

Value Added products from ripe banana: Banana juice and ripe banana powder

Banana is the largest grown fruit crop in India. Introduction of tissue culture techniques in banana cultivation has further enhanced its production. The fruit has a very short post-harvest shelf life because of its highly perishable nature. Unlike the developed countries, in India the development of commodities of consumer interest by value addition of fruits is less than 2 % of the annual agricultural produce. Short shelf and increased production necessitates development of non-conventional products from banana. BARC laboratory has developed a bench level technology for extracting almost 60-70 % of the total soluble materials of banana in the form of its juice and the left over pulp can be dried into a fine powder. This process has been patented. Taste panel studies were conducted at Food Technology Division, FIPLY, BARC involving 30 panelists.

The technology is capable of extracting 600-700 ml juice from one kg of Basari '10 Gy' [developed by tissue culture at BARC] variety; 400-500ml from Harichal variety, and does not involve addition of any external agents such as water and enzyme. The left over pulp retains all aroma of banana. It can be dried and powdered to give ripe banana powder. Taste panel studies showed general acceptability of non-conventional products developed from banana. The dry powder can be used as an additive in confectioneries, milkshakes and baby foods. Other products developed from ripe banana powder in BARC laboratory include biscuits, cake and baby food. Banana juice can also be used for the production of banana wine by fermentation, which has a lot of commercial value. The extracted juice after a dilution is ready to serve as nectar and / after carbonation as a drink.

Scale- up of this technology provides an excellent scope for the development of non-conventional products from banana.

World Nuclear University (WNU) Selects First Fellows

The WNU is a partnership of the world's leading institutions of nuclear learning. The WNU's four "founding supporters" are the IAEA, the Nuclear Energy Agency of the OECD, WNA, and WANO. The WNU's mission is to foster inter-institutional cooperation and establish accepted global standards in professional and academic qualification. Over 70 young nuclear professionals have gained fellowships to study at the World Nuclear University's first annual Summer Institute, to be held during July 9- August 20, 2005 in USA. About half of the fellows are from developing countries and countries in transition, with financial backing from the IAEA's technical cooperation programme. Women comprise one quarter of the fellows, who come from 34 countries.

The WNU was inaugurated in September 2003. The IAEA helped to shape the WNU Summer Institute's six-week educational programme, and participated in the selection of fellows. The course will be held at the Idaho National Laboratory with support from the US Department of Energy.

The curriculum for WNU Fellows looks at the future of nuclear technology and will include a special lecture series from world experts, among them WNU Chancellor and former IAEA Director General Hans Blix, as well as other current and former IAEA senior staff. Topics to be covered include:

- | The Global Setting: energy supply and demand, global warming and climate change, nuclear technology in sustainable development, and key political issues and trends;
- | International Regimes: safety, radiological protection, non-proliferation and security, waste management, transport, nuclear law, and global emissions control;
- | Technology Innovation: next-generation reactors, advanced fuel cycle, hydrogen production, desalination, space applications, and controlled fusion; and
- | Nuclear Industry Operations: including industry economics, knowledge management, fuel market, comparative risk assessment, public acceptance and communication, and operational excellence.

(Source : IAEA website)

Industrial Training Courses being organized by the Indian Nuclear Society

The Indian Nuclear Society has been organizing, from time to time, various courses for the benefit of Indian industries. Following are the courses to be conducted by the Society in near future.

Application of Numerical Heat Transfer to Industrial Problems

Schedule: July 18 – 22, 2005

The course is aimed at engineers and scientists who intend to develop user-specific computer codes and use commercially available heat transfer packages for process and engineering industries and environmental science applications.

Course Contents

- | Introduction to theoretical modeling and review of basic equations,
- | Finite Difference Method for Conduction Heat Transfer,
- | Direct and Iterative Solution Techniques,
- | Finite Element Method in Heat Transfer,
- | Finite Difference Method for Convective Heat Transfer and Fluid Flow,
- | Finite Volume Method for Heat Transfer, and
- | Application of FDM, FEM and FVM to Industrial Problems.

Design of Components Operating at High Temperature

Schedule: July 25 – 29, 2005

The course is aimed at engineers from research establishments and engineering industries, who are involved in the design of pressure vessels and piping.

Course Contents

- | Introduction: Plasticity, Viscoplasticity and mechanism of creep deformation,

- | Deformation & fracture behaviour at high temperature (HT),
- | Material selection for HT application,
- | Design codes & standards,
- | NDE & ISI,
- | Models for creep crack initiation and growth,
- | Design by Analysis, and
- | Life assessment.

Welding NDT and Structural Integrity Assessment of Pressure Vessel & Piping

Schedule: July 11 – 15, 2005

It is well accepted that all welded structures contain flaws and that these do not necessarily affect structural integrity or service performance. The fracture mechanics based fitness-for-purpose approach enables the significance of flaws to be assessed in terms of structural integrity.

This course is intended for engineers engaged in design, fabrication, operation, regulation, quality assurance, inspection and maintenance of plant facilities.

Course Contents

- | Overview of Welding Processes,
- | Weld Defects,
- | Overview of Nondestructive Test Methods,
- | Defects-origin, nature and significance,
- | Surface Examination NDT Methods,
- | Volumetric Examination NDT Methods,
- | Qualification and Certification of NDT Personnel,
- | NDT Methods for Monitoring Service-induced Damages,
- | Overview of Damage Mechanisms,
- | Concept of Fracture Mechanics,
- | Overview of API RP579, BS

- | 7910 and ASME code,
- | Assessment for Fracture and Fatigue,
- | Assessment of Environmental effects viz. stress corrosion cracking, corrosion fatigue and hydrogen embrittlement, and
- | Assessment for localized metal loss.

