ADVANCED MATERIALS & PROCESSES RESEARCH INSTITUTE, BHOPAL
COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH (CSIR)
Hoshangabad Road, Near Habibganj Naka, Bhopal – 462026 (M.P.)

Digital Catalogue for Technology and Products Development

Basic Information:

**Required field.*

The only characters allowed to be entered in the form are: **( ) & ' : " _ - , . =**. Please don't enter any other special characters.

Technology developed:*	DEVELOPMENT OF BIO-BINDER FOR MAKING BIO-COMPOSITES FROM BAMBOO/OTHER NATURAL RESOURCES – A GREEN & SUSTAINABLE APPROACH
Category: (Select any one)	✔ Technology Service/Know how Product(Hardware/Material/Software)
Details of Inventor(s):	Inventor*: Institution/Organization/Company*: CSIR-AMPRI , Bhopal Designation:
Technical Application Area:* (Select One)	Agricultural Artificial Intelligence & Machine Learning Automation and Robotics Aviation Biotechnology Chemicals and Materials Science Communication ✔ Construction Covid-19 technologies Electronics and Semiconductors Energy Environment Engineering E-waste Technologies Healthcare Industrial Waste Utilization Information Technology

		ITS & Assistive Technology
		Manufacturing
		Military
		Space
		Transportation
		Water Treatment
		Other
	If 'Other', please specify:	
	Please give more details of new technical application area:-	
Organization(s):*	Council of Scientific and Industrial Research (AMPRI) Bhopal	
Affiliated Ministry/Funding Agency:* (Select One)	✔	CSIR, Govt. of India
		DST, Govt. of India
		NPMASS, ADA, Govt. of India
		DRDO, Govt. of India
		ISRO, Govt. of India
		MoEFCC, Govt. of India
		MoFPI, Govt. of India
		Ministry of Education
		DAE, Govt. of India
		SERB, DST, Govt. of India
		Central Power Research Institute
		MeiTY, Govt. of India
		DBT, Govt. of India
		BRNS, Govt. of India
		VGST Government of Karnataka
		AICTE, Govt. of India
		ARDB, Govt. of India
		Biotechnology Industry Research Assistance Council
		Ministry of Petroleum and Natural Gas (MoPNG)
		Institution Funding (Self Supported)
		Office of the Principal Scientific Adviser
		Ministry of Defence
		Ministry of Road Transport and Highways
		Ministry of Health and Family Welfare
		Ministry of MSME

		Testing Funding Agency
		NCCS Intramural Core fund
		NCCS Fund
		DOT Govt. of India
		CDOT New Delhi
		National Security Council Secretariat
		NDMA Govt. Of India
		Test Funding Agency SS
		DME Government of Karnataka
		I-STEM Funding at IISc
		RUSA Govt of India
		Government Of Kerla
		KSCSTE Government Of Kerla

Type of Technology Development:* (Select One)	✔	Indigenous
		Collaboration with Foreign Entity

Does the technology help in replacing any import items currently procured from outside India? (Select One)	✔	Yes
		No

Does the technology have export potential? (Select One)	✔	Yes
		No

Category of Technology developed:* (Select One)	✔	Immediate Deployment
		Futuristic
		Export Potential
		Import Substitution

Stage of Development:* (Select One)	✔	Lab-scale
		Prototype Level
		Field Test
		Commercialized

Please describe (also specify the TRL Level):*:

Abstract:

The development of bio-binders from renewable resources represents a significant advancement in the field of sustainable materials. CSIR-AMPRI, Bhopal has successfully developed a bio-binder for bamboo and other natural plant fiber resources-based bio-composites. Bio-binders can be synthesized from renewable resources like starch, and other suitable raw materials. These resources are abundantly available and can be sustainably utilized, ensuring a continuous supply without depleting natural reserves. By utilizing these renewable sources, bio-binders help to reduce the dependency on petroleum-based binders, significantly lowering greenhouse gas emissions and contributing to environmental conservation. One of the key advantages of bio-binders is their enhanced biodegradability leading to reduced long-term environmental impact and easier disposal. The processes for bio-binder development require less energy input, making them cost-effective and environmentally friendly. Additionally, bio-binders are free of by-product formation. This further reduces their environmental footprint and toxicity, making them a safer alternative for both manufacturers and end-users.

