

Promoting Innovations in Individuals, Start-ups and MSMEs (PRISM)

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Promoting Innovations in Individuals, Start-Ups and MSMEs (PRISM)

1. PREAMBLE

Department of Scientific and Industrial Research (DSIR) has launched a new programme viz. Promoting Innovations in Individuals, Start-ups and MSMEs (PRISM) during 12th five year plan. The scheme has now been extended further till 31.03.2020 i.e. co-terminus with the fourteenth finance commission period. The programme aims at to support individual innovators having original ideas to convert them into working models, prototypes etc. It also aims at supporting autonomous institutions or organizations or registered society for developing state-of-art new technology solutions aimed at helping MSME units in industrial clusters. The department has supported twenty-one (21) new projects during 2017-18 (up to December 11, 2017), Annexure-9. The department has also successfully completed fifteen (15) PRISM projects during the year. The details of the completed projects supported under PRISM are given in Annexure-10. The highlights of some of the completed/ on-going PRISM projects are given below for ready reference:

Commercial Extraction of Bio- product from Biomass

Shri Bhagaban Baruah of Jorhat (Assam) has been scouted and mentored by TOCIC (TePP Outreach cum Cluster Innovation Centre) located at NEIST, Jorhat with financial support from DSIR under PRISM Scheme. The Edible bi-carbonate, popularly known as Kal Khar is a popular and traditional food ingredient used in

North-East part of the country. This product is invariably used by almost all Assamese families. It is traditionally produced by burning some selected parts of the banana trees, mixed in water and filtered with the help of cloths. This traditionally produced edible bi-carbonate has impurities (mainly carbon particles). In urban and semi urban areas, the people do not have time and facilities to produce the edible bi-carbonate. So the people are taking the chemically produced bi-carbonates. The present product satisfied the needs of the edible bi-carbonate produced from banana, in scientific way. The project is originally targeted to produce the edible bi carbonate, but as a bi-product, organic potash is also produced. With the concept of zero discharge (except the small amount of flue gas generated), the ash produced in the process are also converted in to product. The while ash produced in the process has considerable amount of silica in it and is added with some organic binder to produce another product called Bhim Ash Detergent, an effective detergent to clean the utensils and similar products. In addition, other edible common food products (pickles etc.) are also produced. Another important design intervention in the process is that, there is no any external fuel used during production. The heat that is generated during the process of burning of banana stems and other parts is utilized in the distillation process. Thus the process becomes energy efficient. The burning chamber, kiln and other parts are designed with care so that minimum heat loss is taken place in the process.





Scaled prototype development for a functionally upgraded 72 nm³/day Bio-CNG Plant for Indian Conditions

Dr. Amitava Roy of Kolkata has been scouted and mentored by TOCIC at CSIR-CMERI, Durgapur. The innovator has developed functionally upgraded 72 nm³/day Bio-CNG plant for Indian conditions. The technology does not use any pre-compressor unlike the competitors. The novelty of the technology has been demonstrated that gas compression, gas scrubbing, and gas drying in a single step resulting into 50-70% lower capital cost and up to 50% higher efficiency. Compressor does not have any mechanical piston thus no mechanical friction, wear and tear inside the compression chamber.

The water column acts as a liquid piston i.e. no leakage of the gas takes place around the piston

ring that translates into increased compression efficiency. It increased volumetric efficiency of about 97% compared to the 70-80% volumetric efficiency in the piston compressors. It has got 30 times greater residence time between the raw gas and scrubbing water reduces the footprint by 70% and the height of the scrubbing tower by 90%. The project has been successfully completed.



Efficient composting of Biodegradable Wastes through Mesophilic Aerobic Rapid Composting (MARC) on continuous method

Dr. Pawan Kumar Jha of Delhi has been scouted and mentored by TOCIC at IIT Roorkee with financial support from DSIR under PRISM Scheme.

