

## II-B. TECHNOLOGY DEVELOPMENT AND INNOVATION PROGRAMME

The programme has two sub-components, viz.

- (i) **Technology Development and Demonstration Programme (TDDP)** to support technology development efforts of industry – R&D system and
- (ii) **Technopreneur Promotion Programme (TePP)** to nurture the innovative spirit of individuals.

### 1. TECHNOLOGY DEVELOPMENT & DEMONSTRATION PROGRAMME

#### 1.1 Objectives

The programme aims at catalyzing and supporting activities relating to technology absorption, adaptation and demonstration including capital goods development, by involving industry and R&D organization. The specific objectives of the programme are:

- Supporting industry for technology development, demonstration and absorption of imported technology
- Building indigenous capabilities for development and commercialization of contemporary products and processes of high impact.
- Involvement of national research organization in joint projects with industry
- Technology evaluation in selected sectors

#### 1.2 Activities

The Department provides, on a selective basis, partial financial support to research, development, design and engineering (RDDE) projects proposed by industry in the following areas:

- Development and demonstration of new or improve product and process

technologies including those for specialized capital goods, for both domestic and export markets.

- Absorption and up-gradation of imported technology.

The partial financial support by DSIR in the above areas, primarily covers prototype development and pilot plant work, test & evaluation of products from such R&D, user trials, etc. Bulk of the cost of the project is met from industry's resources. TDDP has now been expanded by adding two more components, namely "TDDP-Start Up" and "TDDP-Small Business" under which support would be provided, as the name indicates, to Start Up companies to start their commercial operations and to small business to carry out both lab/pilot scale R&D as well as commercialization.

The Department, under this activity has so far supported about 193 R&D projects of Industrial units. These projects cover products and processes in various important industries such as metallurgy, electrical, electronics, instrumentation, mechanical engineering, earth moving and industrial machinery, chemicals and explosives, etc. 111 projects have so far been completed and over 35 technologies developed under the scheme have been commercialized or under commercialization. During the year, 52 Technology Development Demonstration projects supported under the scheme were reviewed for progress.

The list of running projects of various industrial units are given in **Annexure 9**. The details of new projects approved during the year are given below:

***Microbial Production of Arachidonic Acid, An Omega-6 Polyunsaturated Fatty Acid Essential for Human Health, submitted by M/s ABL Biotechnologies Ltd., Chennai***

Arachidonic Acid (ARA) is a polyunsaturated fatty acid and is a precursor of eicosanoids. Eicosanoids, which are made by oxygenation of twenty-carbon essential fatty acids, (EFAs) are signaling molecules that act as messengers in the central nervous system and also exert complex control over many bodily systems, principally in inflammation or immunity. Absence of ARA or such other polyunsaturated fatty acids can lead to many and varied disorders such as pre-menstrual syndrome, schizophrenia, rheumatoid arthritis, multiple sclerosis, etc. ARA is also deemed as essential for the healthy development of the brain in infants and, to this end, is recommended in infant foods together with other polyunsaturated fatty acids such as docosahexaenoic acid (DHA).

ARA is an essential requirement of most mammals and for many mammals, the requirement is met by converting linoleic acid. Plants and plant oils do not contain ARA, and at present, the commercial source of this important fatty acid is a group of fungi belonging to the genus *Mortierella*. Many patents have been taken on individual strains of the fungus as well as the use of ARA in various formulations.

The present project proposes to establish a high yield strain of the fungi available in the Indian sub-continent and to optimise the conditions for the growth of this culture with a view to scale up for commercialisation. When they succeed, it will be for the first time that a commercial production of ARA would be set up in India.

This project has been supported by DSIR with a support of Rs. 180 Lakhs out of a total project cost of Rs. 471 Lakhs.

***Development of Process for the Manufacture of Nano Labeled DNA/RNA Compounds, submitted by M/s Ogene Systems (I) Pvt. Ltd., Hyderabad***

The labelling compounds that are referred to above are used in research for gene expression, automated nucleic acid synthesis/sequencing, quantitative PCR and in situ hybridization. It is believed that the nano-labelled compounds proposed to be developed under the project are the latest state-of-the-art second generation compounds with such a high level of sensitivity that they could enable the detection of the presence of even a single molecule in the sample. The technology for the production of such compounds has been developed at laboratory scale by M/s BioGenex of USA. Ogene proposes to commercialise this technology.

The proposal has been supported by DSIR with a support of Rs. 110 Lakhs out of a total project cost of Rs. 308 Lakhs.

***Development of Novel Therapeutics based upon Natural Products from Indian Medicinal Plants, Joint Project Proposal of Chemistry Department, Delhi University, and VP Chest Institute, University of Delhi, Delhi***

The proposal proposes to identify natural product based molecules which have better efficacy than the compounds already identified till now. The proposal also includes medicinal chemistry analysis on potential anti-inflammatory, and anti-platelet aggregation and vasorelaxation compounds already identified by them.

