



CFRI NEWSLETTER



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Established in November 1946, Central Fuel Research Institute is a unique Institute of its kind in India under CSIR, New Delhi to conduct research in different areas of Fuel Science and Technology with emphasis on coal and lignite.

Mission: Enhance the position of the Institute as a premier R&D centre for technology development and transfer by forging strategic alliance with other agencies and continuously strive for excellence in the area of potential expertise for generation of basic knowledge, innovation, and advanced concepts in science and technology for economic, efficient, and environmentally safe energy management

HIGHLIGHTS OF COMPLETED PROJECT

Mitigation of GHGs and SPM in Landfill/OB Dumps Area of Talcher Coalfields of MCL in the Close Vicinity of Different TPPs through Afforestation (Sponsored by MoEF, Govt of India through Winrock International, New Delhi, India)

In the continued emission of CO₂ and other pollutants from the anthropogenic sources to the atmosphere, extraction of coal and its combustion and deforestation contributes substantially, which has significant effect of environmental concerns and needs appropriate measures for its mitigation. Of the various mitigating options, afforestation is distinctive method for reducing CO₂ concentration and other pollutants including particulates and some gases appreciably depending on different stages of plant growth and seasons. From these considerations, the present study was carried out by observing the role of different forest covers (manmade), as a sink of CO₂ in Indian context, through determination of the rate of photosynthesis and other physiological parameters of predominant plant species (*Acacia auriculaeformis*, *Albizia lebbek* and *Dalbergia sissoo*) common to different plantation sites of different age groups made in the mine spoil/OB dump/waste land of MCL, Orissa, and accompanied reduction in the air pollutants, like particulates, SO_x, NO_x. The concentration of various pollutants including CO₂ was well above adequate level at the bare site. Of these predominant species, *Acacia auriculaeformis* has shown relatively better photo-synthetic activity, transpiration rate, stomatal conductance and leaf area than *Albizia lebbek* and *Dalbergia sissoo*. Also increase in the values of these parameters with the growing stages of the plant species was observed. The predominant species have been found to be quite effective in reducing these pollutants depending on their inherent ability and

growth stage that make them suitable to grow under specified edaphic conditions and seasonal variation, where the concentration of these pollutants including CO₂ is minimum in the rainy season. As such potential plant species playing major role in the CO₂ sink and reducing SO_x, NO_x and particulates emission can be planted in the vicinity of GHGs emitting sources like TPPs and coal mining areas affected by coal extraction in the form of huge generation of mine spoil/OB dumps in order to mitigate the CO₂ and other gases including particulates from the atmosphere in an eco-friendly manner and make the environment healthy.

COAL PREPARATION: THRUST AREA

R&D activities under Task Force project entitled "Quality enhancement of coal for its efficient utilization" have been intensified. Under this project, sanctioned by CSIR Planning Commission, there are three tasks consisting of: (i) Impact assessment of coal quality for clean power generation, (ii) Technological options for efficient utilization of difficult to wash coals for their use in steel, cement, power plant and foundries, and (iii) Development of improved technology for fine coal beneficiation. CFRI, Dhanbad; NML, Jamshedpur; RRL Bhopal; and RRL, Bhubaneswar are the implementing agencies having huge infrastructure facilities and expertise in this field. CFRI being the nodal laboratory has finalized the program of work in consultation with the networking laboratories. The main objective of the project is to identify the optimum beneficiation strategy of non-coking coals to meet the needs of different end users, to assess the effect of blending of coals on efficiency of power generation and evolve strategies of blending of dissimilar coals, and to develop suitable beneficiation scheme for optimal utilization of large reserve of low volatile coking (LVC) coals from western part of

Jharia and Bokaro coalfields. In case of fine coal beneficiation, main objective is to enhance the recovery of cleans from coking coal fines using optimum combination of different fine coal treatment processes and development of suitable reagents for treating non-coking coal fines by flotation process. Slurry samples have been collected from Patherdih washery and sent to NML, Jamshedpur, RRL, Bhubaneswar and RRL, Bhopal. Basic studies on coal fines have been started at CFRI.

