



# Products of PP&PDC


## Ultra Marine Blue

<b>Process</b>	Pilot plant for the production of Ultramarine Blue
<b>Area</b>	Inorganic Chemical
	<p><b>Uses</b> Commercially used in stereo chroming of paper hangings, calico printing, coloring printing inks, bluing linen and in cotton fabrics.</p> <ul style="list-style-type: none"> <li>• It is also used in the manufacture of paper, soap, paraffin candles, sugar, starch etc.</li> <li>• In paint industry it is used as a useful material in lime washes and in distemper paints.</li> </ul>
<b>Salient Features</b>	The sulfur content of the product has been found lower than the imported one.
<b>Scale of Development</b>	The process is standardized at pilot plant scale
<b>Major Raw Materials</b>	China Clay, Sodium Carbonate and Sulfur.
<b>Major Plant Equipment/Machinery</b>	<ul style="list-style-type: none"> <li>• Muffle furnace</li> <li>• ball mill</li> <li>• pot grinder</li> <li>• drier</li> <li>• sieve tray</li> </ul>
<b>Details of specific application</b>	Bluing cloth, paper etc
<b>Status of Development</b>	Ultramarine blue is produced and field tested and ready for commercialization.


# Sunflower Oil

<b>Process</b>	<b>Pilot plant for the production of Sunflower oil</b>
<b>Area</b>	<b>Refining of crude oil for edible</b>
<b>Uses</b>	<ul style="list-style-type: none"> <li>• Sunflower oil is widely used as an edible oil in the developed countries.</li> <li>• The main advantage of sunflower oil is that it is cholesterol free and it has a high Vitamin E content.</li> </ul>
<b>Salient Features</b>	The free fatty acid (FFA) content of the refined sunflower oil has been found to be around 0.2%, which is within the range of edible grade.
<b>Scale of Development</b>	The process is standardized at pilot plant scale (650L)
	<b>Major Raw materials</b> <ul style="list-style-type: none"> <li>• The raw materials are sunflower seed, phosphoric acid, caustic soda and decolorizing chemicals.</li> <li>• Recently, sunflower seed is being cultivated in Bangladesh.</li> <li>• Other chemical constituents are available in the local market.</li> </ul>
<b>Major Plant Equipment/Machinery</b>	<ul style="list-style-type: none"> <li>• Mixer (650 lit)</li> <li>• Vacuum concentrator (1000 kg)</li> <li>• Filter press</li> <li>• Neutralizer</li> <li>• Steam generator etc.</li> </ul>
<b>Details of specific application</b>	<ul style="list-style-type: none"> <li>• It can be used for shallow and deep fat frying.</li> <li>• A number of margarine and spreads that are rich in sunflower oil are being manufactured in various countries</li> </ul>
<b>Status of Development</b>	The process is patented and leased out to Amrita food product for commercialization.

# Liquid Glucose

<b>Process</b>	<b>Pilot plant for the production of Liquid Glucose</b>
<b>Area</b>	<b>Substitute of sugar</b>
<b>Uses</b>	<ul style="list-style-type: none"> <li>• <b>Liquid glucose is mainly used as sweetener in food and pharmaceuticals. It is a high viscous syrup.</b></li> <li>• <b>Liquid glucose is also used as substitute of sugar.</b></li> <li>• <b>It is cheaper than sugar.</b></li> </ul>
<b>Scale of Development</b>	<b>The process is standardized at pilot plant scale</b>
	<p><b>Major Raw Materials</b></p> <ul style="list-style-type: none"> <li>• <b>The main raw material for the production of liquid glucose is starch, which can be obtained from sweet potato, potato, maize, cassava etc.</b></li> <li>• <b>The production also needs a small amount of Hydrochloric acid, which is available in the local market.</b></li> <li>• <b>Sweet potato and potato is abundantly available in Bangladesh.</b></li> </ul>
<b>Major Plant Equipment/Machinery</b>	<ul style="list-style-type: none"> <li>• <b>Reactor (700 Liters)</b></li> <li>• <b>Dehydration kettle</b></li> <li>• <b>Filter press (18"x18")</b> <ul style="list-style-type: none"> <li>• <b>Water de-ionization system</b></li> </ul> </li> <li>• <b>Steam generator etc.</b></li> </ul>
<b>Details of specific application</b>	<b>Sweetener for medicine and food</b>