Seismic Design of Industrial Structures, Equipments and Piping Systems

Schedule: July 04 – 08, 2005

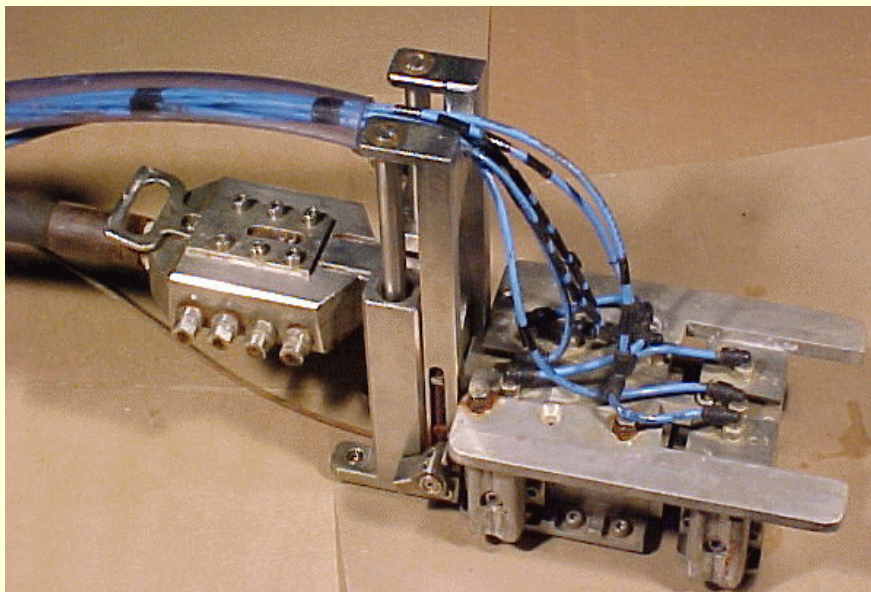
The course is aimed at engineers from research establishments and industries such as petrochemicals, power generation & transmission, communication etc., who are involved in the design of industrial structures, equipment and piping systems. It is also useful for the academicians who are interested to enhance their knowledge in the field of seismic design of industrial structures, equipment and piping systems and perform further practical oriented research.

Course Contents

- | Introduction to Earthquakes,
- | Ground Motion Parameters,
- | Introduction to structural dynamics,
- | Seismic Analysis methods,
- | Criteria for Earthquake Resistant Design of Structures (Indian Standard-1893,
- | Steel structure design,
- | Seismic design of vessel, tank and pipe,
- | Seismic design of electrical and control & instrumentation systems, and
- | Introduction to Retrofitting.

*For further information
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Indigenous Sludge Lancing Equipment



Jet Manipulator Assembly for Sludge Lancing Equipment

Steam generator is a vital and complex component of a nuclear power plant. During years of plant operation, corrosion products and other solids deposit in the form of sludge on the tube sheet of steam generator. The sludge formation not only adversely affects the steam generator performance but also diminishes its service life if left unchecked. Although utmost care is taken to reduce sludge formation, periodic sludge removal from steam generator is an essential part of the operation to ensure high availability and service life of the equipment.

BARC has developed a Sludge Lancing Equipment, an import substitute, that ensures long service life of steam generators of nuclear power plants by periodic removal of corrosion products from steam generator.

In the indigenously developed Sludge Lancing Equipment by BARC, high velocity narrow water jets or water lances are used for dislodging and removal of hard and strongly adhesive sludge from the steam generator tube sheet.

The cost of the indigenously developed equipment is Rs. 2 crore while an imported equipment costs three times. The Sludge Lancing Equipment built by BARC incorporates a remotely operated state-of-the-art robot, technically called Jet Manipulator Assembly, with sophisticated computerised controls. This manipulator directs high velocity water jets to dislodge sludge from the steam generator tube sheet. A remotely operated camera Remote Visual Inspection System that carries out visual inspection of the steam generator, displays images of steam generator internals before and after lancing. The dislodged sludge remains suspended in water and is separated by passing the water containing the sludge through a series of increasingly fine filters. The sludge-free clean water is recycled in a closed loop system and is pumped back to steam generator in the form of continuous high velocity water jets or lances.

TWAS Prize for TIFR Professor

Professor Spenta R. Wadia, a senior professor of physics at the Tata Institute of Fundamental Research (TIFR), Mumbai, has been awarded the prestigious TWAS prize for the year 2004 by the Academy of Sciences for the Developing World, Trieste, Italy.

The annual TWAS Prizes, awarded in eight fields of scientific research, rank among the highest scientific accolades given to scientists in developing countries. Each TWAS Prize carries a cash award of US\$10,000.

Professor Wadia was awarded this prestigious prize in Physics for his significant contributions to theoretical physics, specifically to non-perturbative quantum field theory and string theory. Dr. Wadia has worked in a wide spectrum of areas in theoretical physics, including quantum field theory, string theory, statistical mechanics and disordered systems. He has guided several Ph.D. students and has been instrumental in forming a string theory group at TIFR.

Wadia, a fellow of the Indian Academy of Sciences (1992), the Indian National Science Academy (1997) and the New York Academy of Sciences (1997), was also awarded the Abdus Salam International Centre for Theoretical Physics (ICTP) prize in physics in 1995.

Reactors under construction



Reactor Building of Kudankulam Unit-1



Reactor Building of Kudankulam Unit-2



Reactor Building of Kaiga Atomic Power Project Unit-3



Reactor Building of Kaiga Atomic Power Project Unit-4



Reactor Building of Rajasthan Atomic Power Project Unit-5



Reactor Building of Rajasthan Atomic Power Project Unit-6

Atomic Energy Establishments in India



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