

*** Low cost production of superfine Nano scale Eggshell powder from waste Egg shell and its applications for Purification of water.***



Dr. Abhay Kumar Aman



Dr. Rakesh Kumar Singh



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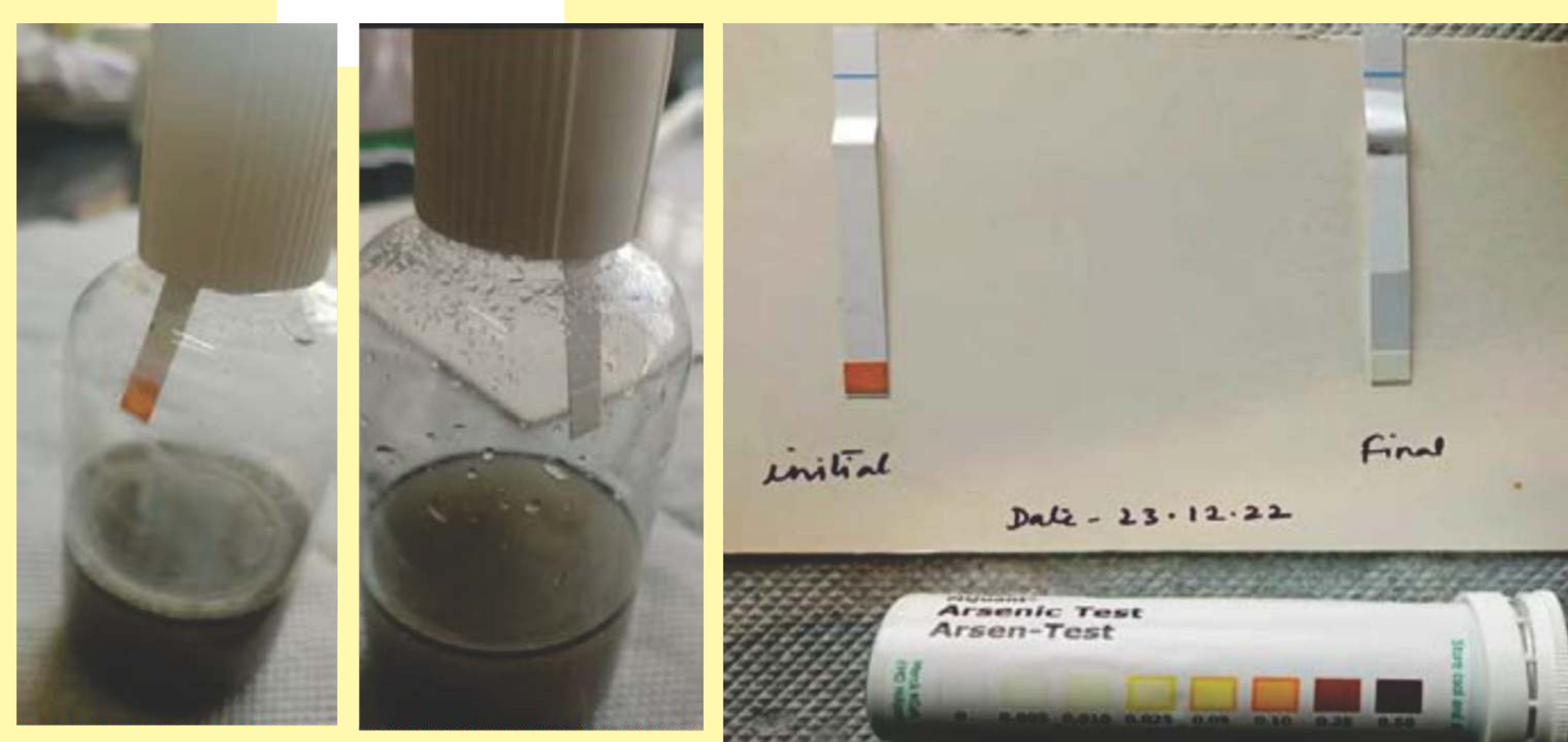
