

CSIR - Institute of Himalayan Bioresource Technology

(Council of Scientific & Industrial Research)

An Institute of local relevance and global significance....



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MISSION

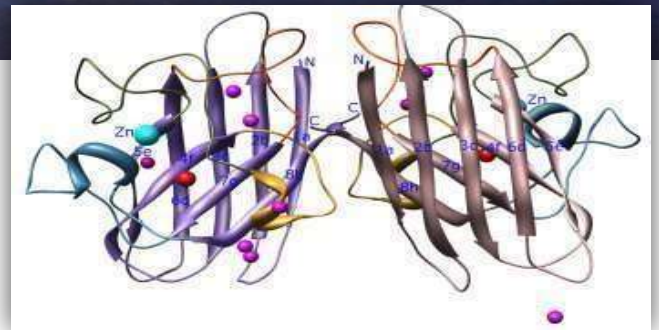
Committed to develop technologies to boost bioeconomy through sustainable utilization of Himalayan bioresources



CSIR - IHBT

SUPEROXIDE DISMUTASE

As antioxidant in pharmaceutical, cosmetic, food, and plant industries.



A unique enzyme known as SOD was identified from high altitude (4500 m) Himalayan plant *Potentilla atrosanguinea*.

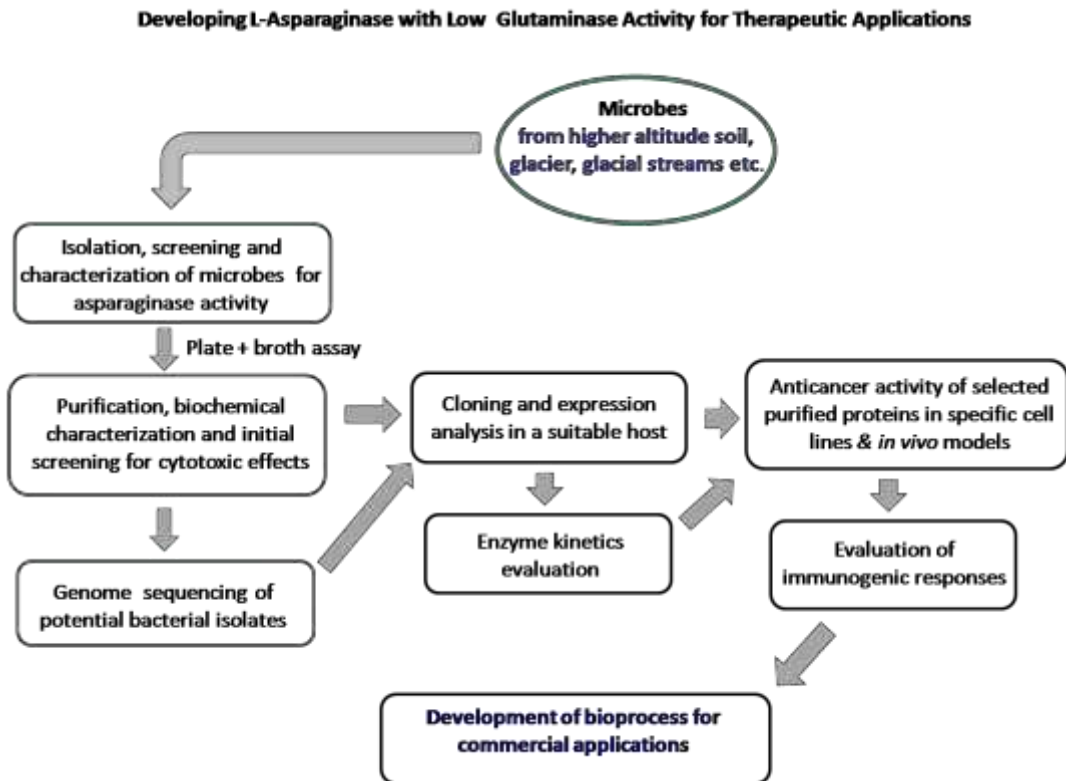
Characteristics of SOD enzyme:

- Tolerates boiling/autoclaving.
- Functions from sub-zero temperature to $>40^{\circ}\text{C}$

L- ASPARAGINASE WITH LOW GLUTAMINASE ACTIVITY FOR THERAPEUTIC APPLICATIONS

Asparaginase therapy is an important component of acute lymphoblastic leukemia (ALL) treatment.

