



CPPRI

केन्द्रीय लुग्दी एवं कागज़ अनुसंधान संस्थान, सहारनपुर

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News Bulletin on Pulp & Paper Research and Development

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MANAGEMENT NEWS

Working Group Expert Committee of Planning Commission on Pulp and Paper Sector for XII Five Year Plan

Working Group on Pulp & Paper Sector was constituted for the task of reviewing the progress made by the Indian Paper Industry during the 11th Five Year Plan and for suggesting suitable measures to accelerate the growth of Paper Sector during 12th Five Year Plan.

The meeting of the Working Group held at Udyog Bhavan, New Delhi on May 30, 2011 was chaired by Sh. R. P. Singh, Secretary, DIPP, Ministry of Commerce & Industry, Government of India. The other dignitaries who participated in the meeting were Sh. M. C. Singhi, Senior Economic Adviser, Sh. Talleen Kumar, Joint Secretary, and other senior officials from DIPP, Ministry of Commerce & Industry, and Ministry of Heavy Industries, MoEF, MSME, FICCI, ICFRE, CPPRI, IIT and senior executives from Indian Paper Industry as well as Indian Paper Industry's Associations.

After deliberating the various issues confronting the Indian Paper Industry, various sub-committees were constituted in the areas of concern viz. Raw Material, Recycled/Waste Paper, Energy, Environment & Technology & Human Resource Development. The sub-committees were advised to work out a suitable action plan in order to address the issues & for achieving the envisaged growth to make the sector globally competitive.

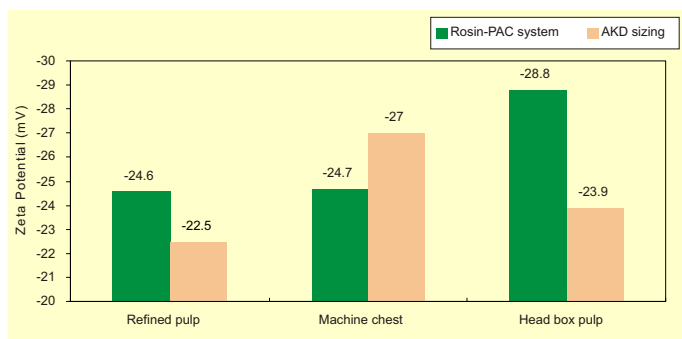
RESEARCH & DEVELOPMENT ACTIVITIES

Raw Material and Product Development

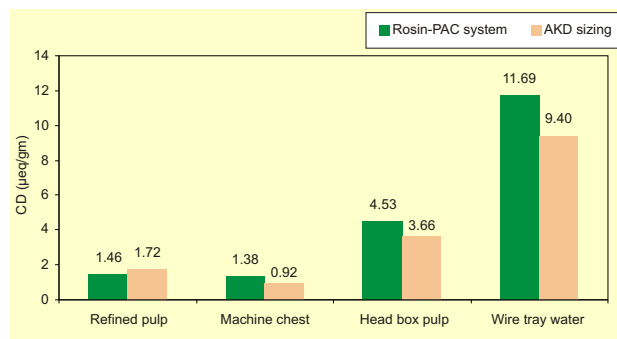
Optimization of Wet end Operation of Paper Making to Improve the Quality of Paper

The project envisages studying the wet end of paper machine to optimize the parameter for effective control of paper quality and improve economics. A case study of hardwood based mills was undertaken to evaluate the wet end performance employing electrokinetics (Zeta potential, Cationic demand) to determine Total First Pass Retention (TFPR) and First Pass Filler Retention (FPFR) for PAC-Rosin and AKD sizing systems. The studies revealed that in case of Rosin-PAC system, the Headbox Zeta Potential increased sharply and Cationic Demand of the wire tray sample in both the cases was also high. The increase in Zeta Potential and Cationic Demand was attributed to the fact that fines retention was poor due to which there was an accumulation of fines within the system leading to presence of high anionic trash in the system. In both the cases the system was under performed compared to an ideal situation.

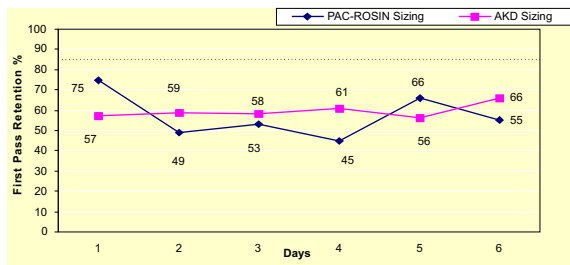
The graphs below show the electrokinetic properties of the stock and its impact on overall retention efficiency.



