INRAE

Bioéconomie pour les territoires urbains

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Keywords

Bioraffinerie
Biodéchets
Déchets organiques
Flexibilité
Résilience
Territoires

INRAE Departments

ECOSOCIO
TRANSFORM

FREGATE

Flexible, Resilient, EGalitarian and Adapted environmental biorefining systems for urban TErritories

> Considering different needs of a territory, different functions expected from biorefining systems by local actors (stakeholders and interested parties) at the earliest design stage, taking into account the necessities for flexibility and modularity, develop the adaptation capacity of biorefining systems to potential (r)evolutions, and even their capacity to be transformed.

Among the numerous challenges that cities have to face, the management of biowaste appears to be more and more crucial. As a matter of fact, the AGEC law provides a generalized separate collection of biowaste all over France for any biowaste producer from December 31st 2023. In 2020 however, only 175 french communities separately collected their biowaste (whether household or professional), representing only 6% of the french population. It is likely that numerous cities will not be able to implement biowaste collection and valorization systems by 2024. The regulatory obligation on biowaste valorization as well as food and energy transition issues confirm the urgency of an in-depth reflection on the best organization procedures of biowaste valorization, including both circularity and adaptation to the territory. In this context, the concept of urban environmental biorefinery deserves scientific investigation.

Objectives

The topic of urban environmental biorefinery is fairly new and original, with very few scientific papers on the subject (9 Web Of Science references respond to « urban biorefinery » in the search field, 2 within the 2015-2016 period and 7 during 2019-2021).

The goal of the FREGATE project is to answer the question: How to implement flexible, resilient and urban-territory-adapted environmental biorefining solutions?

FREGATE will address 3 strongly interrelated research questions:

- How to co-construct a tailored design of an Urban Environmental Biorefining System (UEBS) for its territory and its needs?

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- In what extend the UEBS' flexibility/modularity changes the constraints of the tailored design?
- In what extend the framework of resilience changes the constraints of the tailored design?

Partenaires

Département INRAE	Unités INRAE	Expertises et contributions
ECOSOCIO	UMR MoISA	Actors' behaviour, economy, marketing; Territorial diagnosis, actors and territory, governance
TRANSFORM	UR PROSE	Biowaste valorization process engineering, systemic approaches and modelling
	UR BIA	Caracterization and valorization of bio-sourced products and co-products in bio-economic systems; Scientific and expert knowledge modelling
	UR LBE	Process engineering
	UR OPAALE	Waste management solutions, territories, environmental assessment, spatial analysis; Process engineering
	UR QuaPa	Physico-chemical caracterization of animal by-products and extracted molecules; Process engineering; Territorial approaches
	UMR SayFood	Process engineering, territorial scale tailored design, process modularity, intensification

Partenaires	Equipe	Expertises et contributions
Centre International de Ressources et d'Innovation pour le Développement Durable (CIRIDD)	Pôle Innovation et Animation territoriale	Territory support toward circular economy
Compostond		Study fields for biowaste composting and valorization, actors' Terrains d'étude compostage et valorisation des biodéchets, organisation of local stakeholders
Université Sidi Mohamed Ben Abdellah de Fès (Maroc)		Economy and territorial governance for sustainable development, study fields in Morocco
Université de Technologie de Troyes (UTT)	UR INSYTE	Circular economy, industrial and territorial ecology, socio-technical systems transition, resilience