Review of: "Techno-Economic Fermentative Microbe-Based Industrial Production of Lactic Acid (LA): Potential Future Prospects and Constraints"

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Potential competing interests: No potential competing interests to declare.

The proposed manuscript aims to explore the use of sugarcane bagasse, a lignocellulosic biomass, for the industrial production of lactic acid through fermentation. It discusses the benefits and challenges of this approach, focusing on pretreatment, saccharification, and fermentation techniques. The study highlights technological advances and solutions to overcome the limitations in industrial lactic acid production from sugarcane bagasse.

The manuscript introduces the concept of lactic acid (LA) production from sugarcane bagasse (SCB). It then delves into the background of SCB as a renewable resource for LA production. The main body of the paper discusses various aspects such as pretreatment methods for SCB, enzymatic hydrolysis, microbial fermentation processes, and factors affecting LA production. It also examines the techno-economic aspects and potential future prospects of SCB-based LA production. Towards the end, the paper highlights challenges and suggests solutions for scaling up this technology for industrial use.

The article includes a comprehensive review of the technological processes involved in lactic acid production from sugarcane bagasse. It effectively discusses the advantages of using sugarcane bagasse, a renewable resource, for sustainable chemical production. The presentation and writing are clear and engaging.

General comments

This is an excellent review of lactic acid production, but there is a discrepancy between the title and the content. The article has limited information about the production costs of LA. There are no figures or tables showing the costs of LA production. It is not clear what the production cost targets are that would make the process competitive with the market. The abstract does not include any cost ranges or prices. The authors are encouraged to either address some of these gaps or amend the title to better reflect the content of the paper.

Minor comments

The graphical abstract has a watermark and may not be suitable for publication.

Some figures have low resolution and appear to be pasted from another source. If that is the case, they should be properly referenced and/or adapted to improve clarity.

Figure 2 could be improved. It is not clear how the top three and bottom three processes are related.

On page 4, both line 3 and line 7 redundantly mention the "annual yield of 67 million tons." Please remove one of these instances.

On page 4, line 15, there is a reference to lignin constituting 60%. This statement requires clarification. Is this in relation to the overall composition of the biomass

On page 5, within Figure 1, use commas to separate the feedstock names in the text, like Animal fats and greases, Used vegetable oils.

For the tables included in the manuscript, I recommend enhancing the visibility of the border lines to distinctly separate the rows and columns.

In the tables specifically (Table 1) presented in the manuscript, where information is unavailable or not applicable, I suggest indicating this clearly by using "N/A" or a dash ("-"). This practice will maintain the clarity and consistency of the tables, ensuring that readers are not left questioning whether the absence of data is intentional or an oversight.

On page 17, beneath Table 1, the notation "Same as above" requires clarification. However, for the sake of clear and unambiguous communication, it's important to explicitly specify what "above" refers to, ensuring that readers can easily understand the information being referenced.

In Table 2, under the column labeled "Temp (°C)/Duration (min)," I recommend applying this formatting uniformly across all entries pertaining to the preconditioning methods.

Notes/Acknowledgment: Ms. Khatun contributed to the preparation of this review.