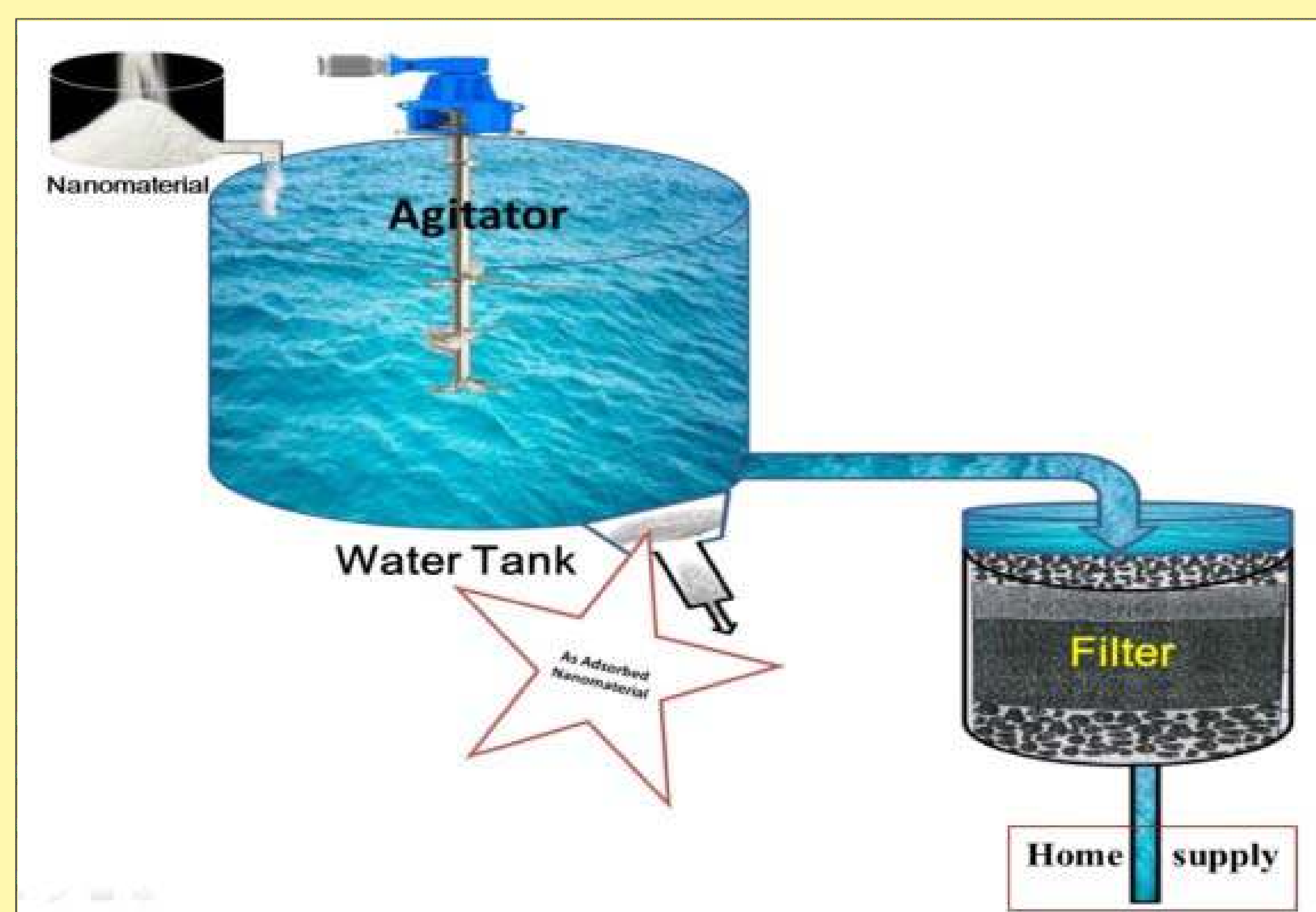
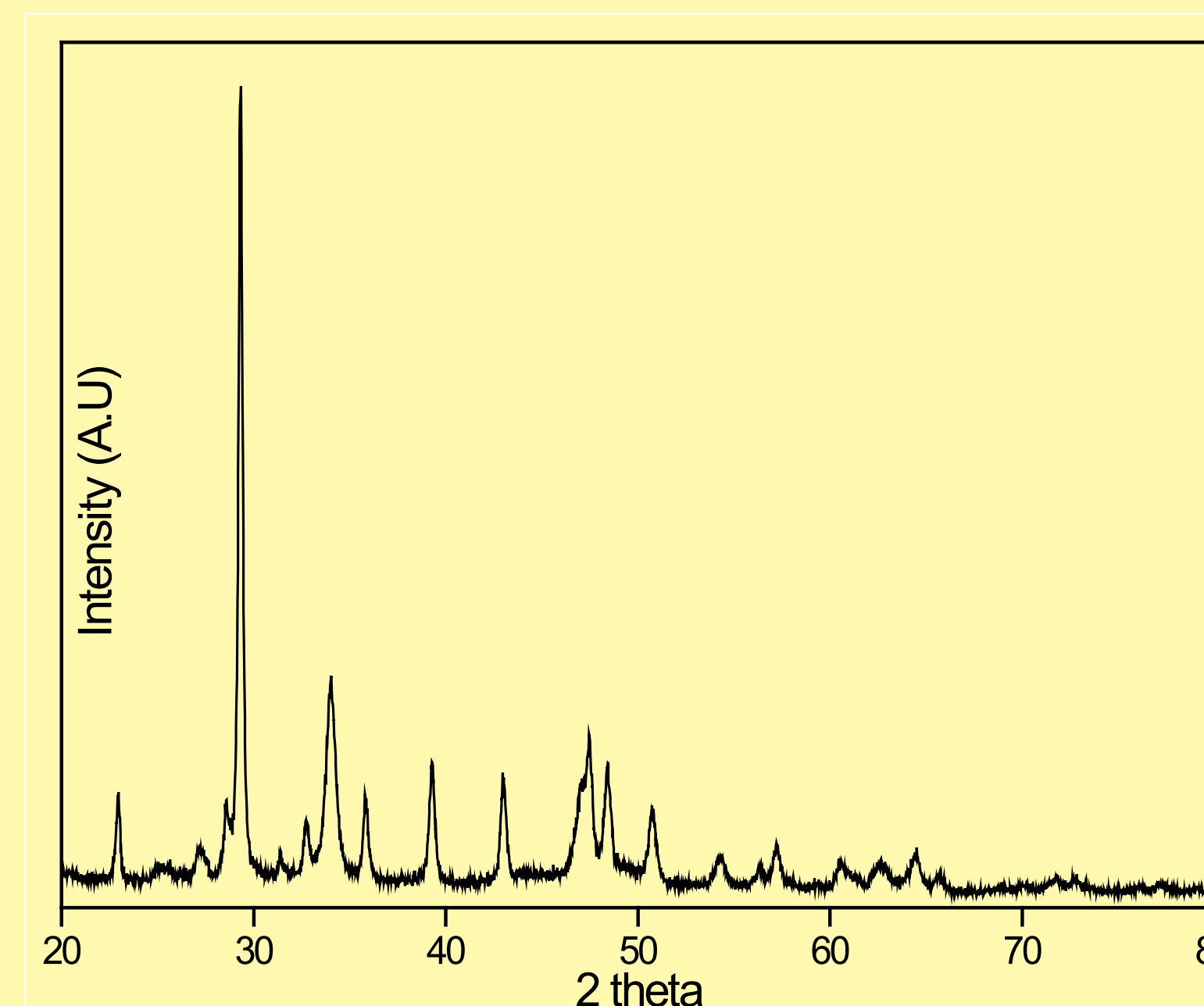
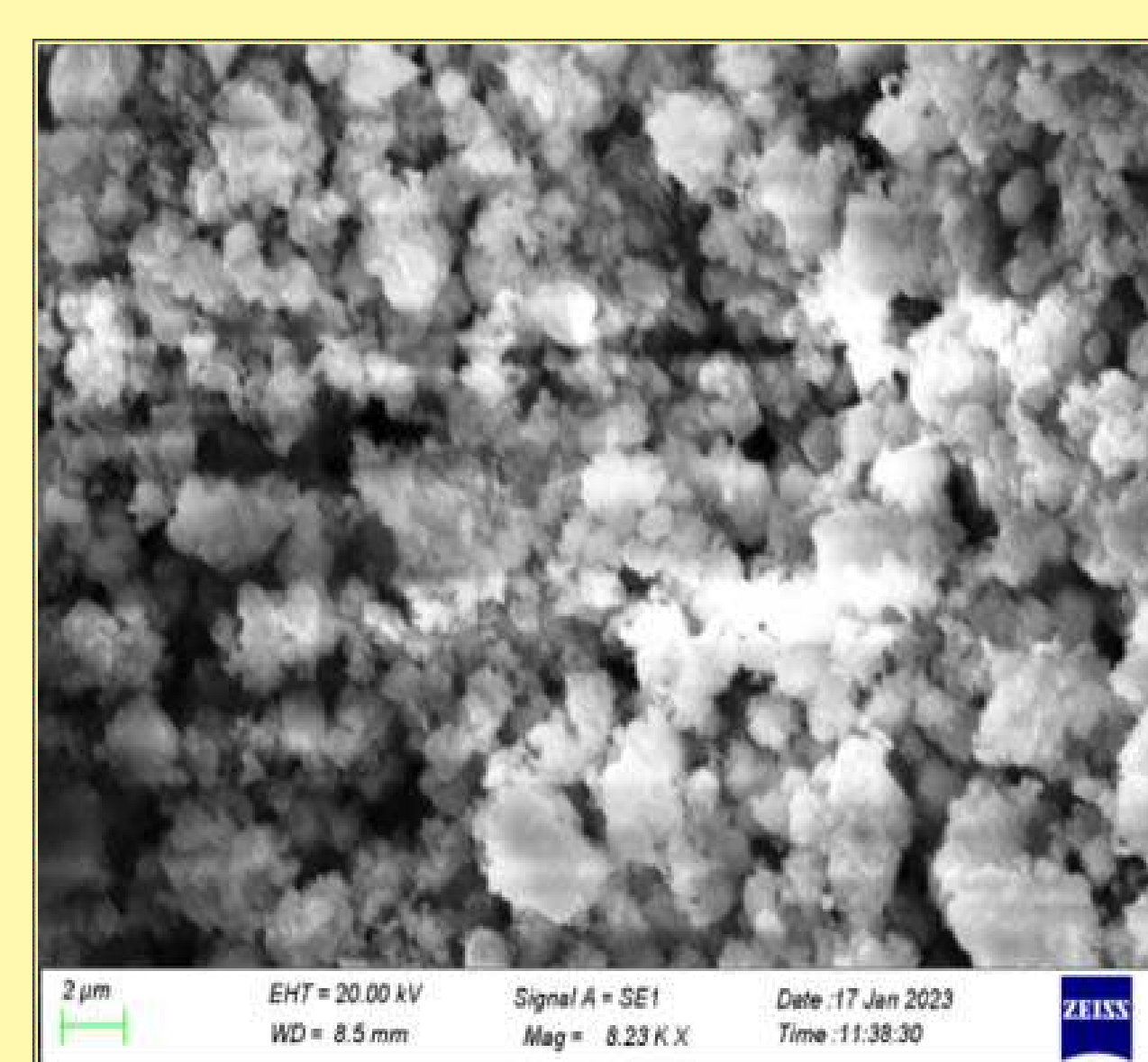
Tanushekh Sinha



