

REVIEWER'S REPORT ON A DISSERTATION

Topic: Technology and equipment for lignocellulosic waste conversion to biofuels and bio-products with high added value

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A PhD student submitted a dissertation entitled "Technology and equipment for lignocellulosic waste conversion to biofuels and bioproducts with high added value". In the following paragraphs I will comment on the following areas:

- Achieving the goal set in the dissertation
- Level of analysis of the current state of the dissertation and the theoretical contribution of the dissertation
- Practical contribution of the dissertation
- Suitability of the solution methods used
- How the methods were applied
- Whether the doctoral student has demonstrated adequate knowledge
- Formal level of thesis

Achieving the goal set in the dissertation

The main objectives and sub-objectives are well described in Chapter 4.

The primary objective is a multidisciplinary parametric model and subsequent economic evaluation for the investment opportunity. Other specific objectives are described in the chapter including the design of brand-new biogas biorefineries, the development of a methodology for techno-economic evaluation including verification of design suitability for industrial application.

Although the objectives are obvious and explain the essence of the thesis, the focus should not be on the tools but on the contribution of the analysis. The hypothesis of the thesis is only one, although there are many interesting outcomes in the thesis. The use of the phrase "can meet" could be replaced by a fact that can be verified in the dissertation.

To validate the research questions, the thesis uses undeniably appropriate methods bringing also innovative approach in relation to the issue.

Level of analysis of the current state of the dissertation and the theoretical contribution of the dissertation

The text is supported by a high-quality literature search and methodology based on 110 sources, most of which are less than 10 years old. The dissertation deals with the very topical issue of waste products processing. The thesis provides several important insights for a multidisciplinary evaluation of lignocellulosic materials processing, including an assessment of the investment opportunity and circular economy strategy. The thesis can therefore be considered highly topical. The thesis is also well timed in relation to the topic analysed, which is widely discussed by the professional community and corresponds to the objectives of decarbonising the economy.

I positively assess the level of the theoretical part and especially the critical evaluation.

The text is properly sourced, references are cited and the text captures the subject matter and relates well.

Practical contribution of the dissertation

Chapter 6 and especially Chapter 7 clearly justify the practical contribution of the dissertation. Chapter 7 also assesses the relevance for theory and practice. Managerial applications are also evident from the text. However, the strengths in the SWOT analysis on page 118 should still be commented on as they may be confused with opportunities.

However, the dissertation makes due to the extensive research a great contribution to practice and the development of the discipline. The results can be considered significant and original.

Suitability of the solution methods used

The methodological approach is defined in Chapter 5 of the text. The dissertation is clearly described in good detail for the expert reader. Methodologically, the dissertation draws on various methods of material preparation and processing, modelling, and economic evaluation. The methods have been used appropriately and the author has been meticulous in his handling of the text.

I have no further comments.

How the methods were applied

The actual solutions and results are presented in Chapter 6. The fulfilment of the objectives is quite clear from the chapter "Results". The comments on the results can in principle be agreed with, although the solution of some of the themes and problems of the thesis is linked to a good data base and the fulfilment of certain assumptions. The presented text shows a clear contribution of the PhD student to the discipline and the research can be considered original.

The seventh chapter is devoted to the discussion, which is meticulously crafted and can be identified with the relevant comments. In the conclusion, the issue is further summarized and the hypothesis corresponding economic attractiveness as one of the main objectives and contributions of the dissertation is commented upon.

Whether the doctoral student has demonstrated adequate knowledge

The design and use of the methodological apparatus can be appreciated due to the complexity of processing some of the data and I appreciate the comprehensive approach of the doctoral student to the problem, the presented findings and proposed solutions.

Formal level of thesis

Despite minor formal and linguistic inaccuracies, the submitted text meets the requirements for a dissertation.

Conclusion

The submitted dissertation entitled "Technology and equipment for lignocellulosic waste conversion to biofuels and bioproducts with high added value" brings completely new scientific knowledge and meets the standard requirements for the level of a dissertation. At the same time, the thesis is a representative of promising interdisciplinary research. I recommend the dissertation for defence and in case of successful defence to gain a Doctorate degree - "Ph.D." written after the name.

Questions for discussion

1. What will be the impact of REDIII on biomass processing for bioenergy and how the availability of resources will be complicated?
2. How can the competitiveness of waste biomass in the coming years and beyond 2030 be predicted and what is the importance of logistics costs.

3. What are the potential externalities of these technologies/sources and how can they be economically valued?

In Prague on 31.8.2023

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