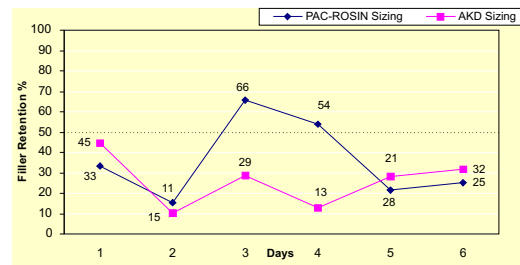
Zeta Potential



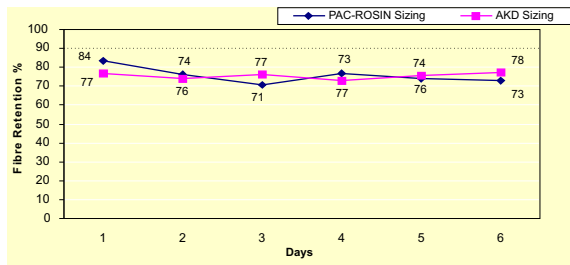
Cationic Demand



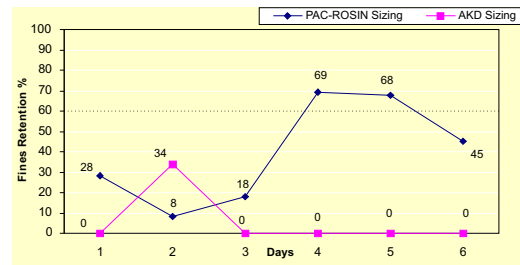
First Pass Retention



Filler Retention



Fibre Retention



Fines Retention

Printing Quality Evaluation - Assessment and Improvement Possibilities for Indigenous Coated Paper and Paperboard.

In order to find out the efficiency of acrylic binders used in coating, experiments were conducted on the base paper samples collected from wood based mill. The coating formulations consisting of china clay and GCC were prepared using acrylic as binder. Trials were conducted with different doses of acrylic binder to optimize its dose in coating formulation. The coated paper thus produced, were calendared using both hard nip & soft nip. Further evaluation of coated paper for strength, optical and printing properties are in progress.

An Integrated Approach on Application of Biotechnology in Pulp & Paper Industry.

The project objective is to promote the biotechnological applications in Pulp & Paper Industry to pursue clean & green technology to address the issues related to resource conservation, quality upgradation and environmental improvement. Various areas identified and work carried out are given below:-

- ❖ **Enzymatic Prebleaching of wood & non-wood based chemical pulps:-** Enzymatic prebleaching experiments were conducted on

oxygen delignified unbleached hardwood pulp (ODL) received from Andhra Pradesh Paper Mills Ltd., Rajahmundry with commercial xylanase. Process conditions for enzyme prebleaching in respect of enzyme dose and temperature were optimized. Results showed that xylanase improve bleach efficiency of low kappa number oxygen delignified pulps also i.e brightness improvement 2% and 15% saving in chlorine dioxide demand. Enzymatic bleaching studies were continued with commercial xylanase enzyme on hard wood pulp received from Star Paper Mill, Saharanpur. Further it was



Xylanase & laccase prebleaching of kraft hardwood pulp - Pilot trials conducted at CPPRI

established that the xylanase bleach boost efficiency of oxygen delignified hardwood pulps with pulp brightness improvement of 2% and 15-20% ClO₂ savings.

Upscaling of laccase enzyme bleaching on pilot scale was done by conducting pilot trial on hardwood pulp using laccase enzyme produced from new isolated white rot fungus by CPPRI. The trial was conducted at pulp native pH and also using a cost effective and easily available mediator. Results were encouraging i.e brightness improvement of 3.0% and 25-30% of chlorine dioxide savings were achieved.

- ❖ **Enzymatic refining of pulps:-** Commercial refining enzymes were procured from a leading enzyme manufacturing company and were evaluated for CMCase, FPase and β-glucosidase activities. (CMCase activity- (IU/ml, FPase activity- 205 to 237 IU/ml and β-glucosidase activity- 200- 253 IU/ml). Temperature and pH profile of cellulase enzyme was evaluated to further optimize the conditions for enzymatic refining of chemical pulps.
- ❖ **Bioremediation of Paper mill effluent:-** Bioremediation experiments were continued with isolated 11 numbers of bacterial strains to reduce the pollution load in respect of colour, lignin and AOX of effluent. Only 3-4 bacterial strains out of 11 strains showed encouraging results in respect of reduction in colour and lignin.

Energy Conservation & Environmental Management

Integrated Approach for Improving Environmental Status of Pulp & Paper Industry.

