



International Conference on Sustainable Materials Processing and Manufacturing, SMPM 2017,
23-25 January 2017, Kruger National Park

Bio-based energy scenarios: looking for waste

Maria Ester Dal Poz ^{*}, José M. F. J. da Silveira , Carolina S. Bueno^b, Leonardo Andrade
Rocha^c

School of Applied Sciences, University of Campinas, Pedro Zaccaria St., Limeira, 13484-350, Brazil

Institute of Economics, University of Campinas, Pitágoras St. 353, Campinas, 13083, Brazil

Federal University of Rural Semi-Arid, Brazil

ABSTRACT

Bioenergy remains as a reference of global sustainable energy production. There is a plethora of raw materials, which may be used as biomass for energy – including agricultural residues and straws, wood, and urban garbage, which may be put under the semantic term of “waste”. These are a surplus material for the co-production of valuable and sustainable biofuels, chemical compounds, electricity and heat. In order to understand global efforts on knowledge production and their relations with Research & Development (R&D) efforts in this bioeconomy field, this paper presents a Science, Technology and Innovation evolutionary map of biobased “waste” materials. Two methodological approaches are integrated: scientometrics global analysis of scientific production and innovation scenarios, through patent categories. Results show a huge pattern of investments in the last decade – which changes from chemical to biological technical bases. They also profile the R&D areas from the engineering processes and technological development demands. The design of technological fields is essential for studies of decision support, for the evaluation of positions of industrial development of institutions or countries, to understand the dynamics of S&T&I for strategic positioning.

© 2016 Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Peer-review under responsibility of the organizing committee of SMPM 2017

Keywords: bioeconomy, sustainable materials, scientometrics, patents indicators, lexicographical analysis.

^{*} Corresponding author. Tel.: + 55 11 37016708
E-mail address: dalpoz@fca.unicamp.br

1. INTRODUCTION

Human economic activity is a large waste generator - huge quantities of materials that are not used - and founded the concept of bio-economic "waste".

The knowledge economy and agile technological change demands answers for planning and anticipation of competitive scenarios for companies or countries, in order to combine internal and external sources of resources for innovation.

This article aims to understand and relate scientific efforts and technological global generation of bio-economic innovations aiming at the use of these materials for energy purposes.

The use of these materials for the purposes of energy production is inserted in the field of innovation in bioenergy, challenge in scientific, technological and economic order.

The role of renewable sources - if on screen - and biodegradable energy and raw materials brings a new dynamic to the activities of knowledge generation and research and development, involving a change in the technological route of traditional fossil materials for the biological basis. One of the fundamental characteristics of this model is a quantitative reduction in the use of productive raw materials, and the qualitative change in raw materials, which requires not only produce new technical solutions, but understand the insertion of new energy products and industrial processes in an economic context.

The bioenergetics production meets a new productive model, based on four assumptions: (1) can be restored over time; (2) are clean; (3) their sources are resulting from production processes or from human activities; and (4) produce quantities much smaller greenhouse gases compound generators, when compared with traditional sources (DEMIRBAS, 2001, 2007a, 2007b, 2009).

The use of waste as feedstock is connected with the debate on bioenergy and the expansion of biofuels in many countries (LAL, 2007). But the cost of waste treatment, considered extremely high, reducing the competitiveness of those alternatives. Environmental concerns – including reducing emissions of green house gas - and food security are relevant issues that determine the debate on economics of biofuels.

So, both developed and developing countries have been investing significantly in the development of technologies needed to make the production process more energy efficient in environmental and economic terms. This is the so-called "biorefineries model", an industrial plant that integrates the processes and equipment to convert biomass with the purpose of fuel, energy and chemical production.

Such markets should be evaluated: *a)* in the context of the potential displacement effects and other markets, such as the electricity of multiple traditional sources and from the potential of the co-generation through biomass and *b)* the allocation of resources for Research and development (R&D) and the adoption of new technological trajectories (GAN et al. 2006).

In sum, there are economic and environmental motivations towards the use of cellulosic materials as feedstock to energy production. The few initiatives in this field and some investments concentrated in few companies and technologies, point to the need to know the technological frontier related to the use of residuals to liquid sources of energy as the basis of technological assessment and to policies formulation.

In this context, this article maps the global production of knowledge capable of portage technical solutions for the use of waste as a source of energy, at the international level; relates this scenario to technological development, also by mapping and analysing patents and their potentially innovative investments areas.

The Methodology presents the application of bibliometric and scientometric studies for mapping the stock of knowledge in industrial use of "waste"; the same procedure is used for the analysis of technologies incorporated in patents. Results present the maps of scientific production and those that aggregate several fronts of technological development, through the research of content lexicon of patents. As Conclusions, mapping of these scenarios seems essential as a first step - in the field of bio-economy, such as decision support on the fronts of R&D, regarding industrial energy and sustainable-raising policies.

Part 2., Methodology, presents the theoretical and conceptual foundations of the application of bibliometric and scientometric studies for mapping the stock of knowledge in the field of industrial use of "waste"; the same procedure is used when it comes to stock analysis technologies incorporated in patents worldwide. In this item are also presented methods for the preparation of key questions to search for scientific and technological production -

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات