

Call for papers

SPECIAL ISSUE OF BIORESOURCE TECHNOLOGY

Bio-based Products and the Food-Water-Energy Nexus: Systems Analysis and Life Cycle Sustainability Assessment

Background

With the continuous growth in population and the high dependence on non-renewable resources, the concerns about insecurity of resource supply and environmental degradation are increasing worldwide. The development of bio-based products is being promoted by policymakers and industry as a promising strategy for reducing the depletion of non-renewable resources and the environmental impacts associated with their use. However, due to environmental, economic and social effects of the development and use of bio-products, rigorous analyses are required to ensure that they are more sustainable than their fossil-based counterparts.

One important challenge in evaluating the sustainability of bio-based products is to define the system boundary to avoid hidden effects, such as indirect land-use change and competition with food, animal feed, water and energy uses. Furthermore, potential rebound effects must also be considered.

Systems Analysis (SA) and Life Cycle Sustainability Assessment (LCSA) lend themselves naturally for these purposes as they can reveal the interactions and trade-offs between the environmental, techno-economic and social dimensions of sustainability.

This Special Issue will focus on the use of SA and LCSA to evaluate the sustainability of bio-based products (biofuels, bio-materials, bio-chemicals, etc.) in comparison with their fossil-based counterfactuals and evidence their performances with regard to environmental, economic, and/or social criteria. A particular focus of the Special Issue is on the impacts of bio-based products on the food-water-energy nexus to explore how they can be developed and used in synergy with the food, water and energy systems.

Papers are invited in the areas listed below. For other topics, please contact the editors. Note that review articles will be considered only by invitation from guest editors (to authors with proven expertise on the specific topic); submission of research articles is open to all interested authors.

1. Biomaterials

Progressive replacement of fossil-based chemicals and polymers by bio-based products and production of building blocks for use in materials and nutraceuticals are challenging due to cost and environmental issues. Polymers are of particular interest due to the waste burdens caused by waterborne transport and loss of biodiversity. Comparative LCSA can be undertaken with the aim of strategy setting or eco-design. The following precursors and polymers from lignocellulosic biomass and algal biomass are targeted in this SI:

- “Green” chemicals precursors
- Biopolymers.

2. Biorefineries

Biomass based refinery is the core concept of any pathway aiming at improving resources utilisation and co-producing energy, food and chemicals. SA and LCSA of the following is of a particular interest to this Special Issue:

- Multi-products plants providing energy, chemicals and food/feed
- Multi-feedstocks and multi-product biorefineries
- Cascading processing
- Complementarities between bio-products, food and energy
- Energy and water efficient biorefineries.

3. Systems analyses of policies promoting bio-based products

The development of bio-based products requires robust and sustainable policies to support the entry of new products into the market. Papers could explore how systems analysis can be used to tackle the complexity of the design and implementation of such policies. Consideration of regulatory frameworks in different countries and regions is encouraged, including but not limited to:

- The European Union and other European countries, US, China, India, Other Asian countries, African regions and countries and biofuel-exporting countries (e.g. Brazil and Argentina).

4. Methodological challenges in SA and LCSA

The following topics related to the methodological developments in SA and LCSA of bio-based products are of particular interest to this Special Issue:

- Life cycle implications on the food-water-energy nexus
- Frameworks for harmonization of SA and LCSA studies.

Submission of manuscripts

Review articles for this SI can be submitted only by invitation from guest editors; research articles and case studies can be submitted by any author. Authors must ensure themselves that contents of their manuscripts fall in the scope of BITE.

Key dates

- Expression of interest to contribute to the Special Issue (SI) to be sent to the Guest Editors : 15 July 2019
- Abstract submission to the Guest Editors (300-400 words) : 31 July 2019
- Selection of abstracts and invitation to submit a full paper : 15 August 2019
- Submission of full papers and peer review process : 20 August-30 November 2019
- EES to open for this SI: November 1st, 2019
- EES to close for this SI: November 30, 2019

Authors who submit papers for this SI especially before November 1st 2019 must clearly state in the cover letter that their articles are for the SI on "System Analysis and Life Cycle Sustainability Assessment"

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