Bio-binders, further can be used for making bio composites utilizing bamboo or other natural fiber resources, which would be eco-friendly with biodegradability and recyclability in nature. These developed biocomposites offer excellent strength while being lightweight, natural and with aesthetic texture. Bio-composites made with bio-binders can be utilized in a variety of applications including Industrial, non-Industrial, and generic uses. The unique characteristics of biocomposites are eco-friendly, lightweight, stiffness with good mechanical and thermal properties would make them suitable for use in the construction industry as internal/secondary structural elements, lightweight structures, etc. Bio-composites offer an environmentally friendly alternative for building partitions and panels, laminates, facade panels, doorframes, and other architectural applications, etc. Bamboo Biocomposites also can be an excellent choice for generic uses such as making nameplates and crafting furniture parts etc., thereby reducing the dependence on wooden furniture.

Thus, the development of these bio-binders for creating biocomposites like bamboo bio-composites and other natural plant fiber resources opens up numerous possibilities for industrial and non-industrial uses, contributing to a greener and more sustainable environment. Thus, the development of bio-binders and bio composites marks a significant step towards a sustainable and greener environment.

Applications:* (Maximum 2000 characters allowed.)	**Please describe all potential applications of the technology in bullet points below and/or attach a file::** The developed Bio-composites can be used for various Industrial, Non-Industrial applications and eneric uses such as - Sheets, Blocks, Laminates Furniture Partitions, Panels for Interior and Construction Industry Name Plates etc.
Advantages:* (Maximum 2000 characters allowed.)	**How does this technology improve upon existing technologies? What differentiates it from other solutions**

	to the problem it addresses? Please write in bullet points below and/or attach a file.: ▪ Bio-binders can be synthesized from renewable resources such as starch, lignin, and other suitable raw materials, which are abundantly available and can be sustainably utilized. This approach ensures a continuous supply of these resources without depleting natural reserves. By utilizing renewable sources like novel lignin and starch-based bio-binders derived, rather than petroleum-based binders, these bio-binders significantly lower greenhouse gas emissions and contribute to environmental conservation. ▪ **The bio-composites offer excellent strength while being lightweight, biogradable, can be ideal for various structural applications.** ▪ **It can contribute to reducing plastic wastes and promote environmental conservation.** ▪ **Enables high-performance composites with a natural and aesthetic texture.** ▪ **Can benefits rural & semi urban population, MSME's. Entrepreneurships**
# Technology Inputs:	
Imported Equipment/Spare Parts:	Equipment/Spare Parts required are - • none Year: ITC-HS Code:
Indigenous Equipment/Spare Parts:	Majo Equipment/Spare Parts required are - • Oven • Heating mantle • Hydraulic Press • Bamboo Cutter Machine • Bamboo Crusher Machine • Knot Removal Machine • **Chemical Processing Equipment like** • **Chemical Reactors** etc. • **Surface Treatment Units** etc.

Imported Raw Materials:	Raw Material: Year: ITC-HS Code:
Indigenous Raw Materials:	Major Raw Material: • Lignin sources • Starch sources • Sodium Hydroxide • Stabilizing agents • Other chemical agents and additives • Bamboo stem and other plant based natural resources Year: ITC-HS Code:
Existing R&D Facilities used:	Facilities: • Material Synthesis • Material Characterization • Chemical Analysis • Mechanical Testing Year: ITC-HS Code:

R&D Investment:

R&D investment (Rs. in Lakhs):*	Indian Source (Rs.): Foreign Source (Rs.): Year:

Patents & Publications:

Patents:	Filed Patents (No.): - NO. 0124NF2024, IN Granted Patents (No.):-- Year: -2024
Publications:	Submitted but not Published (No.): Published (No.): Year:

Commercialization Potential:

Who are the Potential Licensees? (Maximum 2000 characters allowed.)	**List companies with any known contacts or highlight relevant industries:** 1) M/S Permali Wallace Pvt Ltd , opposite Reserve Bank of India, Zone-I, Maharana Pratap Nagar, Bhopal, Madhya Pradesh 462011 2) M/S Ecological Fiber Composite Pvt. Ltd., Jabalpur 3) M/S Asili Bamboo Products, Meerut
What commercially available products (if any) address the same problem, at least in part?	Company: Product: Problem Addressed:
Would you like to develop this invention further with corporate research support?* (Select One)	✔ Yes No
Would you be interested in participating in cluster based programs for commercialization research or business planning for your invention?* (Select One)	✔ Yes No

Indigenous Technology Development Plan:

Technologies/raw materials proposed to be indigenized and action plan:	Action Plan: Year:
Total Investment to be made on expansion (Rs. in Lakhs):	Indigenous Components (Rs.): Imported Components (Rs.): Year:
