AGRO PROCESSING & TECHNOLOGY DIVISION

CSIR - National Institute for Interdisciplinary Science & Technology (CSIR - NIIST)
Thiruvananthapuram

OUR TEAM

BIOLOGISTS







FOOD TECHNOLOGISTS



CHEMICAL ENGINEERS



CHEMISTS

OUR EXPERTISE

POST HARVEST PROCESSING TECHNOLOGY

- Technology development & commercialization
- Consultancy services for industries/MSME's/start-ups
- Product evaluation & quality control

PRODUCT DEVELOPMENT IN FOOD SECTOR

- Development of RTE/RTC products
- Nutraceuticals and functional foods
- Fortification and validation

BIOACTIVES FOR LIFE STYLE DISORDERS

- Phytochemicals and Phytopharmaceuticals
- Validation studies with industries

CROP PROTECTION

- Biopesticides
- PGPR

WHAT DO WE OFFER?

- Turn key project implementation through engineering and technical consultancy services
- Advisory consultancy and training in quality control and agro processing
- Pharmacological evaluation of bio actives for lifestyle related disorders
- Skill development short term courses
- Technology business incubation centre (TBIC)
- Technology transfer/Technology licensing
- Testing and analytical services

MAJOR PROGRAMS

- Design/engineering consultancy, erection and commissioning of industrial plants for agro-products
- Research activities pertaining to post-harvest management of agro products
- Development of scientifically validated nutraceutical products in RTE/RTC forms.
- Food safety and consumer health— acrylamide studies, food toxicology etc.
- Agro-waste processing and by-products utilization

PILOT PLANT FACILITIES

- Molecular distillation unit
- Pilot scale spray dryer
- Dehumidified drying unit
- Fluid bed dryer
- Tray and solar dryer
- Wiped film evaporator
- Sieving unit
- Granulation unit
- Multi-purpose reactor
- Oil deodorizer & dehydrogenation unit
- Lyophilizer
- Inverted fluorescence microscope

ANALYTICAL FACILITIES

- HPLC
- GC-MS
- HPTLC
- Bio imaging facilities
- Flow cytometer
- Real time PCR
- FTIR
- UV spectrometer
- Particle size analyzer
- Texture and color analyzer
- Multimode readers
- Polarimeter
- Differential scanning colorimeter

IMPLEMENTATION OF TURN-KEY PROJECTS

Commissioning Trails & Project Implementation

NIIST have set up commercial ventures in **North east states** of Manipur, Meghalaya, Sikkim for processing of Ginger, Turmeric and Green Cardamom.

First venture in India for processing of **20 TPD of fresh chillies** making high value added product, free of aflatoxins at Bydagi, Karnataka (2012).

Recently, **7.5 TPD ginger** processing plant has been installed at Wayanad, Kerala (2016).

Currently, **1 TPD vegetable processing unit** is being set up for Kerala horticulture board at Thiruvananthapuram, Kerala (2020).

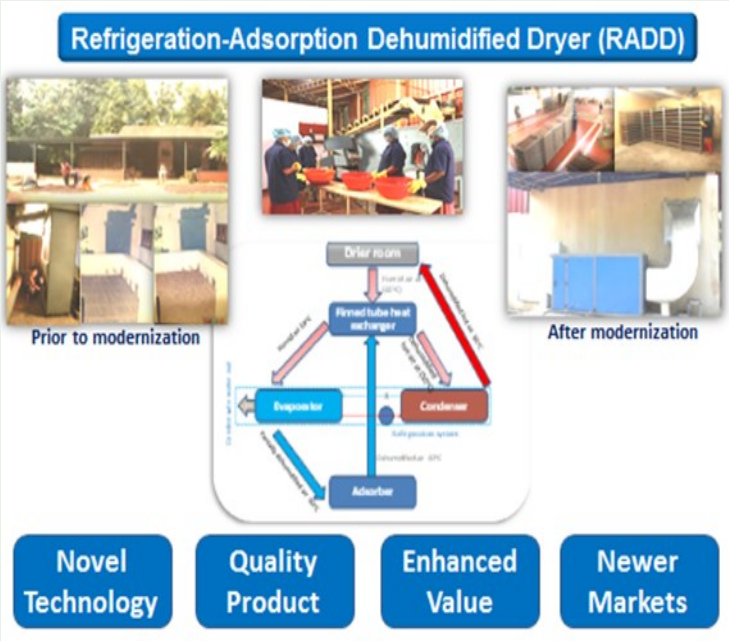
TECHNOLOGIES ON OFFER

- Technology package for integrated processing of spices for essential oil, oleo-resin and active ingredients extraction
- Dehumidified dryers (RADD) for shelf life enhancement of agri/food products
- Agriculture waste based biodegradable products (plates, cups, cutleries etc.)
- Technology package for RTC based food products from various agro produces
- Technology package for syrup formulation from palm/coconut neera and cane juices
- Micro encapsulated products for vegetable oil/Ayurvedic industries
- Technology for value addition of spend materials from food/nutraceutical/ Ayurvedic industries

