

AGRO WASTES (PARALI) POTENTIAL FOR MANUFACTURING HYBRID PARTICLE / FIBRE BOARDS

EVERGREEN COMPOSITE WOOD

Recycling Technology for Eco Products: Paddy stable & Wheat straw fibres



OPPORTUNITIES

- Transforming agro wastes into wealth
- Create start-up, entrepreneurship & employment thus enhance the economy
- Contribute to Atmanirbhar Bharat
- Technology is ready for commercialization

HYBRID GREEN COMPOSITE PARTICLE BOARD FROM AGRO WASTES

CSIR-Advanced Materials and Processes Research Institute (AMPRI), Bhopal has developed a technology for large scale recycling parali (paddy straw/ stubble) and wheat straw for manufacturing Hybrid green composite particle / fibre boards in pilot scale. Optimized the process parameters and the process know-how and technology package is ready for commercial scale manufacturing. The developed composite materials are better alternative for particle board, MDF board and wood to use as an architectural cladding panels, partition wall, door and furniture.

Vision

- Transform agro wastes into hybrid particle boards
- Create business from parali
- Contribute to Make in India, Clean and Skill India program
- Provide holistic solution to agro-wastes management
- Enhance the rural livelihoods of the poor

Crop Residues Generation in India

States	Residues Generation (Million Tons / Year)
Punjab	50.75
Uttar Pradesh	59.97
Haryana	27.83
Maharashtra	46.45

Raw Materials : ■ Parali (Paddy Stubble/Straw) ■ Wheat Straw ■ Polymer

Processing agro wastes :



Paddy straw



Paddy straw fibre



Processed paddy straw



Processed fibre matrix

MANUFACTURING PROCESS

Raw paddy stubble / straw / agro wastes



Processed agro wastes/
Paddy stubble / straw in polymeric system

Casting of composites under compression moulding

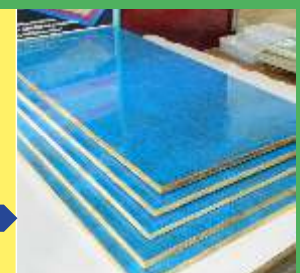
Final products

Testing and quality assessment

Hybrid particle board from parali

Unlaminated

Laminated



TECHNOLOGY READY FOR COMMERCIALISATION: TRL-5

- Technology is ready for commercial scale manufacturing medium density and high-density hybrid composite particles / fibre boards
- All essential testing have been done as per the BIS and ASTM standard and confirmed the suitability for use in housing sector
- The quality and performance have been validated at IPIRTI, Bengaluru
- Energy saving & eco friendly products and technology



