This is a review paper compiling information about the potentialities of the hydrogel as a substrate in agriculture that have been published between 2018 and 2022. These type of review papers are very helpful to the scientific community as the current knowledge of the topic can be found in one paper, saving a lot of time. It will be of interest for people that work on substrates for crops, particularly.

In this paper, the authors first start with an introduction that tries to provide the reader with the context of the problem to be investigated, the hydrogel in agriculture which is a very good start. However, here I disagree in one of the reasons done. I'm referring specifically to the paragraph L34-41 about one of the reasons to substitute the soil by a hydrogel medium: the lower use of pesticides and fertilization. Both facts depend on external factors such as how fertile is the soil or the advent of pests and diseases. The advantage of the hydrogel cultivation should be based on others factors.

Many review articles do not explain how they have found the papers because it is expected to use the searching engines of the databases and check the suitability of the papers by reading them and selecting the most significant findings of each one. However, in this paper the authors explain the steps used to find the articles (PRISMA methodology) and the numbers of papers selected in each step of the research is given. Although the methodology is very well described even with a diagram, from my point of view, this part of the paper would make sense if the authors want to quantify the number of papers dealing on specific sub-topics such as the number of papers about types of hydrogels, physical properties, soil water characteristics, chemical properties, in order to carry out further analyses (meta-analyses), but this is not the case. In other words, I don't understand what is the point in using the PRISMA methodology, that allow a quantification of the papers, if finally, this figure is not used for any further analysis and the rest of the manuscript is just an overview of current thinking on the topic like any other review article and no new own experimental results are presented.

Besides the above comments, the manuscript is correctly writing. The information is presented appropriately although, as said above, I don't see the usefulness of the PRISMA methodology for the objective of the work. The information given about the hydrogel in the results and discussion section is clear, comprehensive and of relevance to the field. The English language is appropriate and understandable. The conclusions are coherent and supported by the listed citations.

Some specific comments:

P166: What do you mean by "raw data"?

P303: Delete one "in".

P336: The point about the biological properties of the hydrogels does not clarify if these substances promote or decrease the activity of the microorganisms.

P380: Similarly, to the above point, please give more information: in what sense were the physiological parameters of the plants affected? Positively? Negatively?

References: There are 108 references in the list but according to the methodology only 58 were selected for this review. Where do the others came from? If they give information on hydrogels they should be included within the 58.