Review Form 1.7

Journal Name:	**International Journal of Plant & Soil Science**
Manuscript Number:	**Ms_IJPSS_112843**
Title of the Manuscript:	**Synthesis and characterization of chitosan encapsulated zinc oxide nanoparticles and its application in maize under zinc deficit soil.**
Type of the Article	

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PART 1: Review Comments

	Reviewer's comment	**Author's comment** *(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)*
Compulsory REVISION comments **1. Is the manuscript important for scientific community?** (Please write few sentences on this manuscript) **2. Is the title of the article suitable?** (If not please suggest an alternative title) **3. Is the abstract of the article comprehensive?** **4. Are subsections and structure of the manuscript appropriate?** **5. Do you think the manuscript is scientifically correct?** **6. Are the references sufficient and recent? If you have suggestion of additional references, please mention in the review form.** **(Apart from above mentioned 6 points, reviewers are free to provide additional suggestions/comments)**	1. **Is the manuscript important for scientific community?** The manuscript titled "Synthesis and characterization of chitosan-encapsulated zinc oxide nanoparticles and their application in maize under zinc-deficit soil" presents a significant contribution to the scientific community, particularly in the field of agricultural nanotechnology. The study addresses the critical issue of zinc deficiency in soil and its adverse effects on maize cultivation. By proposing and evaluating a novel approach using chitosan-encapsulated zinc oxide nanoparticles (Cs-ZnO NPs), the manuscript explores a sustainable and efficient method to enhance maize growth and yield. The manuscript begins by highlighting the importance of nanotechnology in agriculture and the potential of nano-based fertilizers to revolutionize farming practices. Zinc deficiency is identified as a prevalent issue affecting crop productivity, especially in maize cultivation. The introduction provides a comprehensive overview of the relevance of zinc as a micronutrient and the challenges associated with its uptake by plants. The synthesis and characterization of Cs-ZnO NPs are meticulously described, emphasizing their nanodimensions and suitability for agricultural applications. Advanced imaging techniques such as scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDS), and transmission electron microscopy (TEM) are employed to analyze the morphology, elemental composition, and size distribution of the nanoparticles. The results demonstrate the successful synthesis of spherical Cs-ZnO NPs with diameters less than 100 nm, confirming their potential as nanofertilizers. The field experiment conducted to evaluate the efficacy of Cs-ZnO NPs on maize growth and yield provides valuable insights. Significant improvements in grain yield, plant height, and chlorophyll content are observed, particularly with the application of Cs-ZnO NPs at a concentration of 100 mg L-1. Statistical analysis validates the significance of these findings, highlighting the promising role of Cs-ZnO NPs in enhancing crop performance under zinc-deficient conditions. In conclusion, the manuscript underscores the importance of chitosan-encapsulated zinc oxide nanoparticles as a transformative tool for sustainable agriculture. By addressing the challenges of zinc deficiency in maize cultivation, the study contributes valuable knowledge to the scientific community and paves the way for future research in nanotechnology-based crop management strategies. **2. Is the title of the article suitable?** The title of the article, "Synthesis and characterization of chitosan-encapsulated zinc oxide nanoparticles and their application in maize under zinc-deficit soil," is descriptive and accurately reflects the content of the research. It succinctly communicates the key elements of the study, including the synthesis and characterization of the nanoparticles, their encapsulation in chitosan, and their application in zinc-deficient soil for maize cultivation. Alternative title suggestions: 1. Enhancing Maize Yield with Chitosan-Encapsulated Zinc Oxide Nanoparticles in Zinc-Deficient Soil 2. Nano-Scale Solutions: Chitosan-Encapsulated Zinc Oxide Nanoparticles for Maize Growth	