# Cotton Stalk Pulp

<b>Process</b>	<b>Pilot plant study for the production of cotton stalk pulp by Soda- AQ process</b>
<b>Area</b>	<b>Pulp and paper</b>
<b>Uses</b>	<b>Cotton stalk pulp can be used for the production of writing paper, printing paper, Newsprint, board, bag, packaging paper and for different types of specialty paper.</b>
	<p><b>Salient Features:</b>  <b>Bamboo is the main fibrous raw material used in Bangladeshi paper industries. The agriculture residues have become important as raw materials for pulp production with the scarcity of bamboo. Cotton stalk is byproduct of the cotton cultivation. It is rich in cellulose. High quality writing grade paper and other types of paper can be made from cotton stalk pulp.</b></p>
<b>Scale of Development</b>	<b>The process is standardized at pilot plant scale</b>
<b>Major Raw Materials</b>	<b>The main raw materials are cotton stalk, caustic soda and anthraquinone, which are locally available.</b>
<b>Major Plant Equipment/Machinery</b>	<ul style="list-style-type: none"> <li>• <b>Chipper</b></li> <li>• <b>Digester (500 kg)</b></li> <li>• <b>Refiner</b></li> <li>• <b>Beater</b></li> <li>• <b>Washing vessel</b></li> <li>• <b>Steam generator etc.</b></li> </ul>
<b>Status of Development</b>	<b>The process is standardized at pilot plant scale</b>

# *Aluminium Block*



- Developed from discarded computer hard disk.
- Eco-friendly and commercially viable e-waste management.
- The recovered metal scraps from discarded hard disks were melted and cast in suitable shapes.

***Raw Materials:*** Discarded Computer Hard Disks from local scrap market.

## ***Chemical Composition:***

- Aluminium (Al) 85.7 %
- Silicon (Si) 9.3 %
- Copper (Cu) 2.5 %
- A trace amount of Ferrous, Zinc and Magnesium.

# *Hydroxylapatite (HAP) from Fish Bone*



- Hydroxylapatite (HAP) produced from treatments of a locally available biological waste fish bone.
- Biomaterial with biocompatibility, bioactivity, osteoconductivity, non toxicity and non inflammatory .

***Raw Material:*** Fish bone of Rui Fish scientifically known as *Labeo Rohita*

## ***Typical Applications:***

1. As implant materials for orthodontics treatments.
2. Coating material for other bio-implants like bone tissue engineering, bone void filler.
3. Curing aid for dental cosmetics (toothpaste) and osteo- drugs.
4. As heavy metal absorbent in ETP treatment plants.

## ***Chemical Composition:***

- CaO -57 %,
- P<sub>2</sub>O<sub>5</sub>-(%) 42 %
- other impurities of MgO - 0.92% and SO<sub>3</sub> -0.40%

***Yield:*** 40% HAP from fish bone

*Hardened and carburized steel for*

## *Bank Vault Door*



- Used in bank vault doors for security deposits in burglary protection.
- This Mild Steel Plate has been hardened by Carburizing Heat Treatment.
- High hardness.
- Designed to provide deposits and storage for cash, jewelry and miscellaneous valuables.

# *Jute-Polymer Composite*

## ***Features:***

- Environmentally-friendly, fully biodegradable, abundantly available, non-toxic, non-abrasive, renewable, and cheap, and have low density.
- Higher Strength ,Stiffness, Better Thermal Stability.



## ***Raw Materials :***


- Treated nonwoven Jute Fiber
- Unsaturated Polyester Resin

## ***Applications:***

- Building and construction materials like particle Boards
- Packaging material and storage devices.
- Car interior trim parts such as door and window panels, hat shelves, and roofing, railway coach interiors
- Walls, flooring, louvers, and indoor and outdoor furniture.




## Production of Footwear Insole Materials from Leather Shaving Dust.

Process	Production of Footwear Insole Materials from Leather Shaving Dust.	
Area	Footwear Industry.	
Uses	Used as an Insole in Footwear making.	
Salient Features	It is made of Leather shaving dust- a tannery waste, suitable for the use of manufacturing of insole and other internal parts of shoe. It is soft, flexible, durable and porous.	
Scale of Development	The process is Standardized at Bench Scale.	
Major Raw Materials	Leather Shaving Dust, Latex, PVA, Reinforcement, Querbracho etc.	
Major Plant Equipment / Machinery	Reaction vat, Suction Pump, Plate, Pressing Machine, etc.	
Details of Specific Application	The Board is mainly used in footwear industry.	
Status of Development	The board has been developed. It is ready for Commercialization.	
Ecological / Environmental Impact (if any)	The manufacturing process involves tanning and other chemical processes, so it needs Effluent Treatment Plant (ETP).	
Patenting Details	Patent Accepted	
Commercialization Status	Ready for Commercialization.	
Key Words	Shaving dust, Latex, Tanning, Querbracho etc.	