Status of Development:



At present, only 3 main preparation of asparaginase are used in treatment (E.coli asparaginase, its PEGylated form and Erwinia asparaginase).

STEVIA



Institute has developed cultivation practices for stevia and green processing technology for steviol glycosides.

Characteristics of processing technology:

- Green Technology
- High quality production(>95% purity)

Uses of steviol glycoside:

- Substitute of sugar in tea, candies and bakery products as it is 300 times sweeter than sugar.
- Safe for Diabetes patients as it is having zero calorie



TEA NUTRACEUTICALS

Tea polyphenols and amino acids with high nutraceutical value are extracted from underutilized parts of tea plant including coarse leaves, flowers and fruits which otherwise are not used in the traditional tea industry. These are green solvents which maintains its health properties and are non-toxic. Institute has developed fast and economical green process for purification of polyphenols and amino acids on largescale.



Properties of Tea Nutraceuticals:

- These are water soluble.
- Can be used as food colorants, food preservatives, and antimicrobials.
- Have high value antioxidants and can be used in rich energy food products and beverages.

TEA WINE

High quality alcoholic beverage

Technical Features:

- Utilizes low grade teas which otherwise does not find market.
- Uses underutilized fruits of the Himalayas along with tea for making wines.
- Utilisation of higher value herbal health product, from otherwise wasted edible produce of plants *Berberis lycium*, *Pyrus pashia*, *Actinidia deliciosa*, *Syzygium jambos* and other species of this plant.
- The herbal product thus formed is self preservative and valuation increases with the maturation.
- Utilisation of source material as culture medium to maintain culture of wine yeast for future uses.
- These wines are low alcoholic beverages and can be made sweet or dry.
- These wines are natural without any additives and possess all the health attributes of tea and the fruits.
- These wines have unique flavour and aroma characteristics.
- Patent on the technology have been granted in US, Europe, Kenya, Sri Lanka and New Zealand.



TEA CONCENTRATES

Application/Uses:

- For making hot or cold ready to drink tea beverages.
- Can take different flavours and colours.
- Contains no added preservatives or colours.
- The beverage can be served with/without sugar and can be carbonated before serving.



Technical Features:

- Process has been developed by utilizing low grade teas (comprising of tea stocks and dust)
- The concentrate can be prepared from green as well as black tea. The concentrate has a shelf-life of six months when kept in the refrigerator.
- Use of simple and environment friendly process to manufacture tea concentrates.



THEAFLAVIN



Properties

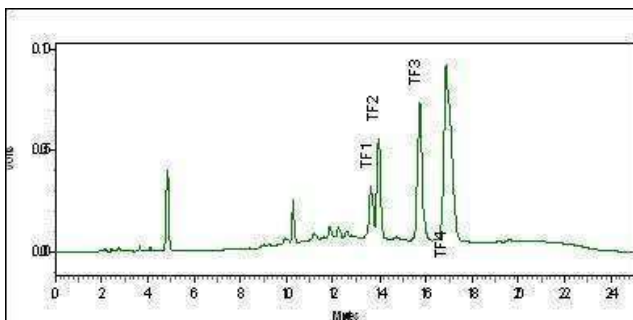
- Anti-oxidant
- Anti-mutagenic
- Food colorant
- Anti-carcinogenic
- Anti-caries
- Cholestelomic
- Hypotensive

Theaflavin Conversion

Capacity of Green Leaf to make Theaflavins 20-30%

Conversion of Catechins to Theaflavins during Black Tea Manufacture 1-5%

Conversion of Catechins to Theaflavins with Immobilized Enzyme System 20-25%



A process for the preparation of theaflavins by immobilization of tea PPO on a solid state matrix (Patent filed)



TEA BASED HERBAL MOUTH FRESHENER



NATURAL COLOURS & DYES

Application/Uses

- Pharmaceutical Industry
- Food Industry & Beverages Industry
- Confectionery& Bakery
- Dairy Industry
- Paper Industry
- Toy & crayons Industry
- Garment Industry



Technical Features

- Non-hygroscopic crystalline in nature
- Already setup company can make more profit
- Readily soluble in water and alcohol
- Improved stability and shelflife
- Green and cost effective process
- Safe for human consumption

CRISPY FRUITS

Crispy Fruit retains near to original texture, taste, aroma and colour in addition of having long shelf stability

Keeps the fruit nutritionally same as of fresh fruit



Simple Cost Effective processing technology Preservation at low temperature

Benefits:

- No loss in physical and nutritional value
- Can be stored at ambient conditions
- Preserved without chemicals

KANGRI DHAM

Kangri Dham is one of the most important or famous cuisine of Kangra region of Himachal Pradesh.