	in Zinc-Deficient Soil 3. Optimizing Maize Growth: Chitosan-Encapsulated Zinc Oxide Nanoparticles in Zinc-Deficient Soil These alternative titles aim to maintain clarity and conciseness while highlighting the key aspects of the research, such as the use of nanoparticles for addressing zinc deficiency in maize cultivation. **3.Is the abstract of the article comprehensive?** The abstract of the article titled "Synthesis and characterization of chitosan-encapsulated zinc oxide nanoparticles and their application in maize under zinc-deficit soil" appears to be comprehensive, covering various aspects of the research conducted. Overall, the abstract effectively encapsulates the key elements of the research, providing a clear and concise summary of the study objectives, methodology, findings, and implications. It serves as an informative overview that invites readers to delve deeper into the details presented in the full article. **4..Are subsections and structure of the manuscript appropriate?** The subsections and structure of the manuscript are appropriate, and they effectively communicate the research objectives, methods, results, and conclusions. The manuscript is well-organized and adheres to standard scientific reporting guidelines. 5. **Do you think the manuscript is scientifically correct?** 1. **Abstract**: The abstract provides a concise summary of the study, including the problem addressed, methodology, and key findings. It introduces the concept of using chitosan-encapsulated zinc oxide nanoparticles for maize cultivation in zinc-deficient soil. However, it lacks specific details about the experimental setup and results. 2. **Introduction**: The introduction provides a comprehensive overview of the importance of nanotechnology in agriculture, the role of zinc in plant physiology, and the significance of maize as a staple crop. It sets the stage for the research question and objectives. 3. **Materials and Methods**: The section outlines the synthesis and characterization of chitosan-encapsulated zinc oxide nanoparticles, as well as the field experiment design and data collection methods. It provides clear details on the experimental setup, including treatment groups and measurements taken. 4. **Results and Discussion**: This section presents the results of the study, including nanoparticle characterization and the effects of different zinc treatments on maize growth parameters such as grain yield, plant height, and SPAD readings. The results are supported by statistical analysis and comparisons with control groups. The discussion interprets the findings in the context of existing literature and provides insights into the potential mechanisms underlying the observed effects. 5. **Conclusion**: The conclusion summarizes the key findings of the study and emphasizes the potential of chitosan-encapsulated zinc oxide nanoparticles as a novel nanofertilizer for improving maize growth and yield in zinc-deficient soil. It also highlights the importance of further research in this area. 6. **References**: The references cited in the manuscript are relevant and provide additional context for the study. Overall, the manuscript appears to be scientifically sound, with clear objectives, well-described methods, and supported results. However, a thorough peer review by experts in the field would be necessary to validate the scientific correctness and ensure the accuracy and reliability of the findings. 6.. **Are the references sufficient and recent? If you have suggestion of additional references,**	

	please mention in the review form. The references provided are relevant and recent, covering a wide range of literature related to nanotechnology in agriculture, zinc nutrition, and nanoparticle synthesis. However, it would be beneficial to include references specifically related to chitosan-encapsulated zinc oxide nanoparticles and their application in plant nutrition. Additional Suggestions: • Consider including references specifically related to chitosan-encapsulated zinc oxide nanoparticles and their application in plant nutrition to strengthen the literature review. • Ensure consistency in formatting and citation style throughout the manuscript.	

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Minor REVISION comments **1. Is language/English quality of the article suitable for scholarly communications?**	Overall, the article demonstrates a high level of language proficiency and is suitable for scholarly communication in the fields of agricultural science and nanotechnology. However, it's essential to ensure consistency in terminology, grammar, and formatting throughout the manuscript before final submission.	
Optional/General comments	I have carefully reviewed the manuscript titled "Synthesis and characterization of chitosan-encapsulated zinc oxide nanoparticles and their application in maize under zinc-deficit soil" submitted by the authors for consideration in International Journal of Plant & Soil Science. Overall, the manuscript presents a comprehensive study on the synthesis and application of chitosan-encapsulated zinc oxide nanoparticles in maize cultivation, addressing an important aspect of agricultural research. I appreciate the efforts of the authors in conducting this research and presenting their findings in a structured manner. However, I have some comments and suggestions for improvement: 1. **Clarity and organization**: o The manuscript is well organized overall, but there are some sections where clarity could be improved. For example, the introduction could provide more background information on the significance of zinc deficiency in maize and the potential benefits of nanoparticle-based fertilizers. 2. **Experimental Procedures**: o The synthesis of chitosan-encapsulated zinc oxide nanoparticles is described in detail, which is commendable. However, it would be beneficial to include additional information on the optimization of synthesis parameters and the rationale behind the chosen experimental conditions. 3. **Characterization Techniques**: o The characterization of nanoparticles using SEM, TEM, and EDS is adequately described. It would enhance the manuscript if the authors discussed the limitations of these techniques and provided a more comprehensive analysis of the nanoparticle properties. 4. **Statistical Analysis**: o The statistical analysis conducted using ANOVA is appropriate. However, it would be helpful to include a discussion on the reliability of the results and any potential sources of variability in the experimental data. 5. **Discussion and Conclusion**: o The discussion section effectively summarizes the findings and their implications. However, the authors could further elaborate on the mechanistic insights into how chitosan-encapsulated zinc oxide nanoparticles enhance plant growth and yield,	

	providing a more in-depth analysis of the results. 6. **References**: ○ The references provided are relevant to the topic. However, I recommend ensuring consistency in the citation format and verifying the accuracy of all references. Overall, the manuscript presents valuable insights into the potential of chitosan-encapsulated zinc oxide nanoparticles as a novel nanofertilizer for maize cultivation. Addressing the aforementioned points would strengthen the manuscript and improve its overall quality.	

PART 2:

	Reviewer's comment	**Author's comment** *(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)*
Are there ethical issues in this manuscript?	*(If yes, Kindly please write down the ethical issues here in details)*	

Reviewer Details:

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