Under the project activities following studies were carried out:-

- ❖ Paper machine back water, combined effluent and final discharge samples were collected from a RCF based kraft paper mill and physico-chemical treatment studies were carried out to evaluate the potential of reducing pollution load for increased recycling and reuse into the

process to reduce water consumption. The initial results have been found encouraging. Further studies are under progress.

- ❖ Adequacy of each unit of ETP in context of environmental compliance was carried out in a waste paper based mills producing kraft paper and an agro based mill producing writing & printing grade of paper. The report with recommendations for ETP modification / up gradation was submitted to the mill.

Infrastructure and Development Activities

Strengthening of Training & Human Resource Development (HRD) Infrastructure in Pulp, Paper & Allied Industries.

Training was imparted to students from various universities and technical personnel from Pulp and Paper Mills.

Paper Making

- ❖ Four students of M. Tech., Chemical Engineering were imparted training for their M. Tech. Dissertation work from Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonipat) in the area of "Paper Making" from January 25 to June 25, 2011.
- ❖ One trainee from Banasthali University (Rajasthan) was imparted training in the area of "Pulp & Paper Manufacturing" from May 18 to June 18, 2011.
- ❖ Seven students of B. Sc. from Sam Higginbottom Institute of Agriculture Technology & Sciences Deemed University (Allahabad) were imparted training in the area of "Pulp & Paper Manufacturing" from June 01 to June 30, 2011

Paper Testing

- ❖ One trainee Mr. J. Bennet, Sr. Superintendent from Stationery Department, Kerala was imparted training in the area of "Paper Quality Assessment using Standard Testing Methods" from April 25 to April 29, 2011.



Biotechnological Applications in Pulp & Paper

- ❖ Training was imparted to three B.Tech students of Biotechnology in the area of biotechnological applications in pulp and paper industry.

Environmental Management

- ❖ Dr Shivaker Mishra & Dr. Nitin Endlay conducted a two day onsite training programme at Orient Paper Mills Ltd., Amlai, and M.P. on various aspects of Environmental Management on Pulp & Paper Industry. Around 25 participants from various process operations attended the training programme.



Dr Shivaker Mishra & Dr. Nitin Endlay with Trainees at Orient Paper Mills Ltd , Amlai , M.P.

Infrastructure Development for Extension of Library & Documentation Service to the Indian Paper Industry

- ❖ **Current Awareness Service (CAS) & Selective Dissemination of Information (SDI)** was provided from the current journals related to Pulp & Paper to 50 Member Mills of CPPRI as well as Institute Scientists.
- ❖ **Rendered Reference/Referral/Reprographic Service** to the Indian Pulp and Paper and Allied Industries, R&D Centre, Member Mills and other organizations.
- ❖ **Published** and circulated CPPRI News Bulletin for the duration of January -March, 2011 to the

DIPP, Associations of Pulp and Paper Mills, Allied Industries, R&D Institutions, Member Mills, valuable customer of CPPRI and other organizations.

- ❖ **Forty Three Visitors from** different organizations visited the Library for reference & research journals, books etc. during the period from April-June 2011.

Cess Funded Projects

Establishment & Demonstration of Wastepaper Collection, Sorting and Grading System in Selected Metropolis in India

CPPRI prepared a Discussion Paper on "**Collection and Recycling of Waste Paper in India**", with the following objectives:-

- ❖ Developing a suitable policy framework to define the obligations of producers and users.
- ❖ To sensitize the citizens to improve the collection and reuse of waste paper in the country.
- ❖ To evolve a sustainable and workable mechanism for achieving at least 50% recovery of waste paper by the year 2025.

The Discussion Paper has been submitted to DIPP, Government of India so as to enable the government to take appropriate policy decisions.

Studies on Ozone Treatment of Indigenous Raw Material Pulp for Better Bleachability

The objective of the project is to improve bleaching pulp quality in terms of optical and strength properties and reduction / removal of elemental chlorine bleaching process for improved quality of liquid discharges.

Laboratory experiments have been initiated with preparation of unbleached pulp from indigenous raw materials like wheat straw, bagasse etc. for further bleaching experiments employing ozone in one of the stage of ECF/TCF bleaching sequence.

An Integrated Approach for Utilization of Bagasse pith for Production of Bio-ethanol and Value Added Lignin Products (CPPRI/IIP, Dehradun)

The objective of the project involves efficient utilization of pith, a waste generated during depithing process of bagasse through development of a process for production of bio-ethanol and value added lignin products. Studies on prehydrolysis of Bagasse pith was carried out in fabricated bioreactor under optimized conditions. Commercial cellulase enzymes were analysed for their CMCase, FPase and β -glucosidase activities and temperature & pH profile of these enzymes were determined. Enzymatic saccharification of prehydrolysed pith was continued for optimization of process conditions in respect of dose of enzyme and treatment time using different combinations of different cellulase enzyme components. Studies on furfural production from xylose rich prehydrolysate were initialized.

