**Dr. Alberto Acosta**

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**Bogotá, Colombia**

**Dear Dr. Acosta:**

Please find enclosed for consideration the following manuscript entitled: A thermodynamic study of preservation of *Azotobacter* *chroococcum* vegetative cells in dry polymers by Daniel F. Rojas-Tapias, Oriana L. Ortega Sierra, Diego Rivera, and Ruth R. Bonilla Buitrago.

This study is a follow-up of our recent papers entitled “Evaluation of three methods for preservation of *Azotobacter chroococcum* and *Azotobacter vinelandii*” published in Universitas Scientarum in 2013, and “Evaluation of polymers for the liquid rhizobial formulation and their influence in the Rhizobium-Cowpea interaction” published in the same journal. In this short paper, we aimed to use a thermodynamic model to understand how bacteria are degraded when preserved using polymers. We feel that this paper is very interesting for your readers because we show the relation between preservation of bacteria in a polymeric matrix, which is itself very novel, activation energy, thermal degradation via Arrhenius model, and prediction of viability based on the use of the model. Interestingly, we found that activation energy is an intrinsic property of each polymer, and therefore finding the best polymer for each microorganism is absolutely remarkable. Although several methods for preservation have been reported, the use of dry polymers has been just recently published (Krumnow et al. 2009). In the previous paper, we, Rojas-Tapias et al. (2013), showed that polymers are a good alternative to preserve these soil-dwelling bacteria. Now, we went deeper and using the Arrhenius model attempted to understand the kinetics that governs the bacterial death in those novel synthetic matrixes. Furthermore, because *Azotobacter* is a very important organism for agriculture, its preservation in polymers is also important for development of new formulations based on this organism. To the best of our knowledge, this is the first paper in which is performed a thermodynamic study of bacterial degradation when maintained in dry polymers either for preservation or distribution of biofertilizers using *Azotobacter*. We thank you in advance for considering our manuscript for publication in your prestigious journal.

We also declare that this paper has not been published previously and is not under consideration elsewhere. We are responsible for all the aspects related with the research. Ruth Bonilla and Daniel Rojas designed the experiment; Daniel Rojas, Diego Rivera and Oriana Ortega performed the experiments and analyzed data; and Daniel Rojas wrote the manuscript. We all agreed to submit the information included into the paper.

Additionally, we report no conflict of interest with authors or reviewer. We recommend the following researchers:

International

• Vera Baldani. She is a prominent researcher in plant growth-promoting microorganisms at Embrapa Agrobiologia, Brasil ([vera@cnpab.embrapa.br](mailto:vera@cnpab.embrapa.br); [verabaldani@yahoo.com.br](mailto:verabaldani@yahoo.com.br))

• Joseph Kloepper. This professor is known as the “father” of plant growth-promoting bacteria. He is an emeritus professor at Auburn University, US ([jkloeppe@acesag.auburn.edu](mailto:jkloeppe@acesag.auburn.edu)).

• Katya Teixeira. She is an expert in nitrogen fixation in *Azotobacter* and *Azospirillum*. She is a professor at Universidad Federal do Rio do Janeiro, Brazil ([katia@cnpab.embrapa.br](mailto:katia@cnpab.embrapa.br)).

National

• Jenny Dussán. She is expert in environmental microbiology, and professor at Universidad de los Andes (jdussan@uniandes.edu.co).

Thank you for your consideration of my work. Please address all correspondence concerning this manuscript to me by dfr47@cornell.edu or Skype (tapias.daniel).

Sincerely,

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Note: I send as an attachment: manuscript, figures, and copyright form.