The proposal has been supported by DSIR with a support of Rs. 226 Lakhs out of a total project cost of Rs. 226 Lakhs.

***Green Process Technology for the Manufacture of Cephalosporin G, Submitted by Orchid Chemicals & Pharmaceuticals Ltd., Chennai***

Cephalosporins are bactericidal and belong to a group of beta-lactam antibiotics (such as penicillins). Like other beta-lactam antibiotics, they inhibit the synthesis of a structural component of the bacterial cell wall. In the case of Cephalosporins, they disrupt the synthesis of the peptidoglycan layer of bacterial cell walls.

Cephalosporins are much more expensive than penicillins. One reason is that some cephalosporins are made from penicillins by a number of chemical conversions. One of the necessary chemical steps involves the expansion of the 5-membered penicillin ring structure to a 6-membered cephalosporin ring structure. This complex chemical processing is both expensive and noxious to the environment. Another reason is that, so far, only cephalosporins with a D-5- amino-5-carboxypentanoyl side chain, such as Cephalosporin C, could be fermented. Cephalosporin C, by far the most important starting material in this respect, is very soluble in water at any pH, thus implying lengthy and costly isolation processes using cumbersome and expensive column technology. Being less potent, Cephalosporin C obtained in this way has to be converted into therapeutically used cephalosporins by a number of chemical and enzymatic conversions.

Cephalosporins are antibiotics characterized by a cephem ring system in which a beta-lactam ring is fused to a dihydrothiazine ring. The cephem ring system is synthesized

by expansion of the five-membered thiazolidine ring of the penicillin to the six-membered dihydrothiazine ring. The enzyme that catalyzes this reaction is the deacetoxycephalosporin C synthetase (DAOCS)—often called expandase. This has been covered under numerous patents.

OCPL claims to have identified and developed competitive mutants of expandase, which would not only be proprietary but also commercially relevant and have filed for intellectual protection by its applications ((Modified expandase enzyme and its use - India, 366/CHE/2004, 22.04.04; India, 838/CHE/2004, 23.08.04; PCT, IB05/01040, 20.04.05). PCT, IB05/01040, 20.04.05 application has been cleared for filing with individual countries.

They have completed laboratory scale trials and now propose to go in for pilot scale trials before going on for commercialization. A successful outcome in the project could enable OCPL to play a dominant role globally in this area.

The proposal has been approved by DSIR and the agreement is under negotiation.

## **2. TECHNOPRENEUR PROMOTION PROGRAMME (TePP)**

Department of Scientific and Industrial Research (DSIR) under its Technology Development and Innovation Programme of TPDU Scheme and Technology Information Forecasting and Assessment Council (TIFAC) of Department of Science and Technology (DST) jointly operate “Technopreneur Promotion Programme (TePP)”. TePP endeavour to tap the vast innovative potential of the citizens of India. Financial support is provided to individual innovators having original ideas to convert them into working models, prototypes etc. It is expected that

**thirty** new projects would be supported during the whole financial year of 2007-2008 by DSIR. The details of the completed, on-going and approved projects supported under TePP during the year under report are given in **Annexure 10**.

### 3. OTHER ACTIVITIES

**3.1** To expand the reach of TePP among common mass, **ten** TePP Outreach Centres of DSIR were set up at Sponsored Research and Industrial Consultancy (SRIC), IIT Kharagpur (W.B.), Society for Innovation and Entrepreneurship (SINE), IIT Bombay, ERDC-Hartron, Ambala Cantt. (Punjab), Acharya Nagarjuna University, Guntur (A.P.), Technopark, Trivandrum (Kerala), Foundation for Innovation & Technology Transfer (FITT), IIT Delhi, Shri Siddhartha Institute of Technology (SSIT), Tumkur (Karnataka), Science & Technology Entrepreneurs' Park(STEP)- National Institute of Technology(NIT), Surathkal (Karnataka), TREC-STEP, Trichy (T.N.) and JSSATE-STEP, NOIDA(U.P.). Besides these, six additional TePP Outreach Centres were also set up by TIFAC at PSG-STEP, Coimbatore, Vellore Institute of Technology- Technology Business Incubator (VIT-TBI), Vellore, Central Glass Ceramics Research Institute(CGCRI), Kolkata, Institute Industry Partnership (IIP) Cell, IT-BHU, Varanasi and SIDBI Innovation & Incubation Centre (SIIC), IIT Kanpur, Kanpur, IIT Roorkee and College of Technology & Engineering, Udaipur (Rajasthan).

**3.2** With a view to sensitize larger mass, **nine** TePP Innovation Funding Camps were organised at Kanpur (6<sup>th</sup> April), Karad (13<sup>th</sup> April), Satara(14<sup>th</sup> April), Patna (21<sup>st</sup> April), Bhopal (28<sup>th</sup> April), Baddi (17<sup>th</sup> May), Mohali (18<sup>th</sup> May), Jabalpur (28<sup>th</sup> July) and Sholapur respectively.