Sponsored Projects

Techno-economic Feasibility for Setting up of Common Chemical Recovery Plant (CCRP) & Common Effluent Treatment Plant (CETP) for Pulp & Paper Industries Operating in Identified Cluster of Uttar Pradesh & Uttrakhand"

The final report prepared jointly by CPPRI, IIT Delhi, IIT Kanpur & IIT Roorkee on Techno-economic Feasibility for Setting up of Common Chemical Recovery Plant (CCRP) & Common Effluent Treatment Plant (CETP) for Pulp & Paper Industries Operating in Identified Cluster of Uttar Pradesh & Uttrakhand" was submitted to CPCB.

Establishing Base Line Specific Energy Consumption (SEC) and Target SEC under Perform, Achieve and Trade (PAT) Scheme for Pulp & Paper Sector (Sponsored by Bureau of Energy Efficiency).

The broad objective of the project was to carry out validation of data for finding out the accuracy in order to calculate the targets of energy

consumption in the mills. The data was analyzed and validated using normalization factors, to account the variability due to raw material, capacity utilization, technology used and the finished products.

As per the objectives of the study, the work was completed and the report has been submitted to BEE (Bureau of Energy Efficiency).

Evaluation of Xylanases and Laccases at Pilot and Mill Scale in Pulp & Paper Industry (CPPRI/ DUSC/ KUK/Jay Biozyme, Pune) Sponsored by Department of Biotechnology, Govt. of India, New Delhi)

The project aim's to evaluate the prebleaching efficiency of Xylanase / Laccase enzymes developed by Department of Microbiology, South campus, Delhi University, New Delhi (DUSC) and Kurukshetra University (KUK) on hardwood pulps on both pilot and mill scale. Activities under the project were continued with pilot scale studies of xylanase and laccase enzymes produced by DUSC, New Delhi at pilot plant of CPPRI. Laccase and combined laccase and xylanase enzyme trials were conducted at pulp native pH of 8.5-9.5 with cost effective and easily available mediator. Results are very encouraging in respect of 2-3% brightness gain and 20-30% ClO₂ savings without affecting the pulp quality.

Technological Improvement of a Process of Biological Reduction of AOX, Colour, COD and BOD of Waste Water Emanated from Large Pulp & Paper Industries. (CPPRI/IGIB, Star Paper mills Ltd., Department of Biotechnology, New Delhi)

The objective of the project is to develop an effective microbial (bacterial consortium) technology for the reduction of AOX, Colour, COD and BOD of waste water from large Pulp & Paper Industries at Pilot scale. Results of the pilot scale studies conducted at M/s Star Paper Mills were highly encouraging. The microbial consortia isolated and screened at IGIB, CSIR, New Delhi was found to be highly effective in reducing the



pollution load of effluents generated by pulp and paper mills and it resulted in reduction of COD, Color & lignin to the tune of more than 50 - 70%. Final draft report was submitted to Department of Biotechnology, New Delhi.

Utilization of Fly Ash for Colour Removal of Pulp & Paper mill effluent (Sponsored by Centre for Fly Ash Research & Management, New Delhi)

Based on the laboratory studies, pilot scale trials were undertaken with secondary clarifier outlet and LRP outlet of the Effluent Treatment Plant (ETP) at identified Mill. More than 90 % color removal efficiency was achieved. Commercial demonstration plant is being fabricated and commissioned at identified agro-based Paper Mill.

Overseas Projects

Effect of Harvesting Age of Eucalyptus Pellita (E. Pellita) and Acacia Crasscarpa (A. crasscarpa) in Comparison with Acacia Mangium (A. Mangium) for Production of High Brightness Bleached Kraft Pulp

An International Project on "Effect of Harvesting Age of Eucalyptus pellita (E. pellita) and Acacia crasscarpa (A. crasscarpa) in Comparison with Acacia mangium (A. mangium) for Production of High Brightness Bleached Kraft Pulp" was entrusted to CPPRI by PT. Tanjungenim Lestari Pulp and Paper, Indonesia. The objective of the project was to study the effect of harvesting age of Eucalyptus pellita, Acacia mangium and Acacia crasscarpa for their suitability for production of high brightness bleached kraft pulp.