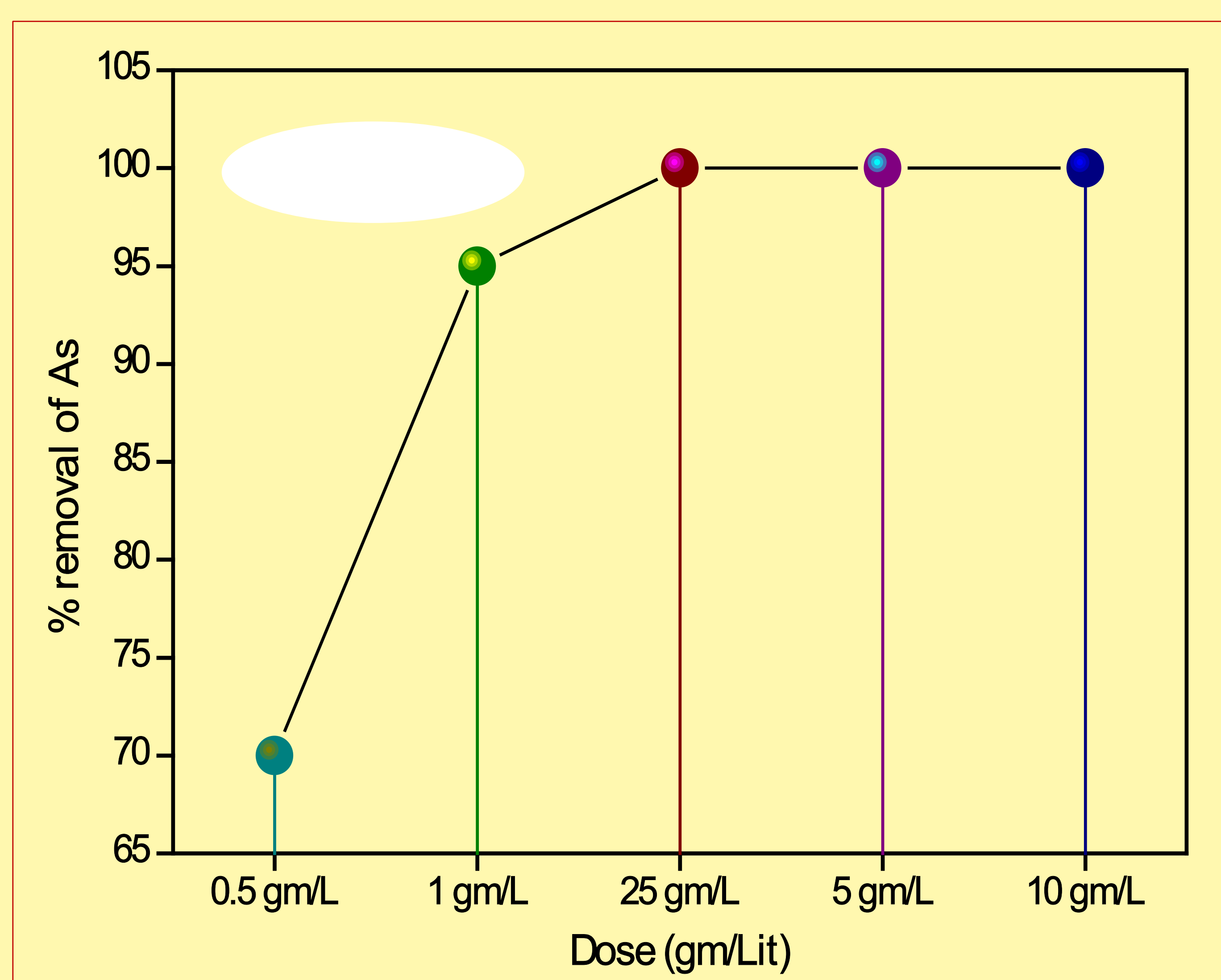
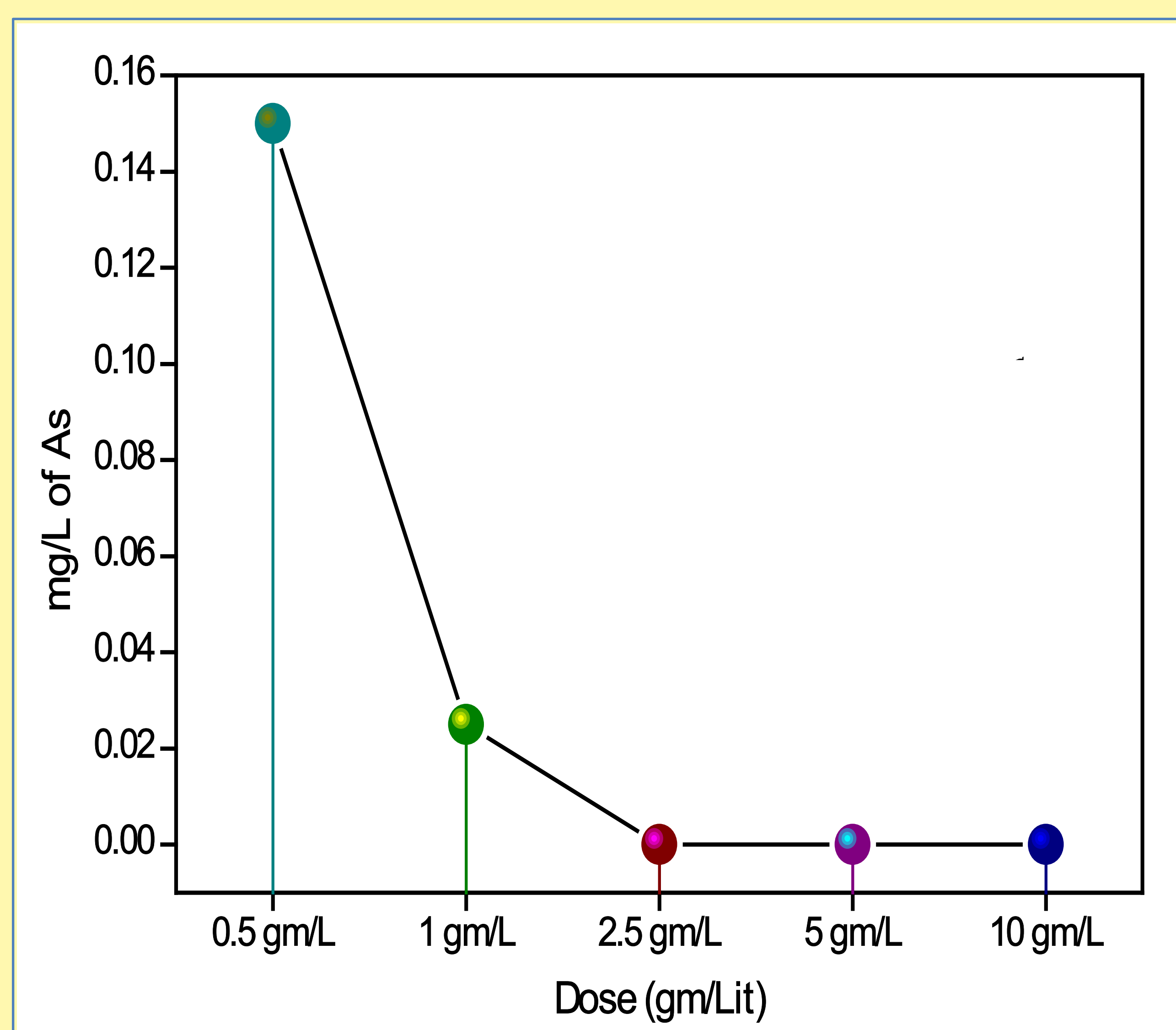
Gayatri Kumari

