GreenDrugScore (GDS)** and the **G.AI.A platform** (by CloudPharm) to predict bioaccumulation and ecotoxicity (like BCF and LC50 models) for compounds and their metabolites.

Assay Innovations: Implementation of high-throughput ecotoxicology screening formats, including aquatic micro-environments and luminescent bacterial assays using *Aliivibrio fischeri*.

Capacity Building & Dissemination:

Conducted multiple training schools, short-term scientific missions (STSMs), and veterinary surveys regarding the environmental impact of parasitic vector-borne disease drugs.

Published over 115 multi-author papers, special issues (such as in *ACS Infectious Diseases* and *Molecules*), and established guidelines for transitioning from *in vitro* to *in vivo* drug discovery pipelines.

ENVIRANT (CA23154) Objectives & Structure

Core Aim: To build a network bridging experts who measure anthelmintic residues in the environment, evaluate sustainable alternatives, and foster knowledge exchange on reducing livestock drug use.

Working Groups (WGs):

WG1 (Anthelmintic Residue Occurrence): Investigates residue levels in soil, water, plants, and invertebrates, linking them to farming practices and climatic drivers.

WG2 (Environmental Impact): Assesses ecosystem repercussions, ecological risks, and ecotoxicology of residues.

WG3 (Green Farms) & WG4 (Overcoming Barriers): Focuses on sustainable helminth control, farm practices, and stakeholder implementation.

WG5 (Benefit-Risk Assessment) & WG6 (Dissemination): Evaluates overall impacts considering animal health benefits versus ecosystem risks, alongside community communication.

Benefit of the ENVIRANT-OHD collaboration

Premise. The focus would be on a core issue that sits at the heart of OHD. When veterinary drugs undergo authorization, the benefits, such as efficacy, animal health, and productivity, are meticulously documented with clinical data. In contrast, environmental risk is only evaluated at the very end of development using a limited set of tests, and only if specific concentration thresholds are crossed. By that stage, companies have already invested heavily, making the system structurally biased toward approval. Consequently, the two sides of the equation (animal health versus environmental risk) are neither evaluated with equal depth nor at the same stage.

This is where the COST Action CA21111 becomes crucial. If ecotoxicity were integrated into the early stages of drug discovery—while candidates are still being selected and optimized—we could flag or discard molecules with poor environmental profiles before heavy financial commitments are made.

Action point

- Identify activities that could be developed together
- Exchange of experimental data to be used for validating the ecotoxicity parameters prediction.
- Collaboration with the computational experts to refine the algorithms and foresee a useful output.

Future Outlook and Legacy

Final Year Priorities: Emphasizes stakeholder interaction (including policy makers and industry), finalizing project deliverables, publishing policy briefs, and advancing safer antiparasitic compounds through patent processes.

Long-Term Legacy: Seeding career development for Young Researchers and Innovators (YRI)—including OHD Ambassadors—and establishing a structured, permanent network platform to sustain One Health drug discovery beyond the formal 4-year COST framework. Action to be developed in collaboration

Program

Program OHD (45’):

Maria Paola Costi – (UNIMORE) Action chair – OHD Overview

Sandra Gemma –(University of Siena) Horizontal group on Biodegradation of pharmaceuticals -

Title: *Biodegradability in the drug discovery pipeline*

Daniele Aiello – (UNIMORE, member of the Ecotoxicity/Docking Team)

Title: *Integrating Machine Learning and GreenDrugScore - GDS- for Compound Prioritization*

Eleni Chontzopoulou - (CloudPharm, SME, Athens)

Title: *G.A.I.A: An Integrated Machine-Learning Platform for Predicting Bioaccumulation and Ecotoxicity of Pharmaceuticals.*

Marco Mazzorana - (Diamond center for structural biology) – Core group member –

Title: *From Molecules to Ecosystems: Structural Biology and Biophysics in a One-Health Framework*

Theodora Calogeropoulou - (NHRF , Athens) - WG2 Leader -

Title: *Integration of early phase studies and low environmental impact actions*

Sheraz Gul (Fraunhofer) - Horizontal Group 4 Leader on Training School –

Title: *In-vitro assays in drug discovery*

Guy Caljon - (Antwerp University, Antwerp) -WG3 leader –

Title: *A roadmap for the discovery of high-quality leads and drug development candidates considering the One Health concepts*

Harry de Koning (University of Glasgow, Glasgow) WG6 Leader -

Title: *A survey of veterinarians on the One Health implications of drugs against parasitic vector-borne diseases.*