Review of: "Biofuels and nanocatalysts: A Data Mining study"

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REVIEW ON THE MANUSCRIPT "Biofuels and nanocatalysts: a data mining study"

GENERAL COMMENT:

It is a very interesting manuscript. However, there are some minor corrections to be made before been accepted for publication. It is missing a list of abbreviations that it is very important to understand their work. Besides, some figures need a better explanation on the text. The specific comments are described in the next section. Also, the conclusion must be rewritten to be clearer.

SPECIFIC COMMENTS:

Abstract

Page 2 – The last sentence …. The most recent pairs of terms associate the need to produce biofuels from oils produced by microorganisms and the use of cerium oxide….

Suggestion: As the authors describe on the text, the pairs of terms were not related only to biofuels from oils or cerium oxide. There are other hot topics to be exploited as described on page 8 (nodes). I would suggest the authors to include other biofuels reported on this manuscript.

Introduction

organic biomass in internal combustion engines.

Suggestion: remove the word organic as there is no inorganic biomass and it may be misleading as popularly, organic means grown in no pesticides. Besides, biofuels can be used in other engines such as gas turbines or even in boilers. Hence, I would suggest to rephrase this sentence.

The main types of biofuels are biodiesel, biogas, bioethanol, biomethanol and pure vegetal oil.

Comment: biomethanol is not a main type of biofuel as most of methanol is produced industrially by hydrogenation of carbon monoxide using natural gas; also, vegetal oil is basically used as feedstock to produce biodiesel, not as fuel.

Suggestion: Remove vegetal oil and biomethanol as they are not main types of biofuels.

Among the most diverse uses of nanocatalysts are energy storage, fuel cells, medicine, ….

Suggestion: The sentence is very vague. Could the authors state the use of nanocatalysts as energy storage, in medicine and in the other applications? The sentence must be very clear to the readers; hence, I would suggest to explain how the nanocatalysts are used in each application reported.

Page 4

In the Figure 1, I would suggest to remove the last point 2022, as the readers may think that there were less publications

in 2022 than in 2021. In the text, the authors state until 2021, hence there is no reason to include 2022 data, as 2022 is not over yet. Besides, the authors stated that the number of publications will continue to increase rapidly over the next few years.

Page 7

The tip of the Figure 5 should be removed. Please, adjust the Figure 5 to page 6.

Page 8 and 9

Also, I would suggest to split the Figure 5 in two, instead do refer to it as top and bottom.

Figure 5 – The clustering map

The Figure 5 should point out seven clusters. They should be numbered 1 to 7, and named according to the explanation given on page 9.

Figure 6- The overlay map.

The Figure on the bottom (the overlay map) that represents the same nodes sorted by age is also very confusing as the nodes are not clearly shown in the figure. The colors palette is also confusing. As there are four years, I would suggest to use four colors, one for each year. Also, the nodes should be identified and named.

As there is no list of abbreviation (it should be included), the explanation given is very confusing. Please, try to make the explanation clearer for the readers to understand.

Suggestions: - Split the Figure 5 in two (Figure 5 and Figure 6).

- Include a box with the 7 main nodes;
- Use four colors to represent the years (one color for each year);
- Include a list of abbreviation;
- If possible, explain the top figure right after it. Then, the other part. In my opinion it would clarify and improve the quality of your work.

Page 9

Regarding the cluster 7 that the authors named Cellulose.

Suggestion: I would suggest to name this cluster Biomass cell wall components as besides cellulose, it also includes hemicellulose and also there are occurrences of lignin and lignocellulosic components.

Page 10

Figure 6 – Suggestion: Include the name of the clusters as they are numbered. Also, I would include lignin in the cluster 7 instead of cluster 1, that is related to biodiesel. Besides, I would suggest the authors to include the name of the cluster when explain them.

Pages 11 and 12

Regarding the nodes of cluster 2. I would suggest to name it “the biodiesel cluster”. However, the authors have to decide how to name the clusters in to make the manuscript more understandable.

Same comment for cluster 3, cluster 4, cluster 5, cluster 6 and cluster 7.

Page 12

On page 12 there is a sentence that is not correct.

One of the limitations of biodiesel as a fuel for IC engines is its high viscosity which increases NOx emissions.

Comment: First of all, biodiesel is used for IC Diesel engines, not for all types of IC engines. It cannot be used in Otto cycles engines. Secondly, the viscosity is similar to Diesel fuel, and it is the cause of the increase of NOx. The reason for the increase in NOx is that the biodiesel molecule has two oxygen atoms, this favors the increase in NOx. The increase in NOx was stated on Page 15; The authors stated: “the higher oxygen content of biodiesel leads to higher concentration of NOx. This statement is correct.

Suggestion: Remove the sentence above.

Page 13

Improve the quality of Figure 7. It is very hard to read the boxes which has white letters.

Suggestion: Put all letter in black, use the same pattern in the whole picture.

Also, Table 1 title has to be in Page 13.

Page 14

Regarding the most recent connect terms, shown at the bottom of Table 1, the CeO_2 nanoparticles…

Suggest: Include the name of the compound. CeO_2 - Cerium (IV) oxide.

Page 15

Their impact and environmental behavior of the CI diesel engine.

Suggestion: Instead of CI Diesel engine, use IC Diesel Engine.

Regarding the second pair of the more recent terms, yeasts are …

Correction: Yeasts are the third pair of the most recent terms.

Please, also, consider to include the name of the pairs, when referring to them.

Conclusions

Be more assertive when writing the conclusions. Please, state what was the purpose of the manuscript and their findings. Alternative fuels are important. What about the clusters and pair of terms? Why data mining is important? I believe that the purpose of this paper was not to state that microorganisms are important to prepare oils, as biodiesel is not commercially produced using 2 - such oils.

The conclusions are too general.

I would suggest the authors to rewrite their conclusions.