Highlights of Research/Prototype and Expected outcome

- ★ Prepared Nano scale Powder of waste egg shell and its superfine behaviour, crystal structure, Physical properties are measured using modern scientific tools- X-ray diffraction, Scanning Electron Microscope, High energy ball mills, Nanoparticle tracking analysis System (NTA) etc.
- ★ Scientific studies shows that Remediation of arsenic from arsenic contaminated water through nanomaterial and nano membrane.
- ★ Developed prototype of low cost device/filter for arsenic remediation.
- ★ Plan for Set up industry/start-up for employment generation and economic development. Such start-up will be 1st kind in state Bihar, to the best of my Knowledge
- ★ Product (egg shell Powder) originates from eggshell waste material , which is eco-friendly and Low cost
- ★ It will help to set up an industry/ start-up for employment generation and Knowledge for society
- ★ Encourage young researchers to think out of the box and help them to think beyond academic for betterment of society.
- ★ It will help in establishing linkages between academic institutes and corporate world



Water with Arsenic Water without Arsenic Results



**Waste-To-Wealth,
Towards a Sustainable Zero-Waste in a Circular Economy**

*** Low cost production of superfine Nano scale Eggshell powder from waste Egg shell and its applications for plant * Growth.***



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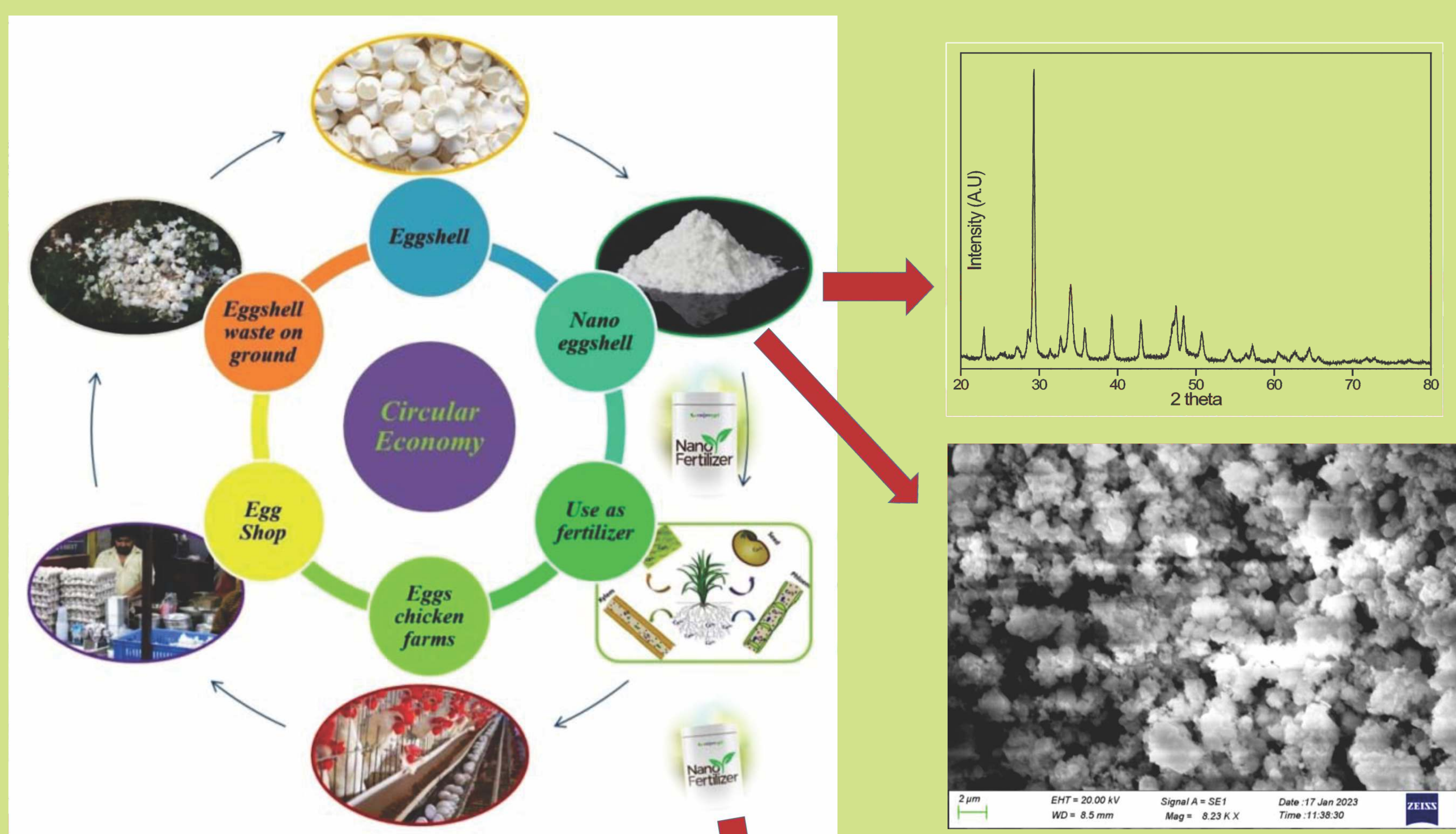
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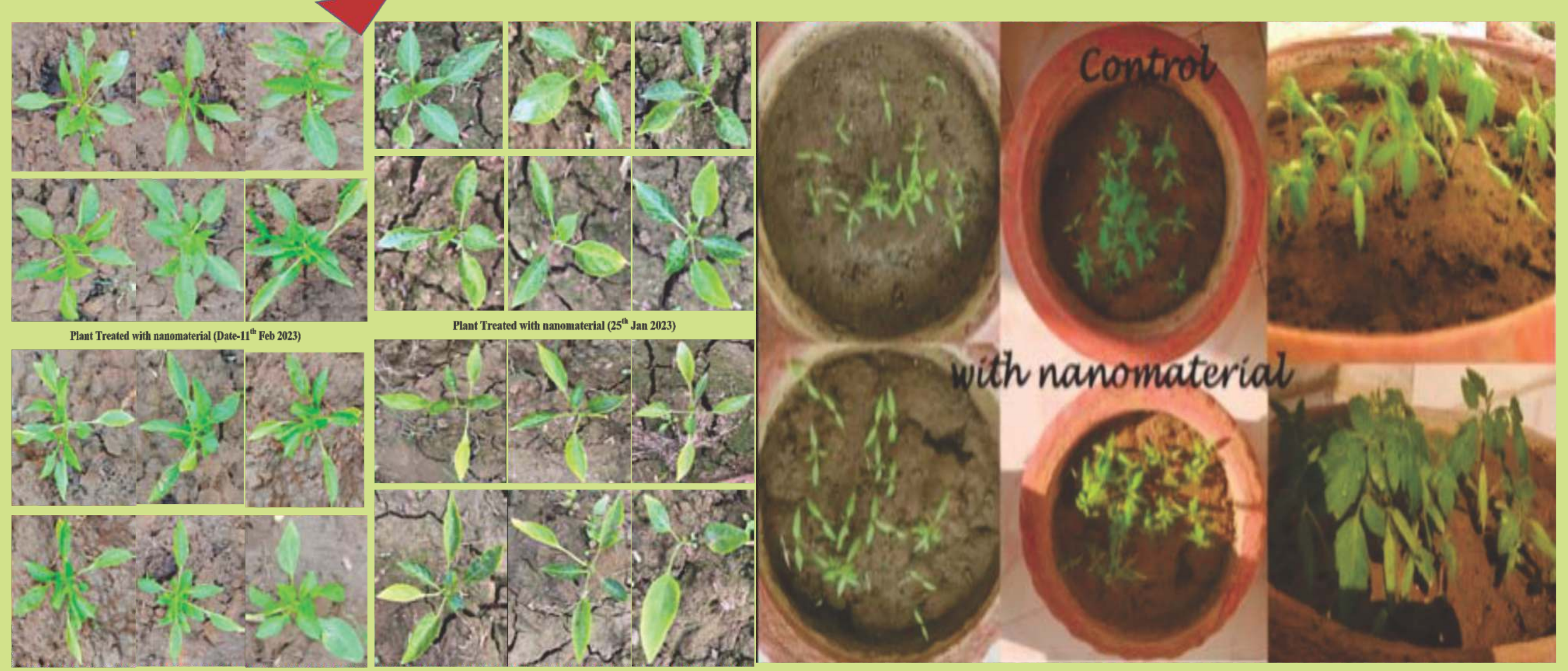
HIGHLIGHTS OF RESEARCH & OUTCOME OF THIS STARTUP/PROJECT