MINERAL TECHNOLOGY: THRUST AREA

Mineral Technology Section is engaged in the testing of coke, coal and lignite ashes for determining their major and trace element components. Besides, determination of fusibility temperature of coke, coal and lignite ashes and support to the industries by providing amicable solution to their problems is their other activity. To assess the suitability of fly ash for brick making, R&D work on fly ash for its proper utilization in different fields like making building components such as bricks, blocks, decorative articles, etc. is in progress. Also spontaneous combustion behavior of coal during storage of coal at Thermal Power Station has been studied and proper remedies have been suggested.

AWARD

Mrs Nandita Choudhury, Scientist E-II has been awarded the 'Subrato Ghosh Memorial Coal Petrology Award' for the year 2003-04 on 18-09-2004 by Mr Abdul Kalam, President, MGMI for her outstanding contribution in Coal Petrology.

PAPER PUBLISHED

1. Satpathy D, Natarajan G. S. and Sen Raja – Modified Granular Activated Carbon : A carrier for the Recovery of Nickel Ions from Aqueous Wastes, *Adsorption Science and Technology*, Vol. 22, No. 4, 285-294, 2004.
2. Singh Sripal and Yenkie M.K.N. – Competitive Adsorption of some Hazardous Organic Pollutants from their Binary and Tertiary Solutions onto Granular Activated Carbon Columns, *Water, Air and Soil Pollution*, 156, 275-286, 2004.

LECTURE

1. Prof. B.K. Mazumdar, Former Director, CFRI delivered a lecture on 'Classification and Characterization of Coal by its Moisture Holding Capacity with Special Reference to CO₂ Emission During Coal Combustion' on 30.07.04.

2. Prof. R.K. Saha, Deptt. of Chemical Engineering, IIT, Kharagpur and Member CFRI-RC delivered a lecture on 'Coal Combustion' on 02.08.04.

PRESENTATION

1. Shri Debasish Mukherjee, Regional Manager – Sales, M/s Labvantage, Kolkata gave a presentation on "Introduction of Computer Based Network Project Management" in CFRI on 05.08.04.

COMMITTEE REPORT DISCUSSED

1. Shri Raja Sen, Gr.III(4) on behalf of Director, CFRI presented the Report of the Committee to Assess and Evaluate the Outcome of CSIR Activities chaired by Shri Vijay Kelkar on 16.08.04. The detail out come of the report was discussed within the staff members.

INDEPENDENCE DAY

Fifty eighth Independence Day was celebrated on 15th August 2004. On this auspicious occasion, Dr Kalyan Sen, Director hoisted the tricolor in front of the main building and gave a salute to it. He also addressed the gathering of staff members, security guards and school children and gave a brief account of the Institute's achievements in the preceding year and future milestones to be reached. In his address, he reminded the sacrifices made by our great leaders on the altar of freedom fighting of India. Sweets were also distributed among the children.

CFRI PARTICIPATED IN THE 5th INTERNATIONAL TRADE FAIR

CFRI participated in the 5th International Trade Fair-cum – Seminar during 9-12 Sept. 2004 at Pragati Maidan, New Delhi. The theme of the fair was Minerals, Metals, Metallurgy and Materials. CFRI stall was within the Jharkhand pavilion. The four days fair was full of visitors/VIPs/dignitaries. Hon'ble Chief Minister, Jharkhand, Shri Arjun Munda also visited the stall and appreciated the commendable R & D work carried out by CFRI in the area of Coal Science & Technology and associated environmental concerns. Two of the scientists Dr B. K. Sharma and Dr L. C. Ram participated in the seminar 'Waste Management-Enhancement of Quality of Life', which was organized under the same banner.



