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Short Communication | OMICS International

# Biomass Direct Liquefaction - Can This Process Become Fully Sustainable and Environmentally Friendly?

**Mateus MM**[1,2] **and Santos RG**[1*]

[1]Engineering Department, Universidade Atlantica, Fabrica da Polvora de Barcarena, 2730-036 Barcarena, Oeiras, Portugal

[2]CERENA-Centre for Natural Resources and the Environment, Instituto Superior Tecnico, Av. Rovisco Pais, 1049-001 Lisboa, Portugal

[*]**Corresponding author:** Rui Galhano dos Santos, CERENA-Centre for Natural Resources and the Environment, Instituto Superior Tecnico, Av. Rovisco Pais, Portugal. Tel: 351218417000; E-mail: rmglopes@ist.utl.pt

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## Abstract

This short opinion manuscript aims to show a point of view of someone, who believes in biorefineries as an essential tool for a better future. However there are still many unsolved issues, in particular, the lack of alternatives to organic solvents often needed. Although, the biorefineries will be a tool that we can develop and leave as an inheritance for future generations.

**Keywords:** Sustainable; Biorefineries; Wastes; Solvents; Biomass

## Short Communication

At a time when environmental concerns are on the agenda, that the control over the carbon dioxide emissions are more constant and its limits tighter along with new policies being outlined for the upcoming years, it becomes especially pertinent to find other sources of raw materials as an alternative to fossil sources. These latter sources are expected to become scarce and expensive not only because of the market value of crude barrels but also because of its impact on the environment.

The bio-refinery concept is not a new concept at all or even can be considered as one of those "outside of the box", but the truth is that such concept has not been explored as much as it was expected [1]. The high initial investment that, usually, has to be done, and the truth is that companies do not always possess the financial structure to deal with such investments, may be one of the main reasons to explain this point.

However thinking in the long term and given that much of the raw material which can be used in bio-refineries is sometimes feedstock no value at all or even in some cases the companies receive financial compensation for their elimination, the implementation of biorefineries could become attractive. The biorefineries projects should take into account the nature of the wastes locally available as well as their seasonality which means that those projects must contemplate the versatility of the installation to be built [2,3].

Concerning the direct liquefaction of wastes in acid medium, it is usual to consider this procedure a sustainable process, which in principle is not entirely wrong. However, in all truth, there is still an obstacle to be overcome, so we can, in fact, consider direct liquefaction as a fully sustainable process. The reader at this time may become a little bit bewildered with this last statement. However, we must be aware of one point, which may be regarded as a drawback of this procedure. The use of organic solvents, including the use of polyhydric alcohols [4-7], which are often produced products that result from fossil sources, are still a barrier that must be torn down, so the process becomes fully sustainable. We have beheld some remarkable and frankly positive advances over the last years with the exploitation of natural and renewable sources. Regarding the lignocellulosic residues, many compounds can be accessed from these sources [6,8-13]. From fuels and value-added chemicals to substrates for the production of bioproducts through fermentation or even antioxidant additives, among many others [9], this process can become a new source of income for companies that are generating these wastes and decide to take the step needed and invest in biorefineries to valorize the wastes created from their production line.

If we consider the life cycles of raw materials and products obtained from the direct liquefaction we may outline, not a simple, closed and carbon dioxide neutral cycle, but a complex web of interconnected cycles which altogether can form a neutral carbon dioxide emission system, as well [14]. Although to make all the involved processes of those cycles fully sustainable, petroleum-free formulations' components are extremely needed. The use of solvents from natural sources or industrial wastes as well could and should be considered [15]. The downstream solvents employed in chemical industries, such as pharmaceuticals, fine chemicals could also be a solution. That will allow not only the elimination of very expensive treatments that usual are needed to eliminate such residues [16] and at the same time making feasible at acceptable costs the process of production energy and other value-added products from biorefining biomasses. Those who believe that biorefineries can be a way out ou part of the solution to improve the environment, so are striving to find alternatives completely sustainable and fossil sources-free. Often in the process of the development of products from biomasses, scientists are confronted with criticism regarding their small advances toward the research of fully sustainable products, because part of the formulations still depends on fossil sources. Although the benchmark to define if a product is more or less sustainable should be fixed at 100% fossil sources dependency. If a product formulation englobes some components from natural sources, then that product should be labeled as a more sustainable product, encouraging to their production and further development of new components to achieve the fully sustainable product. The 100% of natural sources or re-usable, production lines with no disposable wastes and with null environmental impact are the goals of any scientist concern with the environment. Still, such process is not possible to attain at one shot, at least very rarely it happens. These approaches should be profusely embraced and supported. Step by step, the fully sustainable products will be achieved while wastes are used as feedstock and eliminated, zero carbon dioxide cycles are developed, making the world a better place. Not for us, maybe not even to our children, but for the generations to come. Those yet to be born will be able to enjoy everything as we did but in a more healthy and greener manner, taking care and praising the world, using some of the tools that we may develop quite now. That will be the best heritage we can leave them as chemists.

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