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# इपिर्टि न्यूज़ IPIRTI NEWS

Delivering Innovative Solutions for Industry, Society and Environment

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Dear Members,

With the increasing building activities and stringent building regulations the behaviour of building components from various panel products or in combination with other materials against fire and to ensure occupants safety is the need of the hour. With the recent tightening of regulations relating to buildings in India, there is also a market for fire retardant wooden doors in housing applications. There are huge opportunities for Developers and Architects to add value to their properties through these fire retardant doors. Occupants of buildings will be the major beneficiaries as it gives them additional peace of mind and protection from fire without compromising the use of green building materials viz. wood and panel products. Keeping future requirements of building bye-laws in our country and to facilitate testing of fire check doors, the facility is being established at IPIRTI for testing fire performance of full size door/shutters as per National/ International standards such as IS:3614 (part 2), BS:476 (part 20 and 22), ISO: 3008:2007 and BS:EN 1634-1:2000 using latest technologies and instrumentation comparable with best in the world.

Fire doors are "rated" by time (in minutes or hours) that a door can withstand exposure to fire test conditions and the failure criteria is assessed by Integrity & Insulation. Hourly ratings include 3 hours, 1 ½ hours, 1 hour, ¾ hour, and 1-3 hour, with the maximum rating required of any swinging type fire door being three hours.

The salient features of the fire door testing setup are, Vertical front open furnace structure with refractory bricks & ceramic wool blanket for best heat insulation. The chamber is fitted with Computer programmable Automated LPG burners, hot gas exhaust system with automated dumper, Pillar mounted I beam jib crane with electric hoist, Test frame to hold door under test with trolley and roller skid, Thermocouple assembly with good measurement accuracy, PC based multi channel data logger, etc. Hopefully the fire door testing facility will be made available to the industries from January, 2011.

Dr. C. N. Pandey  
Director

## RESEARCH & DEVELOPMENT

### DEVELOPMENT OF SOYA BASED ADHESIVE

Environmental concerns, and the high cost of petroleum based resins have resulted in an increased interest in renewable feedstock and also have caused a resurgence of interest in developing adhesives from biomaterials of natural origin. Defatted Soya flour is one of the materials which can be cross linked with formaldehyde to form a phenolic and amino resin system. Being a naturally renewable material this can widely serve the industries in partial replacement of phenol and amino in the resin system. Many research have been carried out in the past on extending the soya flour to synthetic resin. However more success was not achieved in the unequal construction of plywood which is actually being followed by industries. Hence to refine the technology, a study of making ply boards with phenolic and amino replacement with soya flour as an integral part of the resin has been carried out at IPIRTI Bangalore. In this study the condition for denaturing soya flour was optimized to maximize its incorporation into the final polymerized structure. Soya flour was made to react with phenol, formalin and caustic to make durable adhesives for the manufacturing of exterior grade

plywood. Soya was partially substituted for phenol in the phenol formaldehyde resin .



*Soya based adhesives*

The percentage substitution was optimized for achieving exterior grade plywood strength with respect to relevant specification. The products made from soya adhesives has shown excellent results as per relevant specifications and the products found to be completely free of formaldehyde emission. However the study were limited to lab scale. Research is being continued to upgrade on pilot scale.

### EFFICACY OF COLEMANITE AGAINST MOULD FUNGI

Moulds are fungi often grow superficially on lignocellulosic materials, but generally do not decay or weaken the strength of such materials. Carbon sources utilized by moulds are simply residual sugars and stored carbohydrates. Although mould fungi do not cause decay, the disfigurement and discoloration of materials can be of aesthetic and economic importance. The majority of the moulds found in homes are Cladosporium, Penicillium, and Alternaria, which

are now known to cause chronic sinus infections, respiratory infections, and asthma. A potentially lethal mould, *Stachybotrys atra* produces airborne toxins that can cause inflammation and injury in the gastrointestinal and pulmonary tissues in children and adults. Previously it could have been argued that control of the non-structurally impacting mould fungi was unimportant. However, specific growth of a number of these organisms has now been associated with negative

