

Consortium
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Coordination

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Keywords

Biorefinery

Waste

Organic waste

Organic by-products

Sustainability

Territory

City

Urban/suburban area

INRAE departments

[ACT](#)

[AGROECOSYSTEM](#)

[ECOSOCIO](#)

[TRANSFORM](#)

INRAE

Bioeconomy for urban areas



ReBUS

Research network for sustainable urban biorefineries



Understand the interactions between the activities that produce, process, value and consume biomass in a systematic rather than sectoral way, and account for the dynamics of the water, energy and land resources that underpin these activities

In the 2010s, the biorefinery concept was extended to include the use of waste biomass, and is now known as an **environmental biorefinery**. The aim is to combine the environmental benefits of a biorefinery as an alternative to a petroleum refinery with the benefits of exploiting waste bio-resources. Researchers have been assessing the possibility of **smaller-scale biorefineries**, particularly environmental biorefineries, for less than a decade. In the same vein, the idea of a **truly urban and peri-urban environmental biorefinery**, i.e. one that is designed to be integrated into the city or its surrounding area, is equally innovative. Shifting to this model would not only help improve the quality of the urban environment and lead to more efficient waste processing, but would also help citizens and local communities adapt to environmental, economic and social changes, and to seize the opportunities arising from these changes (new skills and know-how, modernisation and added value for industry, improved quality of life, etc.).

Progress and results

Leadership of the REBUS consortium enabled the creation of an **interdisciplinary network of researchers** aimed at catalysing forward-looking thinking on urban environmental biorefining by drawing on the thematic and disciplinary diversity of INRAE researchers. The **main objective** of the consortium was to create a shared understanding and to co-construct scientific projects, in other words, to 'sow the seeds' of interdisciplinary thinking about the urban environmental biorefinery among INRAE scientists.

The main results produced by the REBUS consortium to date are:

- An exploratory study of start-ups that collect and recycle bio-waste. This study was the subject of a 2nd year INSA Centre - Val de Loire internship report and is currently continuing with the submission of an abstract to the "10th International Conference on Sustainable Waste Management": New circular business models for urban solid biowaste valorisation, V. Savary, S. Costa, M. Donner, C. Duquennoi.



- Creating and running the "REBUS" research school: "*Managing and recovering organic waste in an urban or peri-urban context: the Urban Environmental Biorefinery*". From Monday the 3rd of October to Friday the 7th of October 2022 at Ecully, Grand Lyon (France) with 30 participants from the INRAE Bioeconomy of Urban Territories metaprogramme and from outside INRAE.
- The Research School has helped structure the research questions underlying the FREGATE exploratory project supported by BETTER in the 2023 call for expressions of interest. The FREGATE project will address 3 closely related research questions:
 - How can we co-construct a design adapted to the Urban Environmental Biorefinery System (SUBE) for our region and our needs?
 - How does the flexibility/modulability of SUBE change the framework of appropriate design constraints?
 - How does the resilience framework change the framework of appropriate design constraints?

Participation in the 10th International Conference on Sustainable solid waste management (Chania, Crete, 21-24 June 2023): "New circular business models for urban solid waste management", V. Savary, S. Costa, M. Donner, C. Duquennoi

Partners

INRAE Division	INRAE research units	Expertise
ACT	UMR SADAPT UMR LAE	Ethology, neurobiology, image processing
AGROECOSYSTEM	UR LBE	Characterisation and technological, health, territorial and environmental optimisation of residual biomass recovery processes and channels
	UMR ITAP	LCA and territorial environmental assessment
ECOSOCIO	UMR MoISA	Economics, management and marketing, business models, behaviour of consumers/users of biorefinery products, organisation of new markets
	UMR BETA	Economics, coupling of economic models (partial equilibrium, multi-agent) and models from other disciplines (LCA, Material Flow Analysis, etc.)
TRANSFORM	UR PROSE	Optimisation and technological innovation of bioprocesses for waste biomass recovery; microbial ecology, modelling, systems approaches
	UR OPAALE	Technological, territorial and environmental optimisation of residual biomass recovery processes, LCA
	UR QuaPA	Recovery of animal slaughter residues (by-products and household waste), regulatory monitoring
	UR LBE	Characterisation and technological, health, territorial and environmental optimisation of residual biomass recovery processes and channels
	UMR FARE	Biotechnological processing and recovery of lignocellulosic biomass
	UR BIA	Fractionation of plant biomass, bio-based materials,

