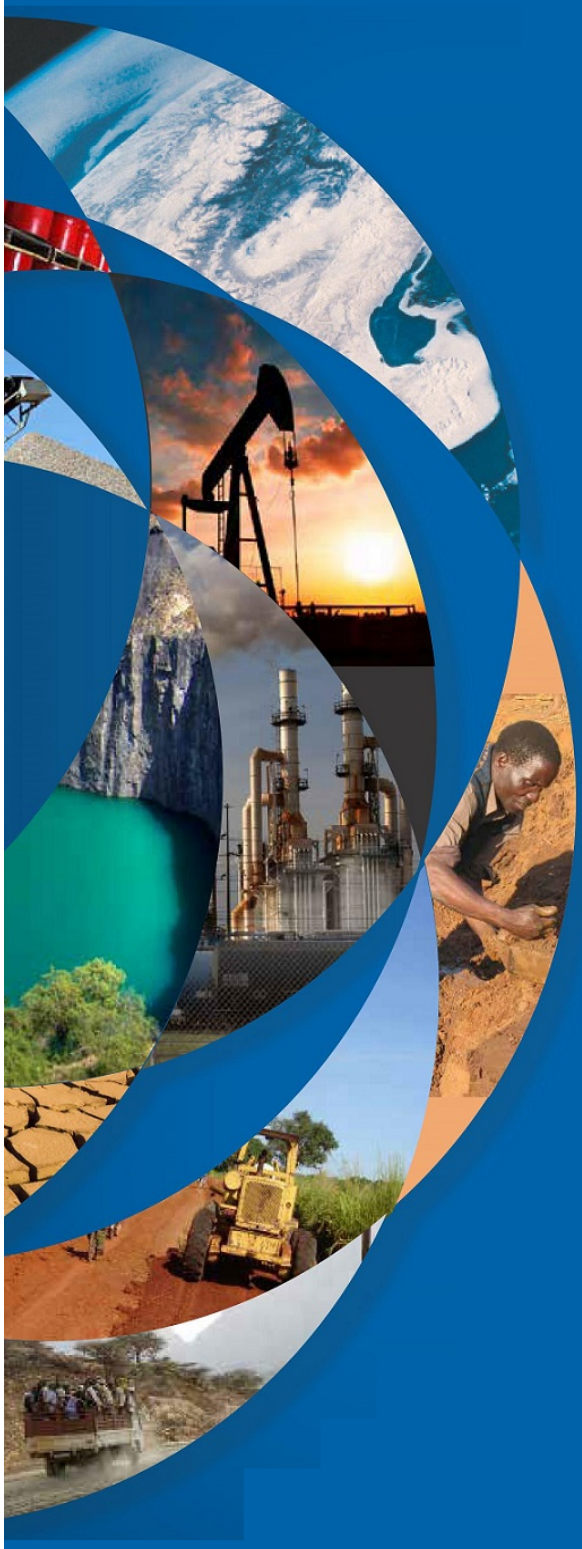

BOOK OF ABSTRACTS

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to be metabolized. Menezes et al. (2009) also tested P. ostreatus on oat xylan and observed considerable degradation on the fifth day. The results obtained in the present work were similar to those obtained by Menezes, Rossi, Ayub, (2017) who found enzymatic activity of 4.44 U.g1 with P. ostreatus on rice husk, 6.17 U.g-1 on soybean hulls, and 24.33 U.g-1 on malt extract.

4 Conclusion

This work shows the possibility to produce xylanases from solid state cultivation of Pleurotus ostreatus on winemaking pomace, with potential improvement in winemaking industry sustainability. The maximum enzymatic activity was 12 U.g-1 after 5 days of cultivation.

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705: Agriculture plays a key role in the transition to circular economy on a tropical island

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Several tropical islands have a high and growing human population that fuels two conflicting dynamics: an increasing need in food and a decreasing availability in agricultural lands due to urban sprawl. Pushed by resource and land limitations, some islands including Réunion choose to both import human food and set up high-input agricultural production systems that rely on imports of mineral fertilisers and raw materials for animal feed. This globalised agri-food system has numerous negative externalities such as nutrient surpluses (and corresponding risk of soil and water pollutions), resources depletion (phosphorus and non-renewable energies) and greenhouse gas emissions due to transportation. A transition to a circular economy (CE) can potentially increase the island autonomy, partially mitigate these negative externalities and foster local economic development. Biomass-based CE is particularly relevant for tropical volcanic islands, like Réunion, endowed with rich soils and higher crop yields.

We studied the opportunities associated with biomass produced locally and used or usable as agricultural inputs to increase circularity within Réunion. The methodology used was based on a material flow analysis (MFA) coupled with a multi-stakeholder participatory approach. It was applied to the present agri-food system to identify local initiatives contributing to the transition to a CE.