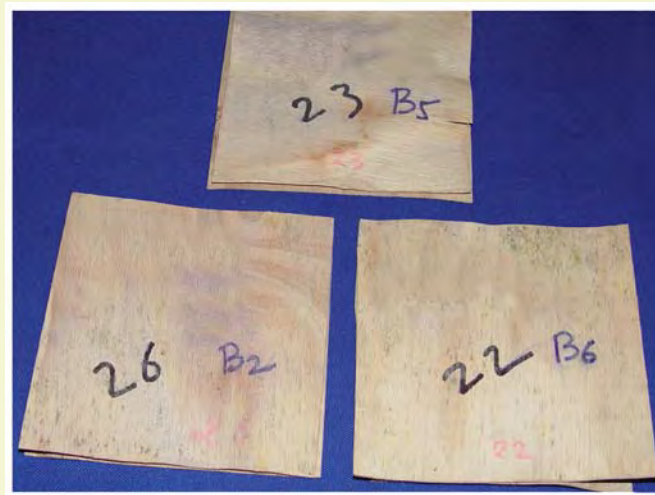
health effects. Hence keeping these points in view a study has been undertaken at IPIRTI to find out the economical chemical against moulds.

Colemanite is a Borate mineral found in evaporate deposits of alkaline lacustrine environments. It is a secondary mineral that forms by alternation of Borax & Ulexite. It is also called as Hydrated calcium borate hydroxide. The LD 50 of Colemanite in rats is more than 5000 mg/kg. Hence based on toxicological studies Colemanite is not toxic to the human being.

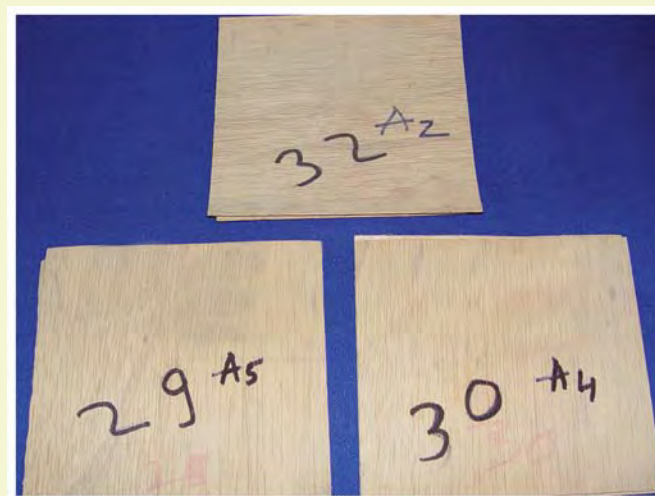
From the studies it has been found that Colemanite at 5% (dipping method) recorded lowest average percentage surface attack of 4.17. Retention of Colemanite at 5% was recorded as 0.18 kg/m<sup>3</sup>. Colemanite at 3% emerged as the second best treatment (5.67%). Absorption of Colemanite at 3% was recorded as 0.074 kg/m<sup>3</sup>. The maximum average percentage surface attack was recorded in water treated control samples i.e. 9.83%. Colemanite at 5% can be considered appropriate in suppressing the mould infestation on the veneer of Rubber wood.

Colemanite is very economical as compared to Borax and Boric acid. The market rate of Colemanite is Rs.25 per kg whereas, for Borax it is Rs.35 per kg and Rs.54 per kg for Boric acid.

The present study is the preliminary work on the efficacy of Colemanite against wood destroying organism. Further studies on the efficacy of Colemanite against different wood destroying organism is under progress. In India this is the first report where Colemanite has been used against mould fungi.



Rubber wood veneer samples treated with 3% Colemanite



Rubber wood veneer samples treated with 5% Colemanite



Rubber wood veneer Control samples showing mould attack

**PATENT GRANTED TO IPIRTI, BANGALORE, BY THE PATENT OFFICE, GOVERNMENT OF INDIA THROUGH NRDC, NEW DELHI**

A Patent (No. 242299) has been granted by the Patent Office, Government of India to IPIRTI, Bangalore for an invention entitled “A Process for the manufacture of Bamboo Mat Moulded Skin Board for Door” on 23<sup>rd</sup> August, 2010 through NRDC, New Delhi.