Benefits: Healthy food with prebiotic, attribute without preservatives Involve local communities for outsourcing of ingredients

VALUE ADDED BUCKWHEAT PRODUCTS OF HIGH ALTITUDE REGION

Salient Features:

1. Buckwheat is a pseudo cereal belonging to the family of *Fagopyrum* is triangular in shape.
2. It is a traditional crop of the high altitude Himalayan region having multifarious utility
3. Healthier starch and fiber profile
4. Healthier fat profile
5. Due to the presence of rare carbohydrate compounds called fagopyritols (especially D-chiro-inositol), of which buckwheat is by far the richest food source yet discovered



Scope : There is a great potential for value addition of buckwheat into other products such as bars, ready to eat cereals, extruded snacks, pasta, noodles and specialty bread etc.

BAMBOO SHOOTS: A HEALTHY FOOD PRODUCT



Low fat content
High fiber
Rich in minerals



DIETARY FIBER FROM APPLE POMACE

Novel technique for separation of apple seeds from apple pomace for its value addition. Presently this kind of machine is not existing in the market.

Dietary fibers obtained from apple pomace after separation of seeds can be used in different products like:

- Bakery products
- Pasta products
- Weaning foods
- Ready to eat snacks
- Breakfast foods
- Non-vegetarian food products, and
- Beverages

Apple Pomace



Prototype



Apple Seed

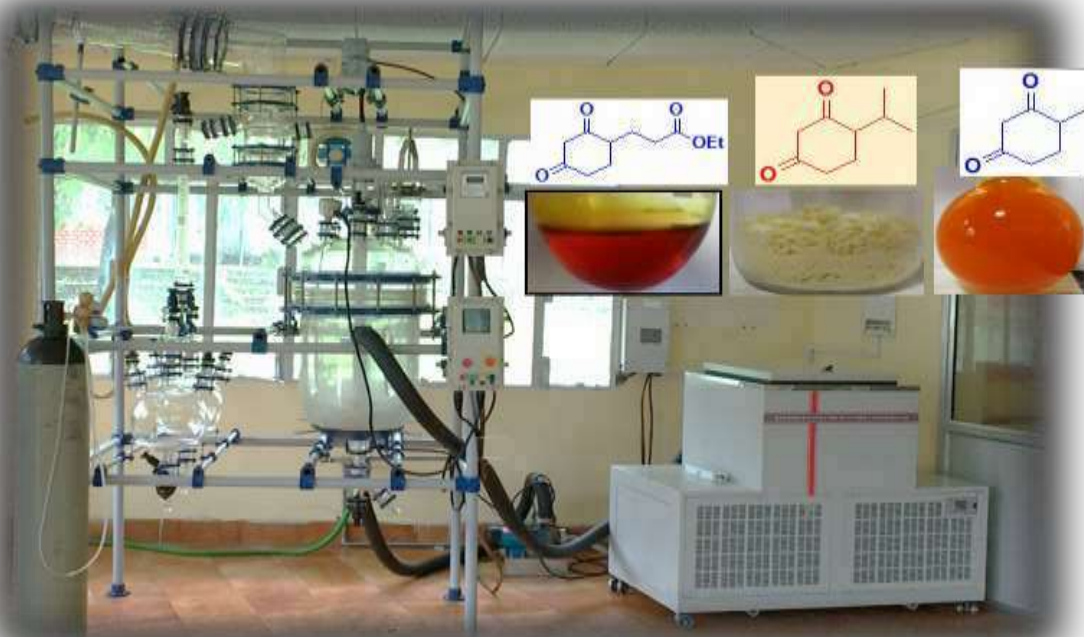


Dietary Fibre



PROCESS FOR 4-SUBSTITUTED CYCLOHEXANE-1,3-DIONE SYNTHESIS

Cyclohexane-1,3-dione derivatives (CDD) are prominent intermediates for several bioactive molecules and herbicides synthesis.