Proximate chemical analysis of wood samples of E. pellita, A. crasscarpa & A. mangium received from PT. Tanjungenim Lestari Pulp and Paper, Indonesia were carried out. Pulping conditions were optimized in respect of seven samples of different age groups of E. pellita, A. crasscarpa & A. mangium to obtain unbleached pulp of 15 kappa number. Unbleached pulps of 15 kappa number obtained were further bleached by O-DEpDD sequence to achieve bleached pulp brightness of + 85% ISO. Unbleached pulps were also evaluated for physical

strength & optical properties besides fibre analysis.

Final report on the findings of the laboratory studies was submitted to PT. Tanjungenim Lestari Pulp and Paper, Indonesia.

TECHNICAL/CONSULTANCY SERVICES

Technical Assistance / Consultancy Services were rendered to following Pulp and Paper Mills:-

- ❖ ETP Adequacy Assessment was carried out at following mills:
 1. Shri Badri Kedar Papers Pvt Ltd., Najibabad, U.P.
 2. Shree Shyam Pulp & Board Mills Ltd., Kashipur, U.K.
 3. Rana Papers Ltd, Muzaffarnagar, U.P.
- ❖ 54 Nos. of samples from 19 Pulp and Paper Mills were analysed for different pollution parameters.
- ❖ Energy audits were carried out at following mills
 1. M/s Sangal Papers Limited, Meerut, (U.P.)
 2. M/s Sardhana Papers (Pvt.) Limited, Sardhana, Meerut (U.P.)
 3. M/s Rama Paper Mills Ltd, Bijnor, (U.P.)
 4. M/s Rana Paper Mills Limited, Muzaffarnagar, (U.P.)
- ❖ In the area of recycled fibre processing, consultancy services provided to :-
 1. M/s Indus Paper & Board Pvt. Ltd, Nagpur for Repulpability studies on imported tissue grade paper.
 2. M/s Thermax India, Pune for Evaluation of four numbers of deinking chemicals.
- ❖ Evaluation of Fibre quality of moulded tray samples for M/s Claridge Moulded Fibre Ltd; Distt. Solan (H.P).
- ❖ 815 Nos. of Paper & Paper Board samples received from various organizations/ mills were tested for GSM, Thickness, Tensile, Tear, Burst,

Brightness, Opacity, Gloss, (l, a, b values), whiteness, double fold, RCT, smoothness, porosity, formation, bending stiffness, printing properties and fibre furnish etc.

- ❖ 01 sample of tile received for calibration was also tested during this period.
- ❖ 102 Nos. of samples of Black Liquor, Lime sludge, Fly Ash, pulp, scales, Coal, Soap, water, Sulphuric acid, stone, effluent, GCC & Lignin were analyzed for Fe, K, Ca, Na, Mg, Hg, Ni, Al, Zn, Ti, Lignin purity and C, H, N, S.
- ❖ Fibre Furnish Analysis was carried out in 20 Nos. of Pulp, Paper & Board Samples.
- ❖ Moisture Content, Proximate Chemical Analysis carried out in 56 Nos. of samples of raw materials.
- ❖ 3 Nos. of Non Fibrous Raw Material samples were analysed for purity.

WORKSHOP/SEMINAR

Workshop/Seminar Attended

- ❖ Dr. B. P. Thapliyal, Sc. 'E-II' and Dr. Sanjay Tyagi, Sc. 'C' attended a workshop on Packaging and presented a lecture on Kraft Paper properties in June 2011 at New Delhi. The workshop was organized by Packaging Development Training Research Laboratory (PDTRL), Moradabad.

Meetings Attended

- ❖ Dr. R. M. Mathur, Director, CPPRI and Dr. B. P. Thapliyal, Sc. 'E-II' attended a meeting with Japanese Delegation at New Delhi on June 13, 2011.
- ❖ Mrs. Rita Tandon, Sc-'F', attended three meetings held under the Chairmanship of Sh. Talleen Kumar, IAS, Joint Secretary, DIPP along with Presidents of Industry Associations in connection with preparation of Discussion Paper on "Collection and Recycling of Waste Paper in India".
- ❖ Dr. Suresh Panwar, Sc. 'F' and Dr. B. P. Thapliyal, Sc. 'E-II' visited New Delhi to attend a meeting of sub-committee on Energy Environment &

Technology constituted under working group paper for XII Five Year Plan in June 2011.