**EXTENSION**

19-07-2010 to 20-07-2010, Dr. C.N. Pandey, Director, IPIRTI Bangalore visited M/s. Timpack Pvt. Ltd., Byrnihat, Meghalaya and attended the inaugural function of Bamboo Mat Ridge Cap (BMRC) production plant.

19-07-2010 to 20-07-2010, Mr. Uday D.N & Ms. Sujatha D. Scientists attended the inaugural function of Bamboo Mat Ridge Cap (BMRC) production plant and successfully carried out trial production of BMRC at M/s. Timpack Pvt. Ltd., Byrnihat, Meghalaya.

23-07-2010, Dr. Aparna Kalawate, Scientist attended the Technical Programme Development Meeting at Bhabha Atomic Research Centre and presented the project proposal entitled “Utilisation of Radiation Technology to increase the preservation quality of wood by inhibition of wood rotting Fungi & Insects”

27-07-2010, Dr. Aparna Kalawate, Scientist attended the Hindi Meeting “NARAKAS” at CPRI, Bangalore.

06-08-2010 to 08-08-2010, Dr. C.N. Pandey, Director, visited M/s. Greenply Industries Ltd., Tizit to discuss modelities for undertaking study on LCA by IPIRTI Scientists at their Plywood Factory.

07-08-2010, Dr. Aparna Kalawate & Mr. Prakash, Scientists accompanied the Keenyan trainees during the study tour to get acquainted with the plywood manufacturing process at M/s. Hunsur Plywood Works Limited, Hunsur.

13-08-2010, Dr. Aparna Kalawate & Mr. Prakash, Scientists accompanied the Keenyan trainees during the visit at KSFIC & Homag India Limited, Bangalore.

14-08-2010, Mr. S.C. Sahoo, Scientist Field Station, Kolkata visited M/s. Singh Brothers Exim Pvt. Ltd. to rectify the bonding and bending problem during plywood manufacture.

25-08-2010 to 28-08-2010, Ms. Sujatha D. and Ms. B. S. Mamatha, Scientists visited M/s. Divine

Bamboo Mat manufacturing (P) Ltd Kolhapur, for trial production of Bamboo mat board.

27-08-2010, Mr. Amitava Sil, Officer-In-Charge and Mr. S.C. Sahoo, Scientists, Field Station, Kolkata, visited Indian Jute Industries Research Association, Kolkata regarding submission of project proposal to ICAR.

06-09-2010 to 10-09-2010 Dr. S.K. Nath, Joint Director and Dr. Vipin K Chawla, Scientist visited M/s. Vidhata Plywood Industries Pvt.Ltd, Ludhiana, Punjab to demonstrate the technology of cold setting UF and PF adhesives for plywood.

27-09-2010 to 28-09-2010, Dr. C.N.Pandey, Director along with Dr. S.K. Nath, Joint Director Mr. Anand Nandanwar, Mr. Pradeep Kushwah, Scientists, & Mr. Purushotham, Consultant, attended Steering committee meeting of IPIRTI-CENTRE, Mohali at office of the Department of

Industries & Commerce, Chandigarh..

28-09-2010 to 30-09-2010, Ms. Sujatha D. and Dr. V. K. Chawla, Scientists visited M/s. Mangalam Timber Products Ltd., Kusumi, Orissa for taking up studies on the different process involved in the manufacturing of MDF.

29-09-2010, Mr. Amitava Sil, Officer-In-Charge, Field Station, Kolkata, visited Bureau of Indian Standards, Kolkata and met Mr.S.K. Dey, Director Marks-II and discussed regarding testing charges and sending samples to Field Station Kolkata based on charges approved by BIS Central Laboratory.

23-6-2010 to 24-6-2010: Dr. C.N. Pandey, Director attended a meeting called by the farmers association and plywood representatives at Periyapattanam, Mysore.

## BOG MEETING

115<sup>th</sup> meeting of the Board of Governors of IPIRTI, held at Paryavaran Bhavan, MoEF, New Delhi on 27<sup>th</sup> July, 2010. The meeting was chaired by Shr. Vijai Sharma, IAS, Secretary to Ministry of Environment & Forests, Govt. of India.



