Dear editor,

Thank you very much for giving us a new opportunity for working on the manuscript. We would like to thank all reviewers that are expending their time on it. We have analyzed the suggestions and they are fruitful to improve the quality of our proposition. We are answering all the comments below. Moreover, you can see all main changes highlighted in red in the manuscript.

Reviewer(s)' Comments to Author:  
  
Reviewer: 1  
  
Comments to the Author  
Please provide response file.

We think that no further comments were made and the “please provide response file” is automatic text. Just inform us in case that we are missing anything.

Reviewer: 2  
  
Comments to the Author  
Authors have addressed the suggestions  
May be accepted

Thank you.

Reviewer: 6  
  
Comments to the Author  
The manuscript contains an interesting research but, before publication, I would suggest to consider some comments/suggestions for modifications, in order to improve the quality paper.  
  
1)      The abstract contains just info about the results obtained from Phase II. Info about the orientation influence should be added as well.

We agree. We added a new line in the abstract.

2)      “its impact is well document in the various ecosystems.12” Revise the sentence.

Fabio, revisa si está bien así.

We have better specified this idea on the impact of the plastics on ecosystems. Certainly, the point is to make aware that plastic at the end-of-life, is impacting the ecosystems and humans.

Changes were made as follows:

*“The impact of plastic pollution in terrestrial and aquatic ecosystems represents a major issue.[12](#ref-Ryberg2019) For aquatic ecosystems, main risks are linked to standing water that acts as a breeding niche (to mosquitoes, pests, vector-borne diseases transmission), becomes a vector for toxic chemicals and, ultimately, disturbs the natural cycles (biogeochemical cycle in terrestrial ecosystems). Additionally, the transfer of plastic into the food chain is a clear danger to animal and, certainly, to humans as well. Thus, reducing the consumption of plastics is of great importance in the long term.”*

3)      Figure 2.1 – Use the same style of Figs 3 and 4 for indicating a), b) and c). Here their font is really big.

We agree.

4)      Section 2.2 – “We have chosen to use fractional designs to minimize the number of tests, being used as screening designs.” It is suggested to not use the first person in the text. Check the whole manuscript (i.e. ..did not allow us to observe..).

We changed these two parts of the text.

5)      Section 2.2 – Where the values, set for the critical parameters, come from? Specifically infill density and printing speed.

Regarding the printing speed, we have chosen the range based on the paper:

Pérez M, Medina-Sánchez G, García-Collado A, Gupta M, Carou D. Surface Quality Enhancement of Fused Deposition Modeling (FDM) Printed Samples Based on the Selection of Critical Printing Parameters. Materials 2018, 11 :1382. https://doi.org/10.3390/ma11081382

Yao et al. (2019) used a slightly larger range:

Yao T, Deng Z, Zhang K, et al. A method to predict the ultimate tensile strength of 3D printing polylactic acid (PLA) materials with different printing orientations. Compos Part B Eng 2019; 163: 393–402.

We have used also this paper as reference and we are including both references in the manuscript.

Regarding the infill density we used as reference:  
Alafaghani A aldin, Qattawi A. Investigating the effect of fused deposition modeling processing parameters using Taguchi design of experiment method. J Manuf Process 2018; 36: 164–174.

The authors used a larger range. We have decided to reduce it in order to diminish the gap in infill density between specimens. We are including the reference also in the text.

6)      Figure 3b – Unit of Printing speed (Young Modulus) is not completely visible in the graph. Please, fix it.

Thank you for the remark. Changes were made to better display the information on the graphic.

7)      Figure 4 – Why do Region A and Region B have intersected values? Between 70% and 85% the slope is actually linear.

Fabio, cambiémoslo a la idea original. Hasta 85 % en línea recta.

Changes were made to the graphic.

The main point that we would like to highligth is thtat after 85% approx, the resistance of the mechanical part increases

8)      Figure 5 – Please add a) and b) under the images. Furthermore, revise this sentence “Average of the load obtain for each build orientation.”

We corrected it in the manuscript.

9)      Why do the authors decide to set an infill density of 50% in Phase III, if this percentage was not analysed in the previous phase?

In this phase the infill density is not analyzed, so it made no difference using 40 or 50 %. We just tried to keep low in order to save time and material as we are indicating in the text.

10)     Which process was used for the PLA recycling? This is an important info to add since the properties of the recycled material are actually dependent of the recycling process employed.

Thanks for the remark. In our study we used commercial materials that were provided to the University. Normally, the mechanical recycling process is used to create this type of recycled bend filaments. And certainly, the extrusion conditions (temperature, screw speed, residences time, nozzle design, cooling conditions) are major influence in the quality of the final filament, and in the matrix degradation of the material.

The strategy that we present in the article is the comparison of both commercial materials, that with great probably designers, makers and other users will test in the day-to-day.

A more deep analysis on the extrusion conditions to the quality of printed part using the proposed approach in three phase are element in perspectives, that unfortunalety are not included in the scope of the proposition so far.

11)     Please, use the same font style for figure captions, sometimes italics is used, like for the tables, but sometimes not (see Fig. 3 – 4 – 5).

We agree. We changed captions for figures 3 to 5.

12)     Discussion section should be extended. Only observations about Phase 2 are reported (actually almost the same reported in section 3.2), and a discussion on the orientations here is not provided.

We agree and we thank you for the remark. We have enlarged the discussion including also a few references to compare our results and perspectives of research path that we can see that our study could add to the scientific community.

13)     Ref. 1. – Journal’s name is missing

Sure. Thank you for checking that. We have corrected it and check that all journal’s names appeared in the draft.

14)     Ref. 41 – Publication year is missing

We think that you are referring to Ref. 42. We added the year.

15)     Ref. 47 – Add the full title of the standard.

Thanks. Done.

16)     Ref. 51. – Journal’s name is missing

Done.

Reviewer: 5  
  
Comments to the Author  
Efforts of authors to incorporate the comments of reviewers in the revised manuscript is appreciable. However, comment 4 of Reviewer#5 is not addressed / replied.  
It should be replied/addressed suitably.

“•        From the study of Babagowda et al. it is observed that lower percentage of recycled PLA in the blend results in the higher ultimate tensile strength. However, in the present study, 90% recycled PLA is used in the blend. Please explain the reason behind the use of 90 % recycled PLA in the blend.

It’s likely that we answered it shortly and we did not explain well our point. Sorry about that. We tried to investigate the influence of recycling and we came across this commercial material that help us arranging the experimental study. We didn’t have any option to manufacture our own recycled material so that was a good option for us. It is a commercial recycled material with the 90 % of recycled material used in the blend and we had no option to analyze the influence of other percentages in the blend.

We agree that the use of lower percentages is likely to improve a little bit the ultimate strength approaching to that of a virgin material but we do not have experimental data to discuss that, so we are not making further comments on the text about the influence of the % in the results.

Reviewer: 7  
  
Comments to the Author

Dear Authors,

Thank you for the revised draft. No further queries from my side.

Thank you.

Associate Editor's Comments to the Author:

Associate Editor

Comments to the Author:

(There are no comments.)

Thank you.

Editor in Chief’s Comments to the Author:  
  
(No Comments.)

Zona de los archivos adjuntos