Advantages:

- Low cost and easily available starting material.
- Room temperature to $-10\text{ }^{\circ}\text{C}$: energy efficient process
- Shorter reaction time
- Scalable process
- Application for new and known classes of compounds



AESCIN

Application/Uses:

In varicose vein skin creamy cosmetics as inflammatory herbal product.



Aesculus indica



Aescin



Antiinflammatory cream

Technical Features: Simple process of extraction from seeds of Indian horse chestnut, seeds available in plenty.



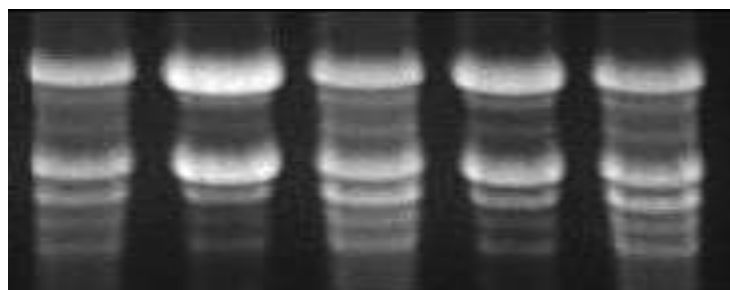
IRIS™- AN EASY SOLUTION TO RNA ISOLATION



*iRIS*Kit



RNA isolated using *iRIS*



Salient Features:

- It is a simple and rapid (45 min) system for RNA isolation suitable for downstream applications.
- Works well for those tissues for which some of the commonly available commercial kits failed.
- It is extremely useful in isolating RNA from tissues recalcitrant to guanidinium extractions.
- Successfully isolates RNA from as little as 10-100 mg tissue.
- The solution developed has been tested to isolate RNA from various plant species belonging to diverse genera and those rich in various types of secondary metabolites and polysaccharides.



CALLA LILY AND GERBERA

CALLA LILY AND GERBERA

Improved varieties of Calla lily and Gerbera released by Hon'ble Prime Minister.



HIM GAURAV



HIM SUMUKH



HIM KEERTI



HIMABHA



HIM SAUMYA



HIM SHWETA



HIM APOORVA



CSIR - IHBT

ROSE ROOTSTOCK



IHBT-WR-16 (*Rosa brunonii*)



IHBT-WR-21 (*Rosa alba*)



IHBT-WR-23 (*Rosa cathayensis*)



IHBT-WR-24 (*Rosa multiflora*)



THORNLESS AND NOVEL ROSE VARIETY

Himalayan Wonder



Himalayan Glory

VIRAL DIAGNOSTIC KITS



Development of diagnostics for viruses infecting apple, cherry and ornamentals.

Salient Features:

- The develop methodologies are based on over expression, antisera purification, conjugate preparation and testing by DAS-ELISA.
- Further, multiplex assays have also been developed to diagnose cherry and apple viruses in a single step.

Applications/Uses:

Similar kits are available from foreign companies in Switzerland, Germany, USA etc. However, to save cost, such tools will be extremely useful for domestic customers especially TC firms, diagnostic labs, quarantine facilities, horticulture units where the material can be reliably tested before distribution or sale to farmers



MINI DISTILLATION UNIT HERBOSTILL™

Salient Features:

- The qualitative and quantitative yields of essential oils are better than glass Clevenger type apparatus.
- The present development overcomes all the difficulties being faced in industrial scale units, and laboratory apparatus & processes.
- The unit is indigenously developed, portable, eco-friendly, easy to operate, flexible, more durable, inexpensive, sturdy and versatile design.

The know-how has been provided to M/s Andel Equipments Pvt. Ltd., Mohali

Uses/Applications:

- Distillation of essential oils and perfumed water from aromatic crops.
- Useful in household cottage industry for marginal farmers, housewives and aromatherapists.
- The unit is portable and can be used at the field sites where water and/or electric power sources are available and can also run on agro waste/LPG using as a fuel source.
- It can be used for demonstration, training and educational purpose in R&D and educational institutes.
- It can create employment and income generation in small business sector, especially in rural areas.



MINI LAMINAR FLOW UNIT STERIFLOW™

As teaching aid for Biotech classes and for setting up Plant Tissue Culture Unit as cottage industry.