DEHUMIDIFIED DRIER FOR FOOD / AGRO PRODUCES

Technology

- The main advantage is less humid air, low temperature drying and uniform distribution of heat ensuring that the functional properties, micronutrients & flavor of the product is retained.
- Most suitable for the processing of heat sensitive exotic spices, fruits & vegetables.



Main features

- Ideal for setting up of unit with 1-2 tons per day capacity.
- Since the air is recycled back into the drier room rather than venting it out to the atmosphere, energy is conserved.
- There was a 60% reduction in total process time compared to conventional mode of for drying for agro crops.

Market potential

Scope for value addition, shelf life enhancement and export market for a variety of dehydrated produces from fruits & vegetables, spices & herbs, onion, mushroom, flowers and leaves with superior quality.

FRESH GINGER PROCESSING TECHNOLOGY

Technology

Developed and commercialized ginger processing technology for producing value added products such as ginger oil, dry ginger powder etc. The institute has set up processing units (5-7 TPD capacity) in the north east and has transferred technology to many industries. CSIR NIIST provides knowhow, technical assistance in sourcing the machinery, engineering consultancy, training the operating staff, assist in erection & commissioning etc.

Main features

- Fresh spice processing has advantage of high quality products with fresh aroma and better yield.
- Mechanical drying of spices operations offer processing during rainy seasons.
- Employment opportunities & income generation in rural sector
- The process is green and no usage of toxic chemicals

Market potential

Very high value addition to spices with export potential in food and healthcare sector for specific produces such as organic ginger, ginger flavour/ extract and ginger powder.

TECHNOLOGY FOR AGRO RESIDUE BASED BIODEGRADABLE PRODUCTS

Technology

- CSIR NIIST has developed and commercialized agro-residues based biodegradable plates and cutleries.
- It is easily biodegradable, has good water retention and heat resistant capacities, Good strength, stiffness and microwave friendly.

Main features

- It can be used as an alternative to single use plastics like plates, cups, spoon, fork, take away units etc.
- This can be used by anyone, who care for environment.
- It will degrade within 30 days and leaves no harm.

Market potential

- Agro-residue based biodegradable products provides an alternative option for conventional plastics.
- There is huge demand for plastic replacing biodegradable products in Kerala and all over country.
- Agricultural residues and wastes are available in abundance and low cost.

TECHNOLOGIES TRANSFERED

Technology

- Technology on "**Agri-residues based cutleries**" have been successfully transferred to M/s Auro Exim, Ernakulam for effective utilization of agro-residues/by-products to make products as an alternative to single use plastics.

- "**Technology Know-How for Trikatu syrup**", An immunity booster has been successfully transferred to Trivandrum-district palm products Development Cooperative Federation Ltd., Parassala.