- Prepared Nano scale Powder waste egg shell and its superfine behaviour, crystal structure, Physical properties are measured using modern scientific tools- X-ray diffraction, Scanning Electron Microscope, High energy ball mills, Nanoparticle tracking analysis System (NTA) etc.
- Prepared Eggshell nanopowder was found effective to increase the rate of photosynthesis, stem growth
- It is important to note that such start-up will be 1st kind in state Bihar, to the best of my Knowledge
- Product (Nano Eggshell powder) originates from eggshell waste material, Product is eco-friendly and Low cost
- Small amount of Nano Eggshell powder as fertilizer use for plant and cheaper than conventional fertilizer.
- It offers reduced cost of agri-inputs as well as enhanced efficiency of fertilizers with minimal losses to the environment.
- Reactive N pollution (NO_3^- , NH_4^+ , N_2O) has emerged as a major factor responsible for environment pollution, and the same is being targeted globally for rational reduction. Nano Eggshell powder may be substitute for reducing global problems.



Nanotablet

Fig: Product Prototype of nanotechnology centre



Yttrium Aluminum Borate (YAB) : A Functional Nanomaterial for LED Light Application



Present LED



Problem:
It has Lanthanides
Affecting Retina of the human eye when anyone sees LED BulB in naked eye
Low coloring Index

NEW LED

REPLACED BY

Yttrium Aluminum Borate (YAB)
 $YAl_3(BO_3)_4$



Solution :
No Lanthanides (Not Affecting Retina of the human eye)
Less Power 1.3v to 1.7v
Enire range of UV light and bluish white in visible range.
High Coloring Index



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Ph.D Scholar Nano Science Center, AKU