**3.3** DSIR participated/ organised in a number of exhibitions/ workshop to showcase the strengths and capabilities of R&D projects supported under TePP as well as to sensitize academia and network partners about the philosophy of TePP during the year.

- An interaction meet of TePP officials with family business managers was organized on 4<sup>th</sup> April, 2007 at S.P. Jain Institute of Management & research, Mumbai.
- TePP participated in All India Junior Robotics Championship – TRICS, 2007 at IIT Bombay on 29<sup>th</sup> April, 2007 to create awareness among young children about TePP scheme.
- TePP participated in India Innovation Summit at Bangalore organized by Confederation of Indian Industry(CII), Southern Chapter, June 15-16, 2007, wherein products/working models of TePP innovators were displayed.
- TePP Orientation Programme for Representatives of TePP Outreach Centres at SIDBI Innovation & Incubation Centre(SIIC), IIT Kanpur, July 30-31, 2007.
- 2-day training programme on “Creativity and Problem Solving” at TIFAC, New Delhi, September 26-27, 2007.
- Two (2) brain-storming sessions were organized to explore the possibilities for setting up “Innovation Export Promotion Council” in association with CII, Gurgaon at FITT, IIT Delhi on 28<sup>th</sup> September, 2007 and at Indian Institute of Management Bangalore on 22<sup>nd</sup> October, 2007.
- Business Plan Competition “METAMORPHOSIS” in association with Indian School of Business(ISB), Hyderabad is being organized for select TePP innovations. The final of the event

has been planned to be held on 17<sup>th</sup> December, 2007 at Hyderabad.

The aim of these activities were to disseminate information on TePP to its clientele.

**3.4** To diffuse the achievements of TePP innovations, a publication entitled “CREATIVE INDIA, Vol. II” consisting 51

profiles of innovators was published and distributed among concerned groups.

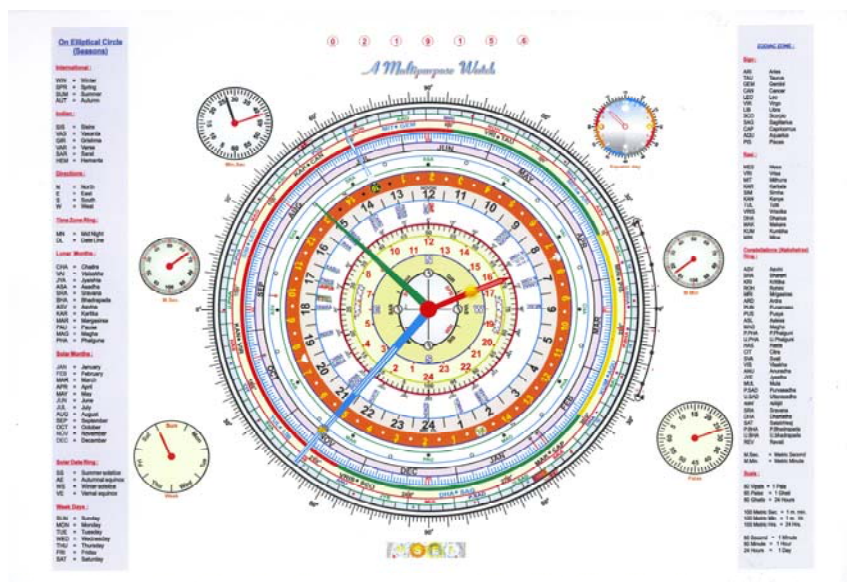
**3.5** To make wider dissemination of TePP through print media as well as to solicit proposals from independent innovators, network partners, an advertisement was given in around 150 newspapers in leading national dailies and regional newspapers.



*Mobile operated remote switch*



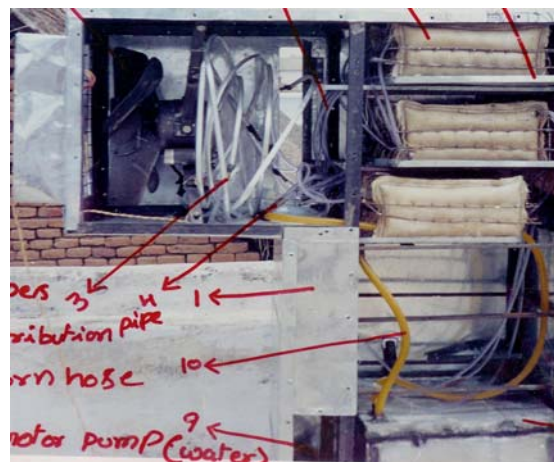
*Hybrid system for solar distillation and drying application*



*A Multipurpose Watch, <http://www.uselwatch.com>*



*Digital Talk Friend(STF) for Speed Warning and Limiting Device*



*Natural air cooler*