**Product Developed By**

**Leather Research Institute  
BCSIR, Nayarhat, Savar, Dhaka-1350**

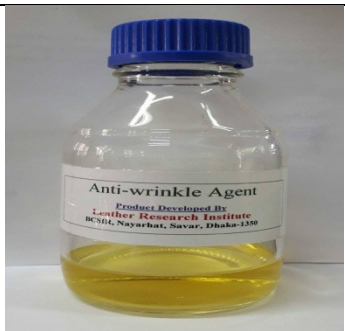
## Design and Development of Diabetic Footwear for Diabetic Patients

Process	A Process for Design and Development of Diabetic Footwear for Diabetic Patients	
Area	Footwear Industry.	
Uses	Persons suffering from diabetes or diabetes related foot problem, who have neuropathy (loss of sensation), minor foot deformation and have developed minor foot complications earlier	
Salient Features	<ul style="list-style-type: none"> <li>• PU and EVA sole with extra depth for more effective pressure distribution</li> <li>• The extra depth sole with special tread for better grip and traction</li> <li>• Specially designed insole bed and foam layer for added comfort</li> <li>• Rigid counter to ensure limited joint mobility</li> <li>• Specially designed upper with leather lining for comfortable wear</li> <li>• Leather tanned with organic tanning material for enhanced perspiration absorption and better breathability property</li> </ul>	
Scale of Development	The process is standardized at bench scale	
Major Raw Materials	Soft upper leather, PU insole	
Major Plant Equipment/Machinery	Foot scanner, Clicking m/c, Sewing m/c, Sole press m/c, Skiving m/c	
Details of Specific Application	The process is applicable for the manufacturing of Diabetic Footwear in industrial scale	
Status of Development	The process has been developed and is under review for verification	
Ecological/Environmental Impact	No harmful product is used in the manufacturing process and no harmful product will generate from the manufacturing process	
Patent Details	Patent Filed	
Commercialization Status	Not yet ready for commercialization	
Techno-Economics	Available on demand	
Key Words	Diabetic shoes, Orthotics	

Product Developed By

**Leather Research Institute**  
BCSIR, Nayarhat, Savar, Dhaka-1350

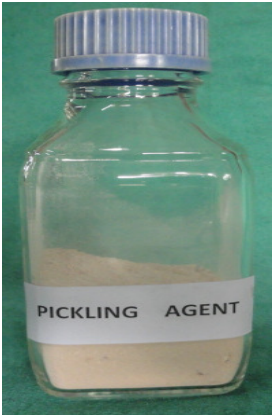
## Process for manufacturing of anti-wrinkle agent used in leather industry

Process	A Process for manufacturing of anti-wrinkle agent	
Area	Leather Industry.	
Uses	The product is used for manufacturing of anti-wrinkle agent in liming operation of leather manufacturing process	
Salient Features	Anti-wrinkle agent eliminates possibility of developing wrinkles during leather manufacturing process thus offers better quality leather with enhanced cutting value	
Scale of Development	The process is standardized at bench scale	
Major Raw Materials	Ethyl amine, Sulphuric acid	
Major Plant Equipment/Machinery	Reaction Vessel (500 ltr.), Water softening m/c, Pumps	
Details of Specific Application	The process is applied for the manufacturing of anti-wrinkle agent in industrial scale	
Status of Development	The process has been developed and is ready for commercialization	
Ecological/Environmental Impact	No harmful product is used in the manufacturing process and no harmful product will generate from the process too.	
Patent Details	Patent right not obtained	
Commercialization Status	Ready for commercialization	
Techno-Economics	Available on demand	
Key Words	Leather wrinkle, Leather process, liming operation	

**Product Developed By**

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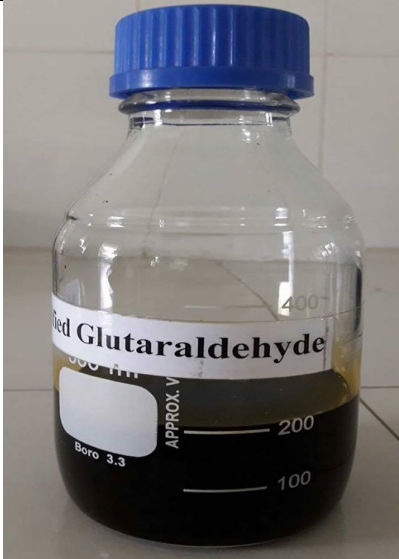
## Process for Manufacturing of Pickling Agent used in leather industry