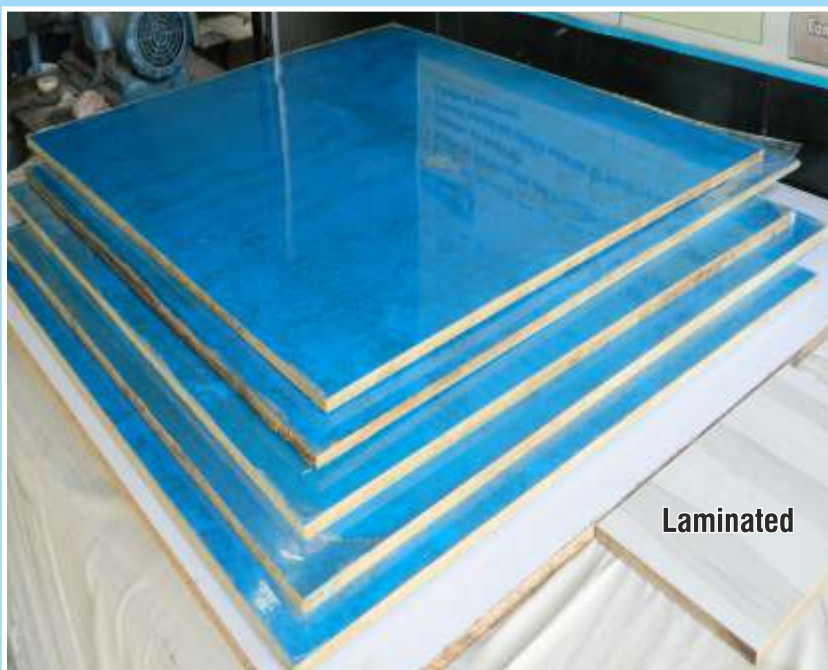
Solution to Parali Burning

- Use of agro wastes and converting them into value added materials
- Providing holistic solution to stop burning parali / agro wastes
- Creating new employment and income to rural people and farmers
- Manufacture a new class of particle / fibre boards from agro wastes



INTRODUCING A NEW CLASS OF ECO-FRIENDLY MATERIALS TO THE SOCIETY

Hybrid particle boards made of paddy straw in pilot scale at CSIR-AMPRI, Bhopal (2m x 1m x 19mm)

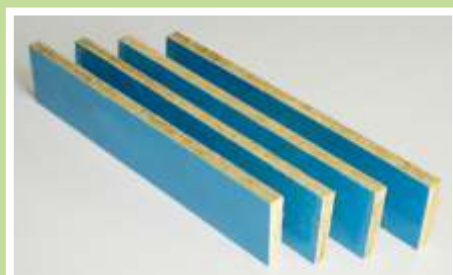


Sandwich composites made of wheat straw (30mm thickness)

PERFORMANCE OF HYBRID PARALI PARTICLE/ FIBRE BOARDS

Material performance (Average value)	Tensile Strength (MPa)	Tensile Modulus (GPa)	Flexural Strength (MPa)	Flexural Modulus (GPa)	Density (g/cm ³)	Thickness Swelling (%)	Water Absorption (%)	Termite Effect
Un-laminated Board	20.02–26.81	2.37–3.89	17.47–47.65	2.09–4.25	0.69–1.18	6.69–22.13	8.95–62.34	RT
Laminated Board	23.14–29.37	2.98–4.58	24.39–40.90	3.50–4.89	0.98_1.40	3.94–12.76	6.19–10.45	RT

RT - Resistance to termite



Parali particle boards : Flexural strength test specimens

Uniqueness of Parali Particle Boards

- Durable, weather resistant & cost effective
- Resistance to moisture, termite & corrosion
- Different colour, texture, surface finish can be made
- Better in quality as compared to particle board and MDF board

Environmental and Social Impact

- Use of renewable agro fibres to avoid synthetic fibres
- Carbon sequestration, control smoke & air pollution
- Contribution to reduce global warming and climate change issues
- A new class of material to housing sector

BENEFICIARIES: Housing, Civil Infrastructure, Furniture Industry, Farmers, Local Population of Delhi NCR, Haryana, Punjab etc.

IPR Status

Two International Patents (i) A glossy finish sandwich composite and process for preparing the same (Grant No.201811047389, WO 2020/121319 A1) and (ii) High performance glossy finish green hybrid composites with variable density and an improved process for making there of (Publication No. 201811016873, WO2019/211862A1) filed.



Paddy straw particle boards



Sandwich board from paddy straw



Particle boards from parali



Sandwich boards from wheat straw

CREATE BUSINESS FROM PARALI ON CSIR-AMPRI TECHNOLOGY

CSIR-AMPRI facilitate R&D business for entrepreneurship, establishing new industries for large scale utilization of agro wastes for manufacturing durable hybrid green composite particle / fibre boards.

For more details >>>

Dr. Avanish Kumar Srivastava
 Director
 CSIR-AMPRI, Bhopal, M.P., India
 Ph.: 0755-2457105 (O)
 Email: director@ampri.res.in
 Website : www.ampri.res.in

Dr. Asokan Pappu
 Chief Scientist & Chairman
 Business Development Cell
 CSIR-AMPRI, Bhopal (M.P.), India
 Ph.: 9425600260 (M), 0755-2489402 (O)
 Email: asokanp3@yahoo.co.in



Hybrid parali particle boards