Greetings from India! Date: 02.05.2022

Dear members of the selection committee,

I'm writing to you regarding the advertised position of Post-Doctoral position on the topic **"Enhancement of anaerobic digestion via biochar obtained by hydrothermal carbonization of agricultural waste in rural Africa"**. I'm highly interested in joining your research team, where I can contribute to the area of **"Waste to Energy"**. My training and six years of research experience working with **thermochemical conversion processes** prepare me to be a strong candidate for this position.

My long-standing interest has been in groundwater contamination. However, I have developed a great interest in thermochemical conversion processes such as torrefaction, pyrolysis, combustion, carbonization and gasification. My doctoral dissertation was conducted in consultation with Dr. Sheeja Jagadevan at the Department of Environmental Science and Engineering, Indian Institute of Technology (ISM), Dhanbad where I studied the field applicability of adsorbents for defluoridation. My doctoral work was primarily focused on designing a simple and cost effective defluoridation technique by employing locally available materials, without compromising the efficacy. In view of that, rice-husk was selected as feed material for biochar production. The quantity and quality of biochar was improved through various physical and chemical processes. A multivariate statistical tool, ***response surface methodology (RSM)*** was employed to evaluate the interaction between the interacting parameters (***temperature, time and heating rate***) and responses (***biochar yield, higher heating value, energy density, energy yield and fluoride removal***). Additionally, the synthesized material was characterized by employing different characterization tools such as FTIR, FESEM, XRD, XPS, TGA, DLS, and TEM etc. The efficacy of synthesized biochar materials was tested in ***both batch and column mode operation***. Moreover, synthesized biochar was further modified by ***hydrothermal activation*** methods. The factors such as hydrolytic temperature, time, normality of activating agent, and solid to liquid ratio were taken into consideration. Finally, ***binary metal hydrochar composite (BMHC)*** was synthesized using the optimized hydrochar and its properties were studied by various characterization techniques. Additionally, the applicability of the **biochar and hydrochar based adsorbents** have been tested **against real water collected from different localities**. The feasibility of **biochar-based household filters for defluoridation** was also tested through breakthrough curve analysis.

I have always wanted to expand my research horizon. **Apart from my doctoral work, I have developed a keen interest in thermochemical conversion processes.** I am excited as I could foresee how my skills could be further enhanced by working on a project which specifically deals with the development of carbon materials such as biochar and hydrochar. Surely, this project will help in the enrichment of knowledge. As an extension to the above work, I want to explore biochar derived from renewable biomass sources such as agriculture waste. We all know that agriculture is a major source for emission of greenhouse gases and its global emission reached 4.7 billion metric tons. Thus it is imperative to manage and utilize these wastes in a more efficient and sustainable manner. In this view, production of biochar is the most suitable alternative material, having multiple applications.

In order to claim my candidacy further, I would like to mention the publication record. I have **published 6 papers with a cumulative impact factor of 27.74** in highly reputed journals and also I have 3 book chapters. I am capable of working on multiple projects both independently and in a team. During my Ph.D., I have gained experience in supervising graduate and undergraduate students who have been co-authors in my publications. I had also

been assigned a Teaching Assistantship at the center. I was a member of a team, who designed and compiled a laboratory manual of water chemistry for the PG students.

Given the opportunity, I am confident that I will be able to contribute successfully to your ongoing projects while at the same time developing the technical skill set and knowledge of biochar research that I will need to succeed in my future independent research endeavors. If you require additional information please contact me via email or phone.

Thank you for your consideration. I look forward to hearing from you.

Yours sincerely,
Krishna Yadav, Ph.D.
IIT(ISM) Dhanbad
Mob: +91-9955228097, 8957314181
E-mail: krishnabhu1991@gmail.com