



## **Council of Scientific and Industrial Research**

### **Press Release**

#### **CSIR Technology Awards 2019**

***New Delhi, September 26, 2019.*** CSIR Technology Awards for the year 2019 under category of Life Sciences, Innovation, Physical Sciences including Engineering, and Business Development and Technology Marketing were awarded on the occasion of CSIR Foundation Day, 26<sup>th</sup> September 2019. The awards were given away by the President of India, Shri Ram Nath Kovind and Dr. Harsh Vardhan, Hon'ble Minister, Ministry of S&T, ES & HFW and Vice President, CSIR to the winners during the Foundation Day of the CSIR.

CSIR had instituted 'Technology Awards' in 1990 to foster and encourage multi-disciplinary in-house team efforts and external interaction for technology development, transfer and commercialization.

This year the winners are: CSIR- Central Drug Research Institute (CSIR-CDRI), Lucknow; CSIR- Central Salt and Marine Chemicals Research Institute (CSIR-CSMCRI), Bhavnagar; CSIR-Central Institute of Mining and Fuel Research, Dhanbad; and CSIR- National Aerospace Laboratories (CSIR-NAL), Bengaluru.

#### **CSIR- Central Drug Research Institute (CSIR-CDRI), Lucknow has won the award for A Novel Osteoinductive Molecule S-008-399 as Medicated Biodegradable Bone Implant Material for Fast Fracture-Healing**

Scientists at CSIR-CDRI have designed and developed a novel dual-acting compound CDRI S008-399 that promotes bone formation and prevents bone resorption while leading to faster bone healing, and enhances bone mineral density.

The compound promotes osteoblast differentiation and mineralization at dose as low as one *picomolar* concentration. This bone inducing agent improves bone quality and restores trabecular micro-architecture in ovariectomized osteopenic cases. S008-399 also enhances new bone formation and decreased the level of CTX (beta C-terminal telopeptide), a collagen breakdown product and bone resorption marker. Design, synthesis and extensive biological studies with CDRI-S008-399 established its dual anabolic and anti-catabolic effects in ovariectomized osteopenic Sprague Dawley rats.

Due to its notable osteoinductive properties, the product S008-399 has been licensed and the technology has been transferred for having orthobiologicals to enhance healing at the fracture site. These will also reduce the cost of bone implant surgery and there will be no need for re-surgery either to remove the metallic screws/pins/plates or for some other infections caused by non-degradable implants. Furthermore, the healing will be faster due to potent osteoinductive property of S008-399.

**CSIR- Central Salt and Marine Chemicals Research Institute (CSIR-CSMCRI), Bhavnagar has won the award for Zero waste process for recovery of potash fertiliser, water & other value added byproduct(s) from spent wash**

This innovation of CSIR-CSMCRI transforms a long-standing environmental concern into an opportunity to achieve a self-reliance. It is a 'Zero Liquid Discharge' compliant W2W technology that generates marketable products from effluent of sugarcane molasses-based distilleries, while water is recovered and recycled. The innovation renders the treated spent wash amenable to a selective K-precipitation technique for recovery of FCO (Fertilizer Control Order) grade potash fertilizer.

CSIR-CSMCRI technology allows remunerative utilization of distillery spent wash through recovery of value-added by products while conforming to 'Zero Waste' concept – a step beyond existing norm. The process is about 20% less energy intensive compared to current practices adopted for similar product portfolio. World's 1<sup>st</sup> commercial plant to produce FCO-grade potassium nitrate from spent wash, based on this unique technology, has been installed at Walchandnagar, Maharashtra.

Major benefits of the technology are production of indigenous potash fertiliser, conservation of water resources, boosting ethanol production and ethanol blended petrol, reduction in potash import, augmented income for farmer, industry and government. Adoption of this globally unique technology is to improve the operational, financial and ecological sustainability of Indian distillery sector.

**CSIR-Central Institute of Mining and Fuel Research, Dhanbad has won the award jointly for Controlled blasting techniques developed for safe extraction of minerals from mines and construction of various civil infrastructure projects**

CSIR-CIMFR is playing a vital role in the domain of rock blasting research, spanning from exploratory research to updating the national methodology for excavation of minerals. It has developed and implemented the controlled blasting technique of pre-splitting for Indian mining operations. The successful execution of this technique facilitated Rampura Agucha Mine to be India's deepest open-pit mine. The technique has been used first time in India for dragline benches at Moher and Moher- Amlohri Extension Open cast and helped the mine management to produce the electricity at the low-priced rate. The inventors have implemented controlled blasting technique and rock excavation methods for more than 500 coal and metal mines and more than 30 prestigious hydroelectric and civil construction projects.

The multi-ring blasting technology has been designed and experimented in Sindesar Khurd and Kayad underground mine which focuses on enhancement of productivity from the stopes along-with minimisation of blast vibration near surface and underground structures. Mine-to-Mill technology developed by the inventors has helped in efficient utilisation of explosives energy for reduction in downstream operational cost of the mine. CSIR-CIMFR has designed the land development sequences for flattening of 92 m height Ulwe hill at the ambitious Greenfield Project of Navi Mumbai International Airport, without causing any inconvenience as well as any future instability. Apart from the flattening of Ulwe hill, river diversion channel has successfully been completed in stipulated time.

**CSIR- National Aerospace Laboratories (CSIR-NAL), Bengaluru has won the award jointly for Carriage, Handling and Stores Release Clearance Studies for a Fighter Aircraft Upgrade**

CSIR-NAL was actively involved in upgradation of a series of frontline fighter aircrafts of Indian Air Force inventory. The series has both fighter and trainer variants with nearly identical combat and air-to-air refueling

capabilities. Although inducted in late 80's, the upgrades have played a pivotal role in current encounters with specific targets. The aircrafts were upgraded recently with multi-mission air-to-air beyond visual range projectile system, fire control *radars*, night vision compatible cockpit, advanced navigational systems, advanced Identification friend or foe system, advanced multi-mode multi-layered radar and fully integrated electronic warfare suite as part of the initial operating clearance.

CSIR-NAL participated in the overall Final Operational Clearance for the aircrafts and provided in-house technological support for structural integrity, stability, control and aero-mechanical clearance of new stores including armament configurations in combination with other stores such as 'new generation precision guided munitions' (Spice-2000 etc.). The novelty of the technology is that it does not require design data or finite element model for fixing critical configurations.

**CSIR-Central Institute of Mining and Fuel Research, Dhanbad has won the award for Significantly Enhancing the Business and Marketing of their Knowledgebase**

CSIR-CIMFR, based on its scientific investigations, has pioneered in providing technical and advisory services, to its stakeholders in the areas of mining, hydroelectric and tunneling. The laboratory has been supporting in solving complex mining problems and also in operation of more than 400 coal and metal mines and more than 20 prominent hydroelectric projects. In addition, blast optimization and safety related subjects pertaining to quarrying, tunneling, metal cladding, railway tracks and over bridges and construction sites have been undertaken and solved by CSIR-CIMFR.

The clientele of the laboratory including user industries have been immensely benefited in terms of safety and productivity from the R&D solutions provided. CSIR-CIMFR has exerted a continuous effort to add new clients by organizing several sessions, and industry meets, and operationalizing new business mechanisms. The recent state-of-the-art contribution from its Rock Excavation Engineering division is extraordinary. These have led to a sustainable and consistent growth of over multi fold increase in its External Cash Flow (ECF) in a period of last five years and makes the laboratory as the top most earner of ECF amongst all CSIR laboratories.