Dr L. C. Ram, Scientist, taking the autograph of Shri Arjun Munda on the visitors book

HINDI PAKHWARA

Hindi Pakhwara was inaugurated on 14th Sept. 2004. The Chief Guest on the occasion was Prof. Shiv Dayal Singh, Former Principal, Markham College of Commerce, Hazaribagh. In his address, he stressed upon more usage of Hindi in day to day office work. A Kavi Gosthi was organized on this occasion, in which S/Shri Kumar Brijendra, Dilip Chanchal, Jai Prakash Ziddi and Fazihat Gahamari graced the occasion and participated actively. Many poems were delivered on the current scenario of the country. The audience was virtually spellbound and enjoyed a lot. The Pakhwara was concluded on 26th September 2004, the Chief Guest for the occasion was Dr Sesh Anand Madhukar, Former Head, Deptt. of Hindi, St. Columbus College, Hazaribagh. In his address, he expressed his concern over the present position of Hindi which could not yet receive the status of National Language. In fact, it has been limited to Pakhwara celebration mostly and conveniently forgotten till the next celebration. He said that CFRI's role in implementing the Hindi is praiseworthy. He distributed the prizes to the winners of the different competitions organized in Hindi during the Pakhwara.

RELEASE OF BILINGUAL FORMS

Eighteen numbers of different bilingual (Hindi and English) forms of administration for official purposes were released by Dr. S.A Madhukar on the occasion of concluding function of Hindi Pakhwara on 26 September 2004.

VIGYAN MELA

A Vigyan Mela was organized from 24 to 26th Sept. 2004 under the banner Year of Scientific Awareness 2004 (YSA-2004). This was inaugurated by Dr (Smt) Beela Rajesh, Deputy. Commissioner, Dhanbad on 24th

Sept. 2004. In her inaugural address, she desired that such type of Mela should be organized in different parts of Dhanbad on a larger scale to include bigger mass. On this occasion, Shri I. A. Khan, Principal, P.K. Roy Memorial College and a renowned social worker, addressed the gathering. Dr P. Samuel, Scientist 'F' in his address, told the importance of such Mela for common people especially in making them aware about misbelieves and superstitions responsible for their miserable life. Dr S. K. Srivastava, Chairman, Org. Committee, YSA-2004 also addressed the gathering and briefed about different activities of this Program in the past and also about the future program especially of Dhanbad Chapter. He appreciated the keen interest taken and commendable efforts made by the students of the nearby areas in organizing this event to a complete success. He said the participation of our children in such a National Program is a good indication as they are the architects of our future India.

CSIR FOUNDATION DAY

Sixty second CSIR Foundation Day was celebrated on 26th September 2004 at CFRI. At the out set, Dr L. C. Ram, Sct. E-II gave a brief background of this celebration. Shri S. P. Gon Choudhury, Winner of 'Green Oscar Award (UK)' for the Year 2003, Director, West Bengal Renewable Energy Development Agency (WBREA) and Special Secretary to the Deptt. of Power, Govt of West Bengal was the Chief Guest. He delivered foundation day lecture on 'Energy Security in Rural India'. In his magnificent lecture, he emphasized over the need of supply of electricity to rural people for the proper development of our country in general and role of renewable energy sources there in particular, which is plenty in the country. He also cited the example of some of the overseas countries meeting their major energy requirements exploiting these energy sources. Dr P. Samuel, Dy. Director in his welcome address apprised CSIR as a big organization in providing the guidelines for industrially exploited resources for human consumption and also for the human resource development through services and training. Dr S. K. Srivastava, Head, Tech. Inf. thanked the Chief Guest, Dr Gon Chowdhury for delivering such a splendid speech especially when the Institute has recently made a common minimum program for the betterment of the life of people in rural/tribal area as per the directive of New Govt formed in the country.

DEPUTATION ABROAD

Dr. Kalyan Sen, Director, CFRI visited USA during 27th September to 1st Oct. 2004 to attend MINEXPO International-2004 at Las Vegas, USA. He also attended business meeting with the Former Director, Coal Preparation Research, US Department of Energy and

other Consultants in the area of coal beneficiation on high ash Indian Coal during 27th to 30th September 2004. He attended another business meeting with Heather Tangora, President, Mosquito Technologies, USA on 1st Oct. 2004.