The project was aimed to develop a system for composting of bio degradable wastes at individual or group of households levels working on continuous basis without emitting any odour and requiring much less space and easy handling the system without requiring external energy source. The composting device named as Mesophilic





Aerobic Raid Composting (MARC) developed under the project, is based on the principle of providing air / oxygen inside the composter for rapid growth of natural occurring microbes resulting in faster degradation of organic matters. For creating aerobic condition through providing air/ oxygen into the composter no external energy is required. MARC is made up of FRP (FerroReinforcement Plastic). It is a cylindrical structure fitted on iron stands with balls & bearing arrangement to help rotate manually without much effort. Cluster of perforations have been provided on the upper and side walls of the composter at some areas. Composter is internally divided in two parts with separate openings. Such openings are sufficient wide to put compostable materials into the composter. It is rotated for a few minutes (5 minutes) manually twice a day. While rotating the system, air from outside inflows into the composter making it aerobic. Under such condition, there is no generation of foul gases like hydrogen sulphide. It enhances growth of aerobic bacteria inside composter and thus increases rate of degradation of organic wastes. Both the chambers are used alternately when one chamber is half filled of its total volume in 15 days or so. After one chamber is filled by half or so, it is locked and waste is put into second chamber. By the time second chamber is half filled, contents of the 1st 3 chamber degrades almost completely and turns into manure. It is taken out easily and used for horticulture/ agriculture purposes by household or sundried and stored till further use in agriculture. It can be sold for economic gain.

Under the project 3 Nos. of such composters were fabricated and installed at different locations in a labour camp near Raj Ghat, New Delhi, where over 700 labourers reside. All composters were regularly operated and monitored in winter as well in summer seasons.

Biomass based environmental friendly incubator for hatching of Fertile Poultry Eggs

Shri Shankar Bhattacharya of Kolkata has been scouted and mentored by TOCIC at CSIR-CMERI, Durgapur with financial support from DSIR under PRISM Scheme. The innovator has successfully developed Biomass Based Environmental Friendly Incubator for Hatching of Fertile Poultry Eggs. It is very simple and can be operated with any type of biomass, which is freely available in plenty in rural areas. It is unlike a conventional electric incubator, there is no risk of spoilage of partially hatched eggs due to interruptions of the power supply. The incubator can be operated in any remote location where there is no power supply. The device can also come in handy in rural areas where facility for mass incubation of eggs is not available, thereby increasing the production rate from a mere 8 to 12 per brooding hen or female duck to a substantial number. The capital and operating cost of the biomass based incubator is significantly less in comparison with conventional electric Incubator of 600 eggs setting capacity. The project has been successfully completed.





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Design & development of affordable personal oral irrigator (3-in-1 Dental Jet) for prevention, control and treatment of dental cavities & gum disease for rural and urban population

Dr. Sudhanshu Kansal of Delhi has been scouted and mentored by TOCIC at CSIR-CMERI, Durgapur with financial support from DSIR under PRISM Scheme. The innovator developed device reposes the use of fluid jet pressurized by the hand or the foot of the user. Fluid is pressurized by a manually operated pump and stored in a reservoir. Pressurized fluid is thereafter conveyed through short length of tubing which in turn is connected to a detachable tip from which the fluid jet escapes. Pressure of the fluid is being regulated. It is useful in personal oral hygiene for removing food debris and plaque and also for preventing common dental diseases, especially dental cavity & gum infections. Since, it is manually operated and less expensive, the innovation will help rural and urban population. The development of the product has been completed by the innovator.



Development of Kits for direct-PCR amplification of plant DNA

Shri Govind Krishan Vyas of Delhi has been scouted and mentored by TOCIC at CTAE, Udaipur with financial support from DSIR under PRISM Scheme. Normally, plant genetic studies or plant disease diagnostics are done through DNA extraction; purification and PCR amplification from plant materials. In this project, the innovator has developed a kit which will accomplish all these three or more steps in a single process, which is innovative, easier, faster and economical. The kit contains a mini lab containing portable puncture with plunger, extraction reagents etc. The kit is useful for doing experiment at lab and field condition. The development will give great impact for plant disease diagnostics, plant genetic purity testing, seed companies & seed testing laboratories for marker assistant selection and varietal identification. Farmers will be able to prevent crop losses. The project has successfully been completed.