Dr. Rakesh Kumar Singh
HOD, Nano Science Center



Prof. R.K.Verma
Founder VC, Munger Univ

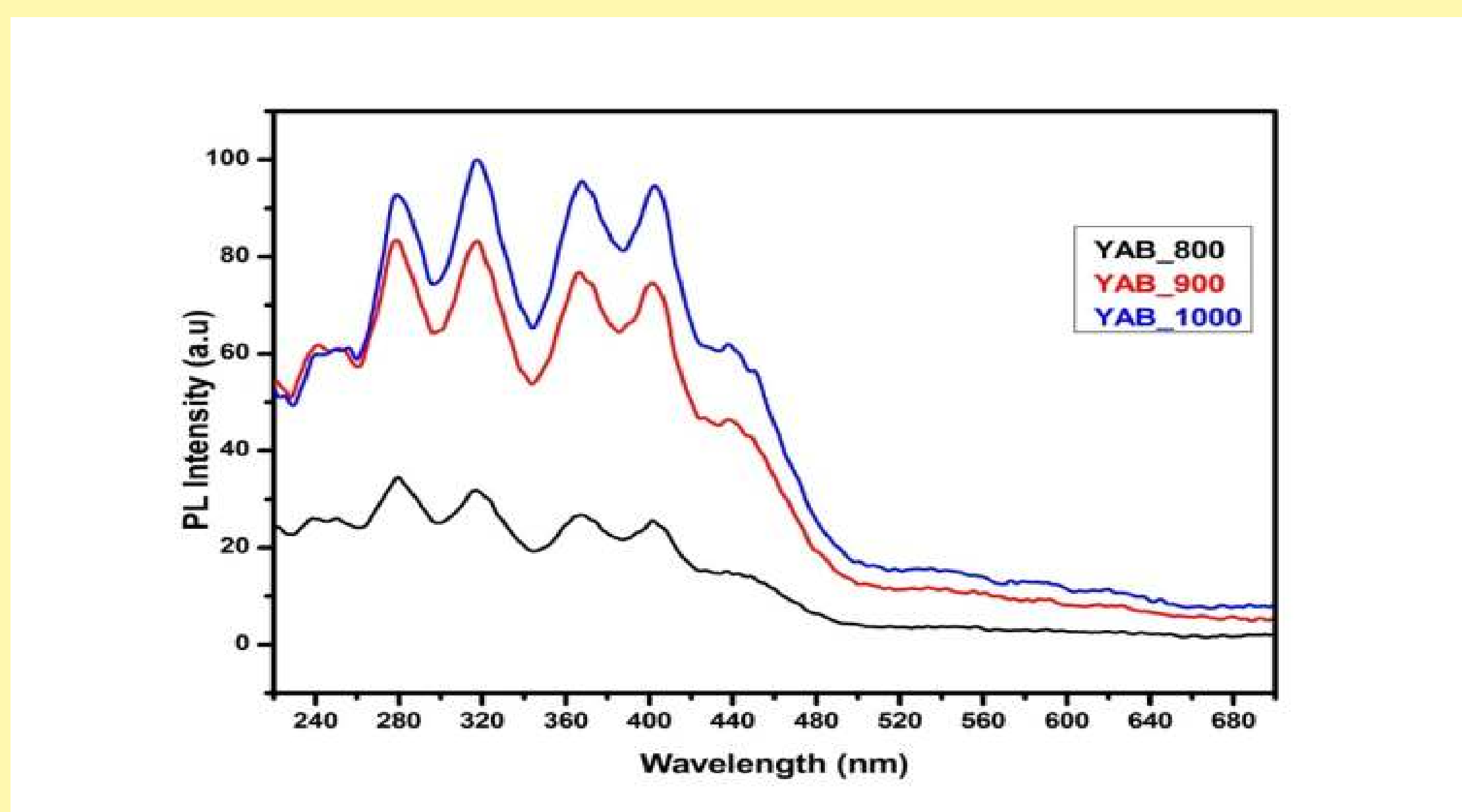


Nishant Kumar
Teech. Asst.

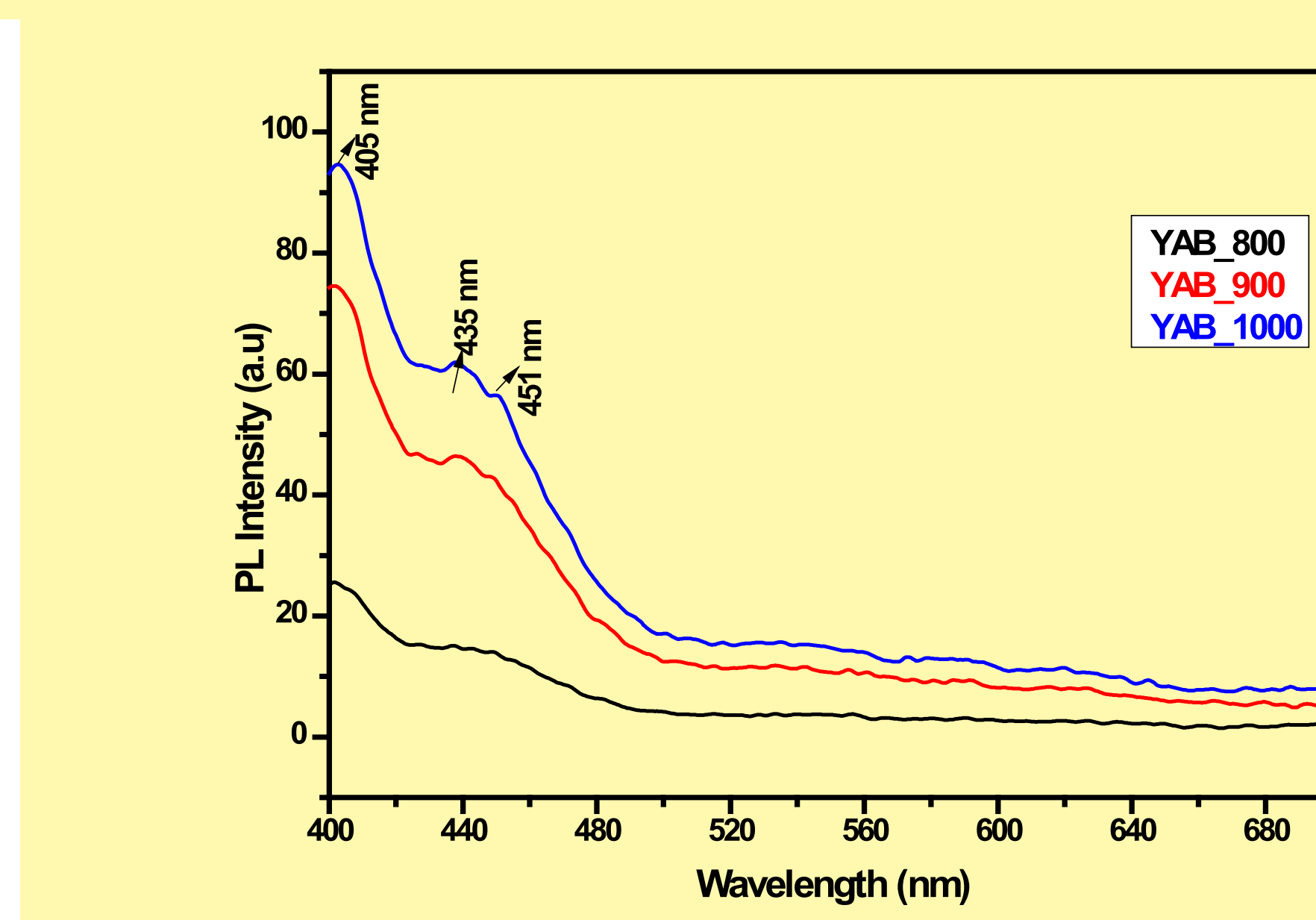
Abstract:

The Present disclosure relates to an economical method for preparation of highly efficient Yttrium Aluminum Borate (YAB) nanomaterial sample which showed photoluminescence properties in the **entire range of ultraviolet** as well as **Bluish white LED** at 400-451 nm wavelength in the Visible region having high coloring index. The disclosed method yields nanomaterial with characteristic band gap energy and can be used in numerous application without any hazard to human or animals from thus prepared LEDs.