- ❖ Dr. S. Panwar, Sc. 'F' & Dr. Nitin Endlay, Sc. 'E-I' visited IIT Delhi & CPCB New Delhi in connection with the Meeting related to CPCB Project on Techno- economic viability for setting up CCRP & CETP in Identified Clusters of UP & Uttrakhand.
- ❖ Dr. B. P. Thapliyal, Sc. 'E-II' visited Cochin along with Sh. P. Bishwas, Director, DIPP to attend the Parliamentary Committee Meeting on Newsprint Control Order 2004 at Cochin on June 22, 2011.
- ❖ Dr. B. P. Thapliyal, Sc. 'E-II' and Dr. Sanjay Tyagi, Sc. 'C' attended a meeting in RBI, New Delhi on June 8, 2011 regarding setting up of specifications for currency paper.
- ❖ Dr. B. P. Thapliyal, Scientist 'E-II' attended the meeting of Sub committee of working group under XII Five year Plan at DIPP, Ministry of Commerce and Industry, Udyog Bhawan, New Delhi on June 26, 2011 to June 27, 2011.
- ❖ Dr. B. P. Thapliyal, Scientist 'E-II' attended the meeting of Development Council at DIPP, Ministry of Commerce and Industry, Udyog Bhawan, New Delhi.
- ❖ Dr. B. P. Thapliyal, Sc. 'E-II' attended Council of Associations meeting in April 2011 at Udyog Bhawan, New Delhi.
- ❖ Sh. Alok Kumar Goel, Sc. 'C' visited Energy Efficiency Services Ltd., (EESL), New Delhi to attend a meeting regarding Base Line Energy Audit studies sponsored by BEE / EESL.

LECTURES

- ❖ Mrs. Anuradha V. Janbade, Scientist 'E-I' delivered a lecture on "Chemical Analysis through Application of Instrumental Techniques" on April 29, 2011.
- ❖ Mohd. Farid, R. A. delivered a lecture on "Waste Water Analysis - Need & Significance" as on May 30, 2011



REPORTS AND PUBLICATIONS

Reports

- ❖ Final report of CPCB Sponsored Project " Techno-economic Feasibility for Setting up of Common Chemical Recovery Plant (CCRP) & Common Effluent Treatment Plant (CETP) for Pulp & Paper Industries Operating in Identified Cluster of Uttar Pradesh & Uttrakhand "
- ❖ Report on Adequacy Assessment of Existing ETP for Treatment of Mill Effluent Generated at Shree Shyam Pulp & Board Mills Ltd., Kashipur, U.K.
- ❖ Report on "Establishing Base Line Specific Energy Consumption (SEC) and Target SEC under Perform, Achieve and Trade (PAT) Scheme for Pulp & Paper Sector (Sponsored by BEE)" was submitted to Bureau of Energy Efficiency (BEE).
- ❖ Hindi Translation of CPPRI Laboratory Manual is in progress.
- ❖ Final report of RAC Project entitled "Storage & Preservation of Fibrous Raw Materials used in Indian Pulp & Paper Industries" was prepared & submitted to RAC Committee for distribution among the members.

Publications

- ❖ J. V. Patil, Chari Appaji, S. V. Rao, R. M. Mathur, Vimlesh Bist, Preeti S. Lal "High Bio-mass Sorghum (Sorghum Bicolor) - An Alternate Raw Material for Pulp and Paper Making in India" IPPTA, Volume 23, No. 2, April - June, 2011, Pg. 161-166.
- ❖ Dr. Vasanta V. Thakur, Diwakar Pandey Dr. R. K. Jain and Dr. R. M. Mathur "Second Generation Biofuels-Bio-ethanol from Ligno-cellulosic materials" Inpaper India Vol.14, Issue 2, March - April 2011, Pg.4-12.

INTERACTION WITH INDUSTRY

Visit of Experts

- ❖ Mr. Gunnar Lindblad, Senior Sales Manager, Mr. Manos Mukherjee, president & Mr. S. Manoj, Manager-Technical Services from Elfo Hansson, Sweden visited the Institute on April 27, 2011 to see the facilities of the Institute.
- ❖ Mr. Robert from Indonesia visited CPPRI on May 20, 2011 to review the activities of the sponsored project on "Effect of Harvesting Age of Eucalyptus pellita and Acacia crassicarpa in Comparison with Acacia mangium for Production of High Brightness Bleached Kraft Pulp".
- ❖ Dr. Rita Kumar, Scientist G, IGIB, New Delhi visited CPPRI & Star Paper Mills to discuss & review the progress of project "Technological improvement of a process of biological reduction of AOX, Colour, COD and BOD of waste water emanated from large Pulp & Paper Industries" sponsored by Department of Biotechnology, Govt. of India, New Delhi.

