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

Zygmunt Kowalski

Potential competing interests: No potential competing interests to declare.

The study explores fermentative microbe-induced industrial lactic acid production using lignocellulosic feedstocks. Challenges include the separation of lignin, inhibitory compounds, and complex broth composition. Progress is being made using green solvents and ionic liquids. This would inevitably shift the focus from supplying energy needs through products like steam, ethanol, electricity, biogas, and bio-CNG. The study highlights the significance of the sugarcane biorefinery as a favorable theory and potential speculation. Manufacturing 2G lactic acid may prove a profitable alternative, as it is commercially produced through microbial fermentation. The least endowment (MSP) of LAs is comparatively more than that of ethanol, but the potential of ethanol in the market as an energy-dense chemical product for energy with a wide range of uses is clear. In Pakistan, 30-40 million tonnes of sugarcane are crushed, producing 12 million tonnes of sugarcane biomass (SCB). A theoretical scenario suggests that using 50% of SCB can create a sugar platform with a combined pretreatment and saccharification efficiency of 70% for fermentable sugars of 40-50 lakh tonnes. The best method for 2G LA downstream processing purifies the product with little waste and has a defined process that is reliable, error-free, and simple enough for industrial scale-up. Sugarcane, which accounts for 50% of major crop yields worldwide, can contribute to at least three sustainable development goals (SDGs) if enhanced and integrated with sugarcane industries in the next five years.

It is a very valuable paper which should be published after minor revision as below.

Detailed remarks

1. Add the full names of 1G, 2G, 3G, SCB when you use them for the first time in the text.
2. Pont 3. Write the chemical formulas in the proper way.
3. Point 6. The full names of all abbreviations should be provided in the text.
4. *Table 2 should be self-explanatory. Please add proper information.*
5. *Figures 1, 3, 4 should be self-explanatory. Please add proper information.*