Novel DIVA ELISA Kit for Detection of Paratuberculosis Infection, a major threat in Animal Husbandry

Dr. Jagdip Singh Sohal of Jaipur (Rajasthan) has been scouted and mentored by TOCIC at CTAE, Udaipur with financial support from DSIR under PRISM Scheme. The innovator has successfully executed the project Development of Novel DIVA ELISA Kit for Detection of Paratuberculosis Infection, a major threat in Animal Husbandry.



Para-tuberculosis is a chronic granulomatus enteritis of ruminants (goat, sheep, cattle, buffalo) leading to huge economic losses every year. The innovator in this project has developed diagnostic process based on ELISA principle using secretary antigens from microbacterium paratuberculosis. Since, it is developed based on secretary antigens; it can easily differentiate vaccinated and infected animals. Due to antigens specificity and ELISA principle, the diagnostic approach is very specific and sensitive. Since, secretary antigens based diagnostic kit is not available for paratuberculosis, it has great potential to get good market. The project has been successfully completed.

Cost effective, technically modified liquid chromatography column

Shri Biswajit Saha of Kharagpur has been scouted and mentored by TOCIC at IIT Kharagpur with financial support from DSIR under PRISM Scheme. The project Development of a cost effective, technically modified liquid chromatography column is executed by the innovator, Shri Biswajit Saha, Kharagpur (W.B.) through the TOCIC (TePP Outreach cum Cluster Innovation Centre) at IIT, Kharagpur. The innovator has developed a cost effective, technically modified liquid chromatography column. The development is having a pioneering design of flange head, which will help in increasing the pressure of the column to incorporate automation in the separation or manufacturing process and reduce the time in production to increase throughput. The development of column with incorporation of automation in the separation process is able to reduce the production cost. The end of the start-of-the-art PEEK plug is also threaded to reduce leakage at junction of the inlet / outlet tube and column during high pressure applications. Since the development is import substituted, overall cost of production for liquid chromatography column will be reduced and will be affordable to small scale industries of India. The project has successfully been completed.



Development of counter irritant against contact dermatitis among cashew nut women workers – A preventive economic skin formulations for occupational health hazard

Dr. K. Jayaprakash of Kanchipuram (Tamil nadu) has been scouted and mentored by TOCIC at SPMVV, Tirupati with financial support from DSIR under PRISM Scheme. The project – “Development of counter irritant against contact dermatitis among cashew nut women workers – A preventive economic skin formulations for occupational health hazard” is executed by the innovator Dr. K. Jayaprakash, Kanchipuram. The innovator has developed a barrier cream (counter irritant) for protection of skin against cashew nut irritant (anacardic acid) contact dermatitis among cashew nut workers. It is formulated with the natural substances (bees wax, Caster oil, liquid paraffin, calcium hydroxide, glycerin and Vaseline). *In vitro* trial has been made in mice model. The innovation protects occupational health hazard and enhance the health of a large, economically backward cashew nut workers. The project has successfully been completed.





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2. OTHER ACTIVITIES

2.1 To expand the reach of PRISM among common masses, one (1) new TePP Outreach cum Cluster Innovation Centre (TOCIC) has been set up by DSIR during the year at following location:

- i. Gujarat State Bio-technology Mission (GSBTM), Government of Gujarat, Gandhinagar (Gujarat)

2.2 A number of other activities organised/ participated by PRISM during the year to sensitize academia, disseminate information on PRISM

to the larger mass of the populace network partners and impact generation among common masses:

- PRISM innovators participated in India International Innovation Fair 2017 at BIEC, Vishakhapatnam during September 9 - 11, 2017.
- To evaluate the performance of PRISM Scheme during 12th five year plan, two review meetings were organized during the period under report.