Visit to Mills & Other Organizations

- ❖ Dr. R. K. Jain, Sc. 'F' and Dr. B. P. Thapliyal, Sc. 'E-II' visited DIPP, Ministry of Commerce & Industry for preparation of working group report on paper and for discussion with Senior Economic Advisor, DIPP.
- ❖ Dr. R. K. Jain, Sc. 'F' and Dr. Vasanta V Thakur, Sc. 'B' visited Department of Microbiology , University of Delhi, South Campus, New Delhi in connection with project activities "Evaluation of xylanases and laccases at pilot and mill scale in Pulp & Paper Industry" under a multi institutional project among University of Delhi, South Campus, CPPRI, University of Kurukshetra, M/s Jay Biotech, Pune sponsored by Department of Biotechnology to review the progress & chalk out the future action plan for pilot and mill scale trials.

- ❖ Dr. S. Panwar, Sc. 'F' & Dr. Nitin Endlay, Sc. 'E-I' visited Bindlas Duplex Ltd, Muzaffarnagar for ETP adequacy assessment.
- ❖ Dr. S. Panwar, Sc. 'F' & Dr. Nitin Endlay, Sc. 'E-I' & Mohd. Farid visited Naini Papers Ltd, Kashipur, Uttarakhand for Study of Water Conservation Measures Adopted by the Mill.
- ❖ Dr. S. Panwar, Sc. 'F' & Dr. S. Mishra, Sc. 'E-I' visited Shreyans Paper Industries, Ahmedgarh Punjab for Technical services
- ❖ Dr. B. P. Thapliyal, Sc. 'E-II' visited the following organizations during the quarter.
 1. Bureau of Energy Efficiency (BEE), New Delhi for discussions on implementations of PAT scheme in Pulp & Paper sector.
 2. Reserve Bank of India (RBI), New Delhi regarding setting up of Technical Specifications and laboratories.
 3. As CPIO, visited Chief Information Commissioner (CIC), New Delhi for seeking advice on matters related to Right to Information Act (RTI) 2005, along with Sh. M. P. Sharma, PS and APIO.
- ❖ Dr. B. P. Thapliyal, Sc. 'E-II', Sh. Alok Kumar Goel, Sc. 'C' and Sh. N. K. Naik, TO-B visited the following mills for energy audit.
 1. M/s Sangal Paper Mills Ltd., Meerut
 2. M/s Sardhana Paper Mills, Meerut
 3. M/s Rama Paper Mills, Bijnor
 4. M/s Rana Paper Mills Ltd., Muzaffarnagar
- ❖ Dr. B. P. Thapliyal, Sc. 'E-II', Dr. Sanjay Tyagi, Sc. 'C', Sh. Alok Kumar Goel, Sc. 'C', Sh. N. K. Naik, TO-'B', Sh. P. Srikanth, JRF and Sh. Akhil Naithani, JRF conducted detailed energy audit in M/s Sangal Papers Limited, Meerut in June 2011.
- ❖ Dr. M. K. Gupta, Sc. 'E-II' & Mohd. Farid visited Pragati Paper Mills Ltd, Ambala, Punjab for Technical services.
- ❖ Dr. M. K. Gupta, Sc. 'E-II' visited Panipat Thermal Power Station for Environmental Monitoring.
- ❖ Dr. S. Mishra, Sc. 'E-I' visited Vedari paper Mills (India) Pvt Ltd, Nalgonda (AP) for Newsprint Sample Collection.
- ❖ Dr. S. Mishra, Sc. 'E-I' visited G.B. Pant University of Agriculture & Technology to conduct viva of three M.Sc (Environmental Science) Students.
- ❖ Dr. R. K. Jain, Sc. 'F' & Dr. A. K. Dixit, Sc. 'E-I' visited Seth Jaiprakash Polytechnic Yamunanagar for discussion & collection of course curriculum being run at Polytechnic under the pre-project activities of 12th Five Year Plan.
- ❖ Dr. A. K. Dixit, Sc. 'E-I' visited M/s Bindal Duplex Limited, Muzaffarnagar for survey on technical manpower existing presently in the paper industry & future requirement.
- ❖ Sh. Alok Kumar Goel, Sc. 'C' visited Bureau of Energy Efficiency (BEE), New Delhi regarding Base Line Energy Audit.
- ❖ Mr. B. Pandey, Mr. Vipin, Mr. Diwakar Pandey and Mr. Dharmendra visited M/s Star Paper Mill, SRE for the procurement of large scale pulp samples for pilot trial of enzymatic prebleaching conducted at CPPRI.
- ❖ Mr. R. P. Singh & Mr. M. S. Bhandari visited BILT Yamunanagar, Haryana and Star Paper Mills Ltd, Saharanpur for Environmental Monitoring.
- ❖ Mr. R. P. Singh, Mr. M. S. Bhandari, Mohd. Farid & Mohd. Salim visited Deen Bandhu Chottu Ram Thermal Power Plant, Yamuna Nagar, Haryana for Environmental Monitoring on weekly basis.
- ❖ Mr. Diwakar Pandey, JRF visited Indian Institute of Petroleum, Dehradun, for conducting studies related to Enzymatic hydrolysis of bagasse pith under CESS project.
- ❖ Mr. Vipin Gupta, JRF visited Indian Institute of Petroleum, Dehradun, under the activities of collaborate project with IIP.



