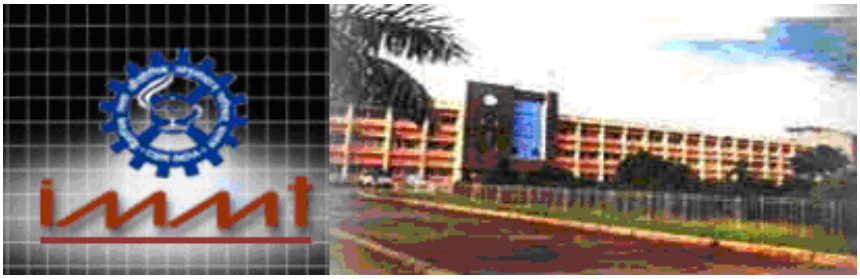
Techno-commercial offer on

An investigation to explore the drag-reducing capability of natural plants during slurry pipeline transportation

Submitted to

M/s OPJU INNOVATION CENTER (OIC), RAIGARH



CSIR-Institute of Minerals and Materials Technology

Bhubaneswar- 751 013, Odisha, INDIA

September, 2023

Brief summary

Transporting a huge amount of mineral ores and their by-product from the point of generation to the utilization sites is challenging for mineral industries worldwide. In this context, slurry pipeline transportation offers many advantages, which include less environmental disruption, low air & noise pollution, less natural habitat interference, feasibility in adverse locations & weather conditions, reduced carbon footprints, etc. One of the major concerns related to hydraulic conveying is obtaining a favouarble flow in the pipeline. Many chemical-based reagents are available in the market to modify and improve the slurry flow by reducing the frictional drag; however, these reagents are expensive and pose additional waste to the ecosystem.

The proposed work explores the capability of natural plant species found in the Raigarh district (as desired by OIC) as environment-friendly bio-additives to reduce frictional drag during slurry pipeline transportation. Since ancient times, natural plants have been used as medicinal plants due to their therapeutic properties. However, their effectiveness in industrial sectors has yet to be examined widely. The proposed work will not only provide an economically viable solution to industries but also encourage the locals/farmers to cultivate plants/fruits that may become a source of income to improve the livelihood of the localities.

Scope of the work

1. Collection of iron ore samples (Preferably from Jindal Steel & Power, Angul/Raigarh)
2. Complete Physicochemical characterization studies of iron ore, including Particle size distribution, chemical composition, particle shape and morphology, particle densities, moisture present, etc.
3. Procurement/collection of natural plants/fruits from villages of Raigarh district (as desired by OIC)
4. Bio-additive extraction using standard methods.
5. Selection of bio-additive type and optimization of dosages using lab-scale tests.
6. Rheological studies of iron ore slurries in the absence and presence of bio-additive.
7. Estimation of Critical velocity, frictional head loss, and specific energy consumption during slurry flow.
8. Technical Report submission

1.	**Title of the Project:**	An investigation to explore the drag-reducing capability of natural plants during slurry pipeline transportation
2.	**Name, Designation &: and Addresses of Principal Investigator**	Dr. Vighnesh Prasad, Scientist Design & Project Engineering Department, CSIR-Institute of Minerals & Materials Technology, Bhubaneswar -751013, Odisha
3.	**Name(s), Designation: and Addresses of the members/co-investigators**	Mr. Snehasis Behera, Chief Scientist, CSIR-IMMT Dr. J.K. Pothal, Principal Scientist, CSIR-IMMT Mr. Anil Dubey, Scientist, CSIR-IMMT Dr. R. D. Patidar, Vice-Chancellor, OPJU Dr. Siddharth Chakrabarti, Head-Mechanical Engg., OPJU Dr. Kalyan Phani, Associate Professor, OPJU
4.	**Institution where the : project will be implemented**	CSIR- Institute of Minerals & Materials Technology Bhubaneswar – 751 013, Odisha, INDIA
5.	**Names of Sponsor:**	M/s OPJU INNOVATION CENTER (OIC), RAIGARH, CHHATTISGARH
6.	**Duration of the : project**	01 year (12 Months)
7.	**Total project cost:**	Rs. 8,00,000 + GST @18% (Rs. 1,44,000) Total cost of the project: **Rs. 9,44,000.00** (Nine Lakh Forty-Four Thousand Rupees only)
8.	**Payment terms:**	100% advance payment along with work order
9.	**Mode of payment:**	The payment may be made through may be made through RTGS in favour of **Director, CSIR-Institute of Minerals and Materials Technology, Bhubaneswar** payable at **Bhubaneswar** with the following bank details: Bank Name: State Bank of India, RRL Campus Branch, Acharya Vihar, Bhubaneswar Account No: **30267734773** Bank Code: **7499** IFSC Code: **SBIN0007499** **GST No.: 21AAATC2716R1ZR** **or** in the form of DD in favour of **Director, CSIR-Institute of Minerals and Materials Technology, Bhubaneswar** payable at **Bhubaneswar.**