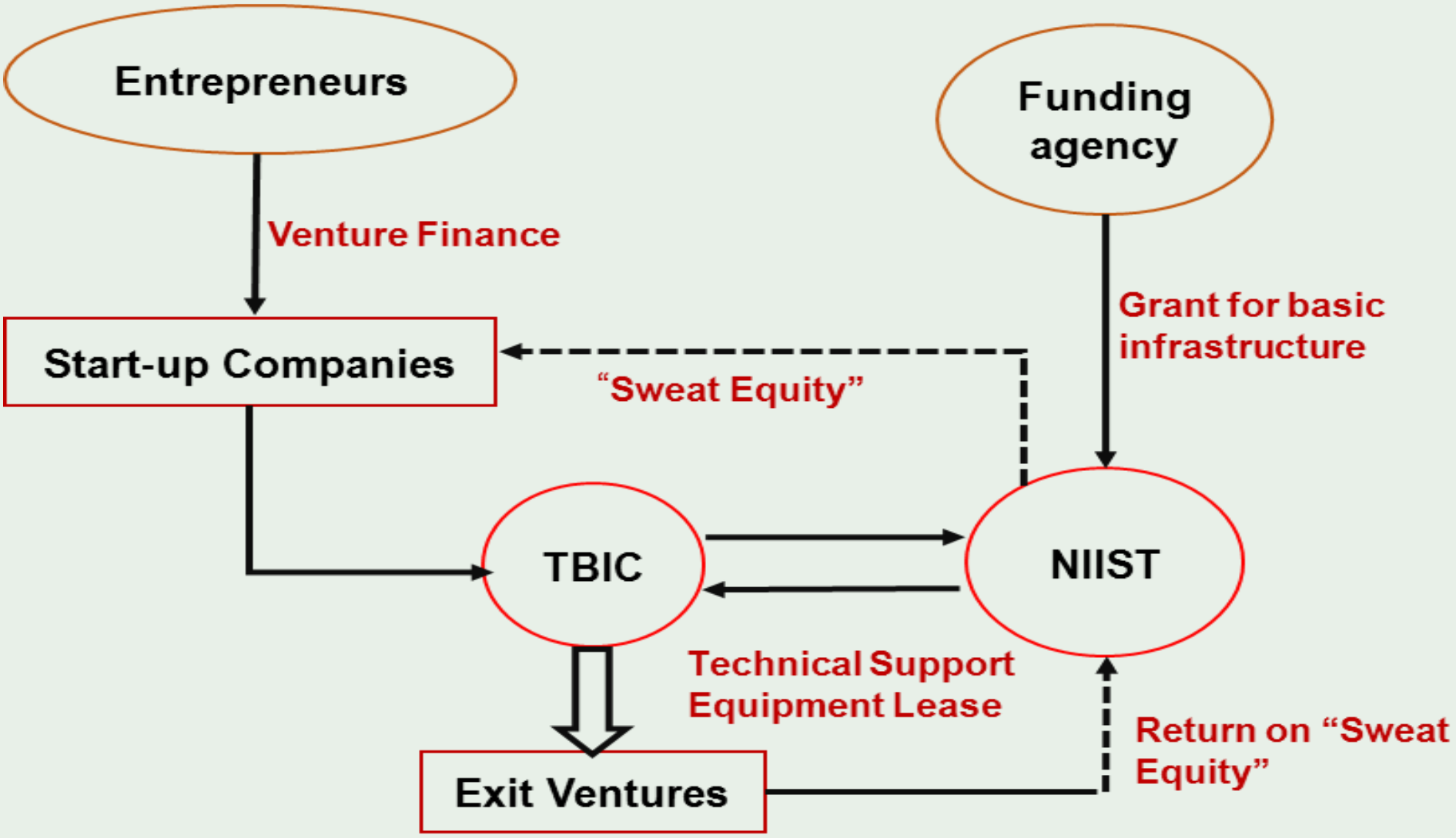
PICTURES OF DEVELOPED PRODUCT

R & D PROJECTS

AREA	NATURE OF PROJECT	OUR FUNDING AGENCIES
Post-Harvest Technology	Projects related to dehumidified dryers, solar drying, encapsulation techniques and agro-waste management have been undertaken jointly by chemical and food engineers of our division.	• CSIR • Department of Science and Technology • Department of Biotechnology • KSCSTE • Agriculture Department, GoK • Ministry of Earth Sciences • BIRAC • Coconut Development Board • Department of Health Research (DHR) • ICMR
Product Development	Projects related to nutraceuticals, fortified foods, Value added products from coconut, banana and other regional crops have been undertaken by food scientists of our division.	
Bioactives for life style disorders	Projects related to bio actives for combating life-style disorders like diabetics, cancer and cardio-vascular diseases, phytochemicals / phytopharmaceuticals and validation studies have been the active R & D interest of the biologists of our division.	

OUR INDUSTRIAL CLIENTS

INCUBATION CENTER



Essential infrastructure, technical expertise and consultancy services are available.

TO SUM UP…

- Expertise in engineering / food technology / biological areas to add value to regional resources and Nation at large.
- Modernization of traditional products sector / functional and neutraceutical sector.
- Offer technological support, trouble-shooting for industries/ MSME's and farmer groups.
- Opportunities for new venture creation in food/agro processing sectors through incubation facilities.
- Research collaboration with various Science and Technology Agencies , State government for societal applications.
- Nucleating and accelerating collaborative technology projects suitable for new venture development through TBIC.