Results of the MFA show that 585 000 tons dry matter (tDM) of biomass used or usable as agricultural inputs are produced in Réunion. The agro-industry sector is predominant, representing 58% of the production. 325 000 tDM are used in agriculture (83 %) or urban sectors (4%), or eliminated (landfill site or discharge to the sea) (13%). The difference (260 000 tDM) corresponds to important atmospheric nitrogen and carbon emissions due to intermediary processes like composting and biomass combustion to produce electricity. This MFA leads us to identify three main levers to increase circularity at territorial level: i) A large part of eliminated materials could be used in agriculture, e.g. urban biowaste as fertilizer, food industry waste as animal feed; ii) Atmospheric emissions could be reduced to increase nutrient conservation and carbon sequestration; iii) The efficiency of agricultural processes at both plot and herd levels could be increased by better matching available inputs (fertilizers and feeds) with plant and animal needs.

Results of the participatory approach show that the main stakeholders of the agri-food system in La Réunion (farmers, cooperatives, industrials, energy producers, public and private waste management organisations) are already involved in the transition to a CE. Several on-going industrial symbiosis initiatives were identified and four are in the design phase:

1. a whole-island fodder supply chain with collective fodder storage units to increase local fodder use,
2. manure spreading plans to reduce manure transport distances for each livestock farmer,
3. collective platforms to co-compost urban green waste with manure to produce organic fertilisers for market gardeners,

4. a door-to-door collection of households biowaste and anaerobic digesters to produce bio-energy.

In conclusion, agriculture plays today a key role in the transition to a CE in Réunion. The research is now continuing with a Substance (nutrients) Flow Analysis (SFA) and an Ecological Network Analysis (ENA) of the whole island economy, i.e. between all economic sectors, including imports, exports, and atmospheric emissions. The objective is to assess the efficiency and the integration of the different sectors, including agriculture. An integrated spatially explicit simulation model is also under-development to study the potential (positive or negative) synergies between the four symbiosis initiatives in the design phase to better access their consequences on circularity, and environmental and economical efficiencies.

Table 1. Main characteristics of Réunion

variable		unit	value
population1		inhabitants	860 000
area		km2	2 500
population density		inhabitants /km2	342
land cover2	forest and natural area	%	71
	agricultural area		19
	artificialized area		10
agricultural area2		ha	41 940
agricultural area per crop2	sugar cane	ha (% among total)	22 700 (54)
	grassland		12 237 (29)
	fruits and vegetables		5 402 (13)
	other		1 601 (4)
agricultural area per inhabitant2		m2	557
number of farms2		unit	6 800
number of farms with livestock3		unit	3 750
average area per farmer2		ha	6,2
livestock population2	bovine	heads	29 289
	porcine		68 977
	caprine		11 921
	ovine		3 454
	poultry		3 647 000
food self-sufficiency2	meat	% of local demand and consumption	67
	fruits and vegetables		70

cereals	0

Sources: 1INSEE 2020, 2DAAF La Réunion 2020, 3DAAF La Réunion 2010

350: How to achieve the sustainability of the seafood sector in the European Atlantic Area?

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Abstract:
Climate change, globalization or marine debris are on the spot of concerns for the most society. Particularly, fisheries are impacted by these and other issues. On the framework of the European Atlantic area, NEPTUNUS project (EAPA_576_2018) tries to provide opportunities for the transition to the circular economy of the seafood and aquaculture sectors by means of a consistent methodology for products eco-labelling and defining eco-innovation strategies. Furthermore, this project will provide key actions for resource efficiency based on life cycle thinking and the nexus water-energy-food, incorporating producers, policy makers and consumers in the decision making process. This review addresses, therefore, the threats and challenges of the current Atlantic fisheries, the methodologies and actions to be face them and the expected results of the NEPTUNUS project.

Keywords: sustainability, life cycle assessment, eco-label, seafood, climate change, marine debris

708 Spatiotemporal Dynamic Evolution of Nitrogen Flow in Food Supply Chain in BTH region: 1978-2018

Di Chen , Yi Liu

The reactive nitrogen(Nr) flows and transforms in food supply chain. It is an important nutrient source for human beings, but causes a series of environmental problems simultaneously. At present, some researchers have studied the nitrogen flow in food system, but the description of food supply chain is rough, and few of them consider the nitrogen footprint caused by transboundary food supply, especially at regional level. As a result, we may underestimate or overestimate nitrogen use efficiency and nitrogen emissions of a single city, and couldn’t propose proper regional nitrogen regulation strategies.
In this study, we developed a food system nitrogen flow model to characterize and quantify the nitrogen flux and flow structure within a region, and then combined it with a multi regional input-output model to study the implied nitrogen emissions from food supply across regions.
Taking the Beijing-Tianjin-Hebei(BTH) region as an example, we found that: (1) from 1978 to 2018, nitrogen emissions from the food system of BTH region first increased and then decreased, with inflection points in 2003, 2004 and 2005 for Beijing, Tianjin and Hebei respectively. However, nitrogen emissions from the consumption-waste management process continue rising. In 2018, the nitrogen pollution emitted by consumption and waste management subsystems in Beijing have surpassed the planting and breeding subsystems and become the largest source of total nitrogen, ammonia and N2O emissions（2) Beijing has the lowest nitrogen emissions per capita and spatial intensity, Hebei has the highest nitrogen emissions per capita, and Tianjin has the highest nitrogen emissions spatial intensity（3) The food supplied to Beijing from Hebei contained 36 kt nitrogen footprint, accounting for 109% of Beijing's local nitrogen footprint, and it increased 56% in the last 5 years. If emission