PATENT INFORMATION: COAL AND ITS UTILIZATION

1. US Patent Application No. 20040128266 July 1, 2004
Title – Method for optimizing energy consumption and cost
Inventors: Yellepeddy, Krishna Kishore (Austin, TX); Dutta, Rabindranath (Austin, TX)
Abstract: This invention describes a method for optimizing energy costs in a home and in particular to a method for implementing the most economical energy usage through the determination of the best time to use energy and the best source of that energy.
2. US Patent Application No. 20040129608 July 8, 2004
Title – Process for treating fuel
Inventors: Clark, Alisdair Quentin (Aldershot, GB); Taylor, Spencer Edwin (Camberley, GB)
Abstract: A process for decolorizing gasoline and for removing, at least some of trace impurities selected from the group consisting of indanes, naphthalenes, phenanthrenes, pyrene, alkylbenzenes and mixtures thereof, from liquid hydrocarbon fuels especially gasoline has been developed. The process comprises contacting the liquid hydrocarbon fuel, especially gasoline, with a decolorizing carbon. The product gasoline provides reduced engine deposit formation.
(Source: www.uspto.gov)

WORLD AROUND

Physics Noble for Theory of Everything

Three US Scientists won the 2004 Nobel Prize in Physics for showing how tiny quark particles interact and helping explain everything from how a coin spins to how the universe was built.

David Gross, David Politzer and Frank Wilczek had shown how the attraction between quarks – the basic building blocks of nature – was strong when they were far apart and weak when they were close together. The Royal Swedish Academy of Sciences said their work on the strong force between quarks helped give “a unified description of all the forces of nature... from the tiniest distances within the atomic nucleus to the vast distances of the universe”. It explains how “an everyday phenomenon like a coin spinning on a table” is determined by fundamental forces between protons, neutrons, electrons. Protons and neutrons are made up

of quarks, bound by the strong force. The three scientists, in a theory known as quantum chromodynamics, also showed that when quarks are close together at extremely high energies they act like free particles, a state they called “asymptotic freedom”.

Gross said the US trio had made a first step towards “the theory of everything”. A grand unified theory of life and the universe has eluded scientists who cannot yet reconcile the way subatomic particles behave with gravity. The three Americans’ research on quarks brought scientists closer to explain the behavior of subatomic forces, which also include electromagnetic and a “weak force” dealing with radioactive decay.

“Once you understand all these forces it turns out that there are certain features that cry out for unification”. Gross said by phone from Santa Barbara, California. Wilczek, speaking in Cambridge, Massachusetts, said the group’s theories had first appeared “outlandish” when they emerged in the 1970s and Nobel recognition came as a “great relief”. Finnish theoretical physicist Stig-Erik Starck said the trio’s research had “built a model of how the universe was born, how it works and how it will ultimately die”.

(Source: *Hindustan Times*, 06.10.04)

CFRI IN MEDIA

1. Independence Day Celebrated at CFRI (*Prabhat Khabar and Aaj*, 17.08.04)
2. Hindi Pakhwara begins (*Prabhat Khabar, Dainik Jagaran and Hindustan*, 15.09.04)
3. CSIR Foundation Day Celebration Tomorrow in CFRI (*Prabhat Khabar*, 25.09.04)
4. Three Day Vigyan Mela begins in CFRI (*Prabhat Khabar*, 25.09.04)
5. CSIR Foundation Day Celebrated (*Prabhat Khabar and Dainik Jagaran*, 27.09.04)
6. Hindi Pakhwara Concluding Function (*Hindustan*, 27.09.04)

EVENTS AHEAD

1. Vigilance Awareness Week from 1st Nov. 2004
2. Jharkhand Establishment Day 15 Nov. 2004

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