*A view of BOG meeting*

## MOU

A Memorandum of Understanding was signed between Dr. C. N. Pandey, Director, IPIRTI, Bangalore and Dr. R. K. Jain, Scientist-EII, Head of Bio-Technology Division, of Central Pulp & Paper Research Institute on 5<sup>th</sup> August, 2010, for the mutual cooperation in taking up a project entitled “Utilization of black liquor and lignin in the manufacture of resin”.

## TRAINING

### TRAINING PROGRAMME ON BAMBOO BASED HOUSING SYSTEM FOR STUDENTS FROM INSTITUTE FOR VOCATIONAL EDUCATION & TRAINING (IIVET), IGNOU, PROFESSIONAL SOCIAL WORKER, SHILLONG, MEGHALAYA

Five day Training Programme on Bamboo based housing system for the Master trainers was conducted during 9<sup>th</sup> August to 13<sup>th</sup> August 2010 at IPIRTI, Bangalore sponsored by Institute for Vocational Education and Training (IIVET), IGNOU, Shillong, Meghalaya.

Total of 11 participants have attended the programme. Mr. Jagadish Vengala, Course Director welcomed the gathering. The programme was inaugurated by Dr. C. N. Pandey, Director, IPIRTI, Bangalore. In his inaugural address he briefed about the importance of trained man power in building the bamboo houses and IPIRTI's commitment in man power training as per the mandate. Mr. Murthy, Consultant was instrumental in getting this training programme from the Institute for Vocational Education & Training (IIVET), IGNOU.



*Mr. Jagadish Vengala, Course Director briefing the topics of the course to the trainees*



*Infill wall construction*



*Mounting the trusses*



*Finished Bamboo house*

Prof. R.N. Shetty, President, ISTE was the chief guest for the valedictory Programme and distributed the certificates to the trainees who have successfully completed the training programme. In his valedictory address, Prof. Shetty congratulated the trainees and their future role in spreading the bamboo housing technology in North Eastern areas. He also appreciated the IPIRTI's role in skill development in the areas of Bamboo housing and development and application of wood and bamboo composites.

**Outcome of the Training Programme**

The Master trainers who took training at IPIRTI also conducted a training programme inturn for local persons on low cost hybrid bamboo house construction at TRYSEM HALL, D.C.W.K. Hills, Shillong, Meghalaya during 15<sup>th</sup> to 17<sup>th</sup> September 2010. The training programme was organised by IIVET, Shillong in colloboration with KDUPLANG SHG NEW NONGSTOIN. 25 candidates attended the three days training programme.



*Group Photo of Trainees who attended the training programme at Shillong*

### Three Months Training Course

Three months training programme on “Plywood manufacturing technology” was conducted for 8 candidates during July – Sept, 2010

### Special Training Course

A Special Training course on “Testing of Plywood & Block Board” was conducted at IPIRTI Centre, Mohali during 5<sup>th</sup> – 9<sup>th</sup> July, 2010.

A Special Training course on “Quality Control of Particle board” was conducted for 10 candidates sponsored by M/s. Hallmark Ltd., during 11-13<sup>th</sup> August, 2010 at IPIRTI, Bangalore

### Training Course for International Candidates



A Special training course on “Veneer Manufacturing” from 28<sup>th</sup> July, 2010 to 18<sup>th</sup> August, 2010 was conducted at IPIRTI, Bangalore for the candidates sponsored by Timsales (K) Ltd, Kenya.

### CALENDER OF SHORT TERM TRAINING COURSES AT IPIRTI, BANGALORE IN NOVEMBER, 2010

| Sl. No. | Title of the Training Course                                    | Duration | Date      | Fee (Rs.) |
|---------|---|----------|-----------|-----------|
| 1.      | Floor level problem and Trouble shooting in plywood manufacture | 2 days   | 8-10 Nov  | 2000      |
| 2.      | Block board and flush door manufacturing                        | 5 days   | 13-17 Nov | 5000      |

### CALENDER OF SHORT TERM TRAINING COURSES AT IPIRTI FIELD STATION KOLKATA IN NOVEMBER, 2010

| Sl. No. | Title of Training Course                           | Duration | Date      | Fees (Rs.) |
|---------|--|----------|-----------|------------|
| 1.      | Preservative treatment of wood & wood based panels | 2 days   | 22-24 Nov | 2000       |

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