Process	A Process for manufacturing of pickling agent	
Area	Leather Industry.	
Uses	The product is used for manufacturing of pickling agent in pickling operation of leather manufacturing process	
Salient Features	<ul style="list-style-type: none"> <li>• Pickling agent is a unique product which eliminates the use of common salt and sulphuric acid in pickling operation of leather manufacturing;</li> <li>• TDS in the discharged liquor of pickling and tanning operation of leather manufacturing process is largely reduced</li> </ul>	
Scale of Development	The process is standardized at bench scale	
Major Raw Materials	Naphthalene, Sulphuric acid	
Major Plant Equipment/Machinery	Reaction Vessel (500 ltr.), Water softening m/c, Pumps	
Details of Specific Application	The process is applied for the manufacturing of pickling agent in industrial scale	
Status of Development	The process has been developed and is ready for commercialization	
Ecological/Environmental Impact	No harmful product is used in the manufacturing process and no harmful product will generate from the process too	
Patent Details	Patent right not obtained	
Commercialization Status	Ready for commercialization	
Techno-Economics	Available on demand	
Key Words	Pickling, Leather process	

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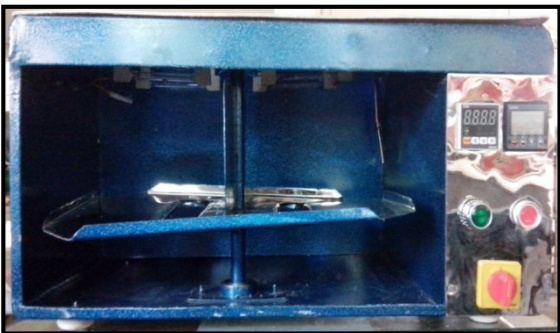
## Preparation of Tanning agent from Glutaraldehyde and its use in Leather Processing

Process	Preparation of Tanning Agent from Glutaraldehyde and its use in Leather Processing.	
Area	Leather Industry.	
Uses	The skin is used as a tanning material to protect from putrefaction.	
Salient Features	Glutaraldehyde is used for making Chrome free Leather.	
Scale of Development	The process is standardized at bench scale.	
Major Raw Materials	Glucose-monohydrate, Glutaraldehyde (50%).	
Major Plant Equipment/Machinery	Reaction Vessel (500 ltr.), Water softening m/c, Pumps	
Details of Specific Application	The process is applied for the manufacturing of Tanning agent from Glutaraldehyde in industrial scale.	
Status of Development	The process has been developed and is ready for commercialization	
Ecological/Environmental Impact	No harmful product is used in the manufacturing process and no harmful product will generate from the process too.	
Commercialization Status	Ready for commercialization	
Project Implementation (estimated) Amount of money	2,30,00,000 / = (100 m tons / year)	
Space for Implementation of the project (approximate)	1700 sft	
Payback period	2.23 years.	

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## Design and Innovation of Hit Reactivation for Footwear Industry.

Process	Design and enhance the various mechanical and electrical parts.	
Area	Footwear Industries	
Description of raw materials	BP Sheet, Temperature Controller, Relay Contact, Lamp, Switch, Cable etc.	
specialty	Economical, easy to use, easy to manufacture and maintain.	
Estimated cost to implement the project	3-5 lakhs Taka	
Estimated space to implement the project	600-800 sq ft	
Main equipment	Sheet Bending Machine, Welding Machine, Drill Machine, Grinding Machine	
Number of Total Workers (Estimated)	2-3 person	
Payback period	1.5-2.0 years	
Fixed time of invented goods	5.0 years	
Cost per unit	16000 Taka	

Product Developed By  
**Leather Research Institute**  
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## Synthetic Rubber Adhesive

### Major Raw materials:

Adhesive grade Synthetic Rubber, Organic Solvents, Hardener, Antioxidants, tackifier, filler, plasticizer, curing agent, vulcanizing agent and sequestering agent.

### Uses:

As an Adhesive for Leather-based goods, especially for joining parts of shoe soles and uppers, leather bags, moneybags, parses, leather jackets, etc.

**Physical State:** Highly Viscous Liquid.

**Demand:** 20,000 MTs/Year.

### Salient Features:

- ✚ Very easy way for preparation of the solvent based adhesive involving simple stirring and mixing process.
- ✚ It doesn't require any mastication process or equipment.
- ✚ Low-cost available solvents were used to make it cheaper.
- ✚ Antioxidant was used for making stable and long-lasting product.
- ✚ It is a product of very high adhesