

CSIR Technology Awards 2011

CSIR Technology Awards seek to foster and encourage multi-disciplinary in-house team efforts and external interaction for technology development, transfer and commercialization. These awards include one each for: (i) Life Sciences; (ii) Physical Sciences including Engineering; (iii) Innovation; (iv) Business Development and Technology Marketing; and (v) Most Significant CSIR Technology of the Five Year Plan Period (awarded once in five years coinciding with the plan period, to such technology which has proven in the market place, atleast for 5 years).

Each Technology Award comprises of a cash prize of ₹ 2 lakh except the award for the "Most Significant CSIR Technology of the Five Year Plan Period" which has a cash prize of ₹ 5 lakh. Besides, a plaque and a citation are also given to the awardees.

For the year 2011, five awards are being given in all the categories following a very stringent criterion:

1. The Technology Award for Life Sciences goes to CSIR North East Institute of Science and Technology (CSIR-NEIST), Jorhat for developing Terminalia chebula based bioformulation (Muga Heal) as an anti-flacherie agent and a silk fibre enhancer.

The developed method results in healthy growth of larvae and improved cocooning of muga silkworm, *Antheraea assamensis* which comprises of spraying Terminalia chebula fruit based bioformulation on the leaves and branches of some plants, *Persea bombycina*. Application of Terminalia chebula fruit based bioformulation resulted in enhanced cocoon production with uniform shape, size, improved quality of silk having more reeling filament of unbreakable length. This is a new method applicable to muga silkworm, *Antheraea assamensis*, helpful for enhancing production of high yield and quality silk. The developed process can be used for the enhanced production of high quality silk fiber and improvement of silkworm cocoons of muga silkworm, (*Antheraea assamensis*) through application of herbal Terminalia chebula fruit based bioformulation.

2. The Technology Award for Physical Sciences including Engineering goes to CSIR Central Institute of Mining and Fuel Research (CSIR-CIMFR), Dhanbad for developing technology for extraction design of locked-up coal by Highwall Mining in India.

Highwall Mining is a new technology which can extend the life of opencast mines without disturbing the surface dwellings, and maintaining economy and productivity. It is a remotely operated coal mining technology closely related to underground mining machinery. The method comprises extraction of coal from a series of parallel entries driven in the coal seam from the face of the highwall. These entries are unmanned, unsupported and unventilated.

CSIR-CIMFR is instrumental in adapting this new Highwall Mining technology for Indian geomining conditions by providing scientific extraction design for the three Highwall Mining sites at Ramagundem Opencast Project-II and Medapalli Opencast Project of M/s. Singareni Collieries Company Ltd (SCCL), and Quarry SEB and AB, West Bokaro of M/s. Tata Steel Ltd (TSL). The first Highwall Mining has started operation from 10th December, 2010 at Ramagundem Opencast Project-II of SCCL. This made over 5 Million tonne of locked-up coal immediately viable for extraction by Highwall Mining, thus adding to the energy supply of the nation.

CSIR recognizes the contribution of M/s. Advanced Mining Technology Pvt. Ltd., Hyderabad and M/s. Delta Construction Systems Ltd., Hyderabad in implementing the extraction design of CSIR-CIMFR for recovering huge amount of locked-up coal using ADDCAR-make Highwall Mining machine.

3. The Technology Award for Innovation goes to CSIR Central Leather Research Institute (CSIR-CLRI), Chennai for developing salt free tanning technology.

The developed technology eliminates brackish water associated during the process of tanning of hides and skins. It ensures uniform distribution of chromium throughout the hide or skin and high quality leather, which has gained user acceptance. Customarily, prior to the actual process of chrome tanning, which is the primary method used in tanning industry, the pH of hides and skins is lowered to about 2.5-3.0 by use of acid through a process known as 'pickling'. Lowering of pH helps in the facile penetration of the mineral tanning agent into the substance. Salt is added to negate the effect of swelling of animal tissues caused by acid addition, which would otherwise make the leather physically unstable. While addition of the salt in the above process helps in retaining the strength and quality of leather, it leads to high amount of TDS (total dissolved solids) with respect to pollution standards in the effluents during treatment at a later stage.

Even after a huge financial investment to treat effluent systems, the present tanning industry has been struggling on for years to meet the proper regulatory standards of TDS in effluent systems. The developed salt free technology has not only eliminated the usage of salt, but also shortened the process by avoiding the steps of pickling and then again basification to make the medium neutral.

4. The Technology Award for Business Development and Technology Marketing goes to CSIR Indian Institute of Petroleum, Dehradun (CSIR-IIP) for significantly enhancing the business through commercialization of its technologies against stiff global competition and marketing of its knowledgebase.

CSIR-IIP played a vital role in Nation's quest towards the scientific and technological leadership; providing globally competitive, sustainable and energy efficient ecofriendly technologies / products / scientific solutions to energy and allied sectors particularly petroleum (upstream, refineries, petrochemicals) and other industries including Strategic/ Defence.

CSIR-IIP has adopted several new initiatives for establishing national and international linkages with prospective industrial, academic and research clients to continually enhance collaboration, cooperation and external cash flow; reach out to new customers; share knowledgebase; and offer consultancy and S&T services to meet the growing needs of the industrial sector; and enhance the valuation of intangible assets. Over the last 3 years CSIR-IIP's earnings from industry have increased significantly.

5. The Technology Award for Most Significant CSIR Technology of the Five Year Plan Period goes to CSIR National Chemical Laboratory, Pune for developing complete process technology for manufacture of 2-acrylamido-2-methyl-1-propane sulfonic acid (ATBS).

2-acrylamido-2-methyl-1-propane sulfonic acid (ATBS) is one of the speciality monomers used in field of Enhanced Oil Recovery Application, Paint industry, Water Treatment, Acrylic / Acrylonitrile Fibre dye-pick up application, Personal care applications, Medical polymers etc. There are very limited players in the field of speciality monomers in India.

CSIR-NCL has developed complete one pot process technology for manufacture of 2-acrylamido-2-methyl-1-propane sulfonic acid (ATBS) wherein complete conversion of isobutylene is achieved. After recovery of excess acrylonitrile, the effluent stream is subjected to side product recovery such as Tertiary Butyl Acrylamide (TBA) recovery, the balance effluent stream is polymerized and the polymer is dried to get powder useful as Construction Additive/Chemical. This has made process economically viable and free of pollution.

The process was licensed to M/s Vinati Organics Limited (VOL), Mumbai. CSIR-NCL has received ₹ 40 lakh as license fee and ₹ 186 lakh as royalty after commercialization of the process. The present capacity of VOL's commercial plant is 18000 Tonne per annum of ATBS and this plant is 2nd largest plant in the world for producing ATBS.