World Environment Day 2011 Celebrations

World Environment Day was observed by CPPRI on June 5, 2011. In Indian context, this occasion holds more significance this year as for the first time; India is the Global Host of World Environment Day 2011 Festivities. To mark the occasion, a programme was held in CPPRI auditorium wherein Dr. R.M. Mathur, Director, CPPRI addressed the staff highlighting the significance and objective of observing World Environment Day every year. A presentation was made by Dr Nitin Endlay on the theme of the World Environment Day 2011 i.e. " Forest at Your Service", Economic and Human Benefits from Boosting Funding for Forests , Carbon Credit through Forest Plantation, CPPRI initiatives in Environmental Protection etc.

STAFF NEWS

Appointments

Name : Mrs. Sarita Sharma
Designation : Library Officer 'A'
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ABSTRACT

Yang, Qing; Wu, Shubin; Lou, Rui, and L.V., Gaojin. **Structural Characterization of Lignin from Wheat Straw.** *Wood Science & Technology, Vol. 45(3): 419-431 (2011).*

Abstract: Enzyme/mild acidolysis lignin (EMAL) was isolated from wheat straw. The structural characterization of wheat straw EMAL was investigated by FT-IR, ¹H NMR, quantitative ³¹P NMR and DFRC, and DEPT CH ($\theta = 135^\circ$) techniques. The wheat straw EMAL was a GSH-lignin with β -0-4' structures and several condensed units (β -5', β - β , β -1', 5-5') and vinyl ether moieties; the contents of DBDO substructures and total β -aryl ether in the wheat straw EMAL were 0.257 mmol.g⁻¹ and 0.818 mmol.g⁻¹, respectively. Meanwhile, the structure features of the hemicelluloses residues attached to lignin were also investigated using DEPT CH ($\theta = 135^\circ$) spectra.

Dorris, G.; Ben, Y. and Ricard, M. **Overview of Flotation Deinking.** *Progress in Paper Recycling (2011).*

Abstract: Currently, over 50% of the raw material used worldwide by the paper industry originates from recovered paper and board. To be usable in graphics and tissue grades, recovered paper must be deinked. Today, virtually all deinking plants use flotation as a means to selectively remove ink and other contaminants from fibrous suspensions so that the optical and mechanical properties of recycled pulp approach that of virgin pulps. This paper presents an overview of the types of ink present in recovered paper blends and their compatibility with flotation deinking. Recent trends in deinking and flotation chemistries are analyzed as well as the basic principles underlying



Dr. R.M. Mathur, Director and other CPPRI staff during the celebration of World Environment Day 2011



flotation.

Bennett, Peter and Allan, Russell. **A review of Australian R&D into corrugated box performance and the evolution of on-machine measurement of Ring Crush.** *Appita journal*, 64(4): 325-330(2011).

Abstract: This paper highlights some of the important developments from the APM/AMCOR research groups over 50 years, especially as they relate to the long and continuing quest to improve the performance of corrugated packaging - both its effectiveness and cost. The paper includes in particular, an explanation of why ring crush paper strength has been a dominant target property in the Australian packaging paper Industry, and the story of measurement developments for that property.

Tao, Li; Genco, Joseph M.; Cole, Barbara J. W.; and Fort, Raymond C. **Selectivity of Oxygen Delignification for Southern Softwood Kraft Pulps with High Lignin Content.** *Tappi Journal*, 10 (8):29-39(2011).

Abstract: The selectivity of kraft pulping versus the oxygen delignification processes over the range of kappa nos. 25-90 was compared. Kraft pulping was found to be more selective than oxygen

delignification for removing lignin from southern softwood kraft pulps. The greater selectivity is thought to be related to hydroxyl radicals that form in the oxygen delignification process that are not present in the kraft process. The hydroxyl radicals attack the carbohydrates and randomly cleave the polymeric chains, causing a significant decrease in the degree of carbohydrate polymerization and thus a loss of viscosity. Kraft pulping generates hydrosulfide ions that are highly selective and attack the lignin. Carbohydrate degradation occurs mainly from peeling reactions, which do not appreciably reduce the degree of polymerization of the cellulose and thus there is less viscosity loss. At low lignin content (i.e., low kappa number), the remaining lignin is likely bound covalently to the carbohydrate portion in both processes. Therefore, removal of the lignin results in significant degradation of the carbohydrates.

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