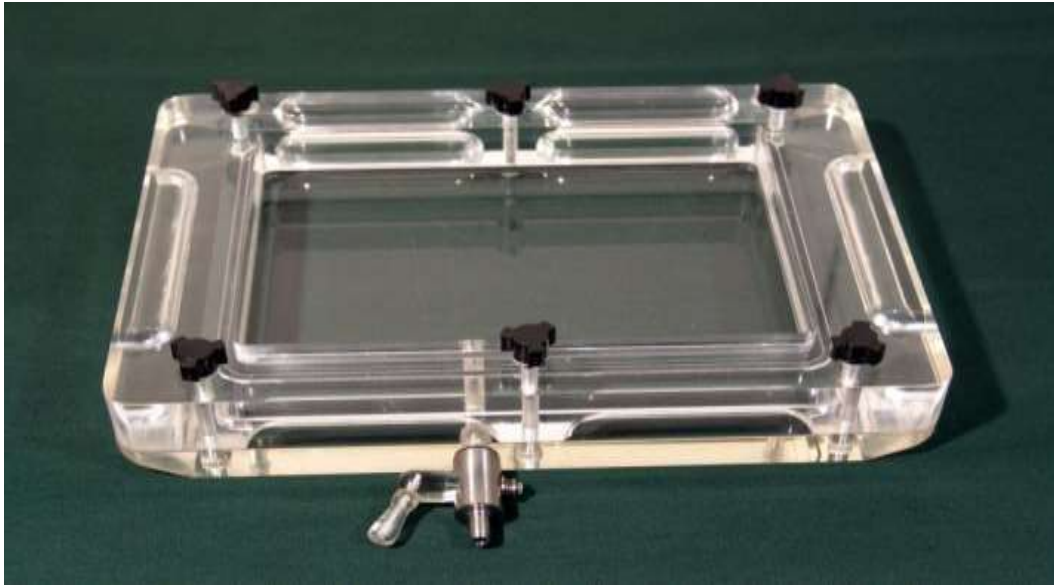


The device is portable system weighing 14.5 kg and can be used as desktop model.

Major Raw Material Required: Wooden plates, Airfilter, UV lights, Perspex sheets etc.

The know-how has been provided to M/s Rescholar Equipment, Ambala

A GEL PROCESSING AND TRANSFER DEVICE (GEPROTED™)



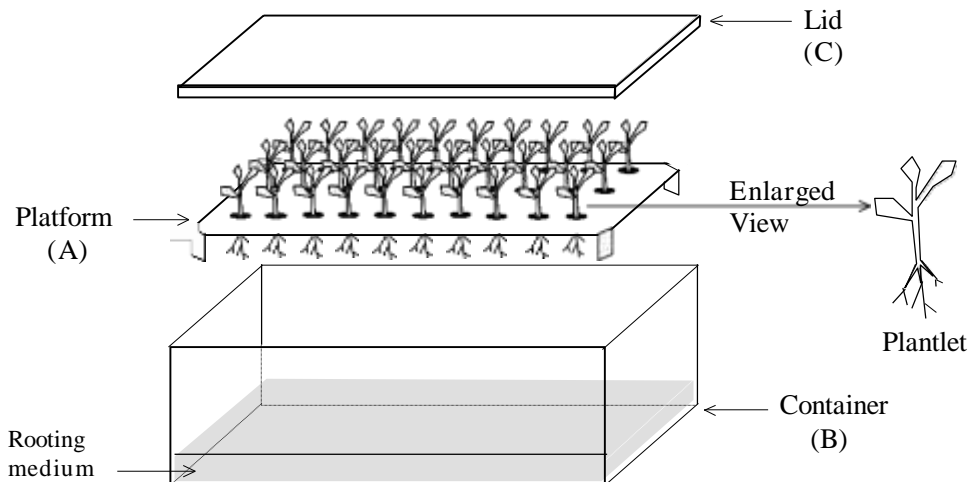
This device takes care of the gel during the processing after electrophoresis and its transfer onto the membrane..

Features and Uses:

- Ensures intactness of the gel during various steps
- An ideal aid for performing miro-RNA, northern and southern hybridizations
- Solutions can be drained out without tilting of device.
- Suitable for processing not only for agarose gel but also for other gels such as polyacrylamidegels.
- Suitable for staining the gels using the recommended staining procedures.
- Safe system for gel transportation from one place to another.
- Safe system for photography of the gel.
- Transparent system for easy visibility.

CULTURE VESSEL FOR ROOTING OF MICROSHOOTS

- Root induction during hardening of micro-shoots is a pre-requisite for micro-propagation system.
- Root induction can be accomplished in difficult to root systems like rose and tea employing liquid medium in the culture vessel.



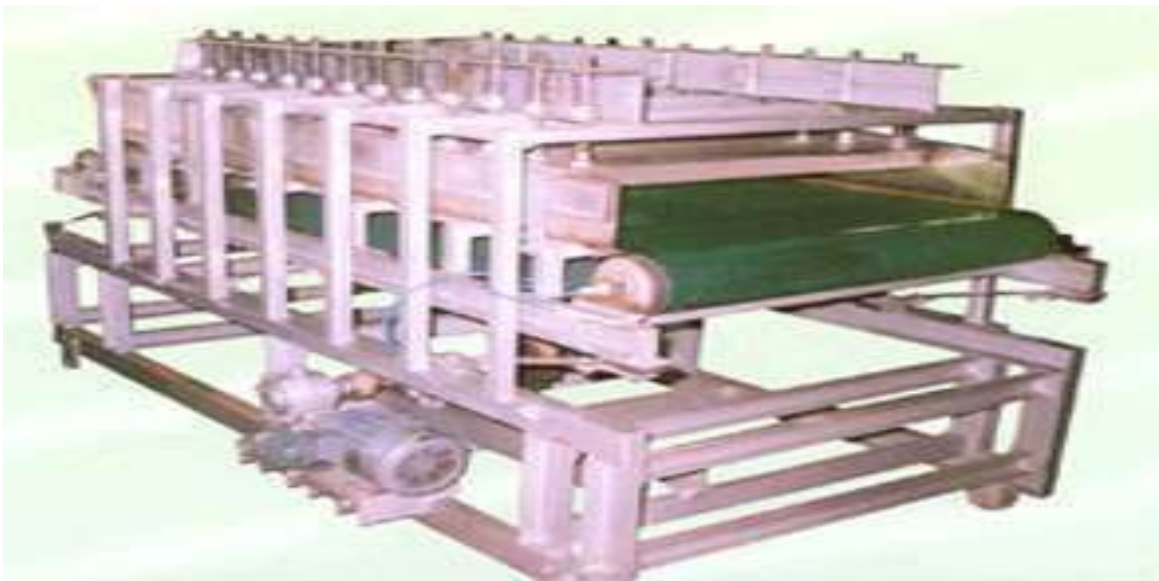
USES

- Large scale handling of micro-shoots.
- Use of liquid medium in small quantities reduces costs.
- Ease of operations.
- Damage to roots is minimized.

TEA WITHERING MACHINE

Application/Uses:

- The use of the device enhances the rate of physical and chemical wither
- The use of this device also cuts down the withering time from the conventional 10 – 20 hrs to 4 ½ – 5 ½ hours
- Saving of factory space needed for processing additional tea shoots that usually arrive at the factory during rush period.
- Saving on the energy to be used during black tea processing.



Technical Features :

- Compact with space requirement of 3.22 m × 1.58 m.
- Flexibility of stroke & pressure in relation to horizontal speed of movement.
- Throughput 2500-4000kg/hr.
- One machine can cope with green leaf of a 10 lakh kg by adjustment of manufacturing time.
- Easily adaptable to a continuous process from withering to drying.
- Substantial reduction of withering space requirement, energy and labour.
- Faster manufacturing program.
- No reddening of bruised leaf during wither and thereby enhancement of quality.

PORTABLE BAMBOO CHARCOAL KILN

Application/Uses:

Conversion of bamboo waste/bio-mass into high quality charcoal



Technical Features:

- Calorific values comparable with other wood charcoal from trees
- Bamboo resource can be used on sustainable basis without sacrificing the motherplants
- High conversion rate of 30-33%
- Its portable and can be used as domestic device

MOBILE ESSENTIAL OIL DISTILLATION UNIT

Application/Uses:

- Can be operated at remote areas where raw material, water, and fuel wood/steam are available
- Can be used for creating awareness among farmers and students
- Can efficiently distill most of the aromatic crops.



Technical Features :

- 2 qtl/batch capacity
- Mounted on TATA1109EXmodel
- Fitted with imported hydraulic system for loading/unloading the unit
- Direct fired
- Optionally fitted with steam sparger
- Light weight
- No fire bricks used
- Compact design
- All contact parts are made up of Stainless Steel-304
- Methods of distillation: Water distillation, Water – Steam distillation and Steam distillation



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Thank You!