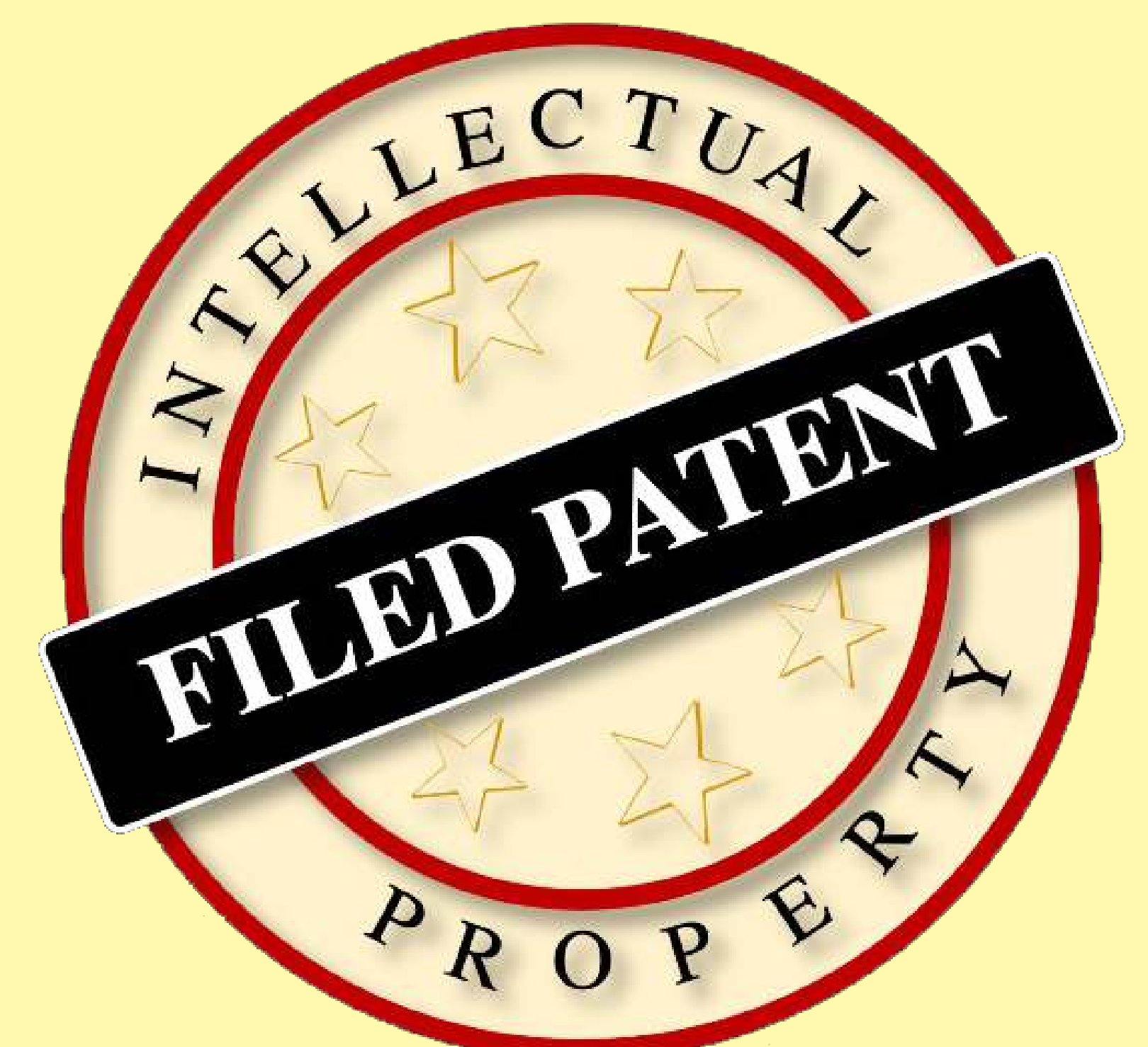
Shows Light Emitting property in the entire range of UV(240 nm, 280 nm, 320 nm, 360 nm and 400 nm and 435 and 457 nm in the blue region.



Photoluminescence in UV Range



Photoluminescence in Visible Range



Provisional Patent
Application No: **202331017221**

Visible LED Application



UV LED Application



Mobiles Back light



Street light



Water Disinfectant



UV Sterilizer



Water Purifier



Plant Lighting



UV Curing Lamp

UV (LED Application)



Bank Notes Security

Aryabhata Centre for Nanoscience and Nanotechnology

Aryabhata Knowledge University, Patna



Hon'ble CM, Bihar, Sri Nitish Kr Ji, , Ex- Dy- CM- Sri Sushil Kr Modi Ji, Former Education Minister Sri K P Verma Ji, Sir Vijay Kr Choudhary Ji, Additional Chief Secretary, Advisor of CM, Sri Anjani Kr Ji, Dep. Of Education, Sri Sanjay kr Ji with some higher Govt. officers and academicians visited Nanotechnology center/ Research activities.



NanoScience Faculty member of Aryabhata Knowledge University, Dr. Rakesh kr Singh, felicitated as Chancellor's Award for 'Best Young Teacher with contributions in modern field of nanoscience' for his outstanding contributions.

- ★ Aryabhata Centre for Nanoscience & Technology (ACNN) is non-traditional, super specialized, frontier areas of subject of 21st century & first cutting edge Research Centre of university of Bihar, equipped with 20 high-end research instruments such as Scanning Electron Microscope, Multiferroic system, Vibrating Sample magnetometer, High energy ball mill etc.
- ★ This Nanoscience center was Established by the first/founder Vice Chancellor Prof. S N Guha and first Pro Vice chancellor and former Vice Chancellor(I/C) Dr. Uday Kant Misra with whole hearted support and encouragement from Honorable Chief minister Sri Nitish Kumar Ji.
- ★ Different affairs of academic, research & development programmes are in progress under the leadership of Dr. Rakesh Kumar Singh from day of foundation. Faculty member(As Resource Person) & M.Tech/Ph.D. students of this research center have published/final progress about more than 150 research papers in peer reviewed/ Scopus/SCI indexed Journals and actively involved to create a conducive atmosphere of Scientific cutting edge Research/ related activities in a state Bihar and outside too.
- ★ In last 6 year more than 1000 eminent academicians/Scholars from different parts of world/country/state visited Nanoscience center. 3 patents and 3 prototype have been filed/developed/in progress in the field of low cost LED, Agriculture and purification of water. Scientists/Academicians of About More than 100 countries of the world including China, USA, UK, Germany, others cited/appreciated/read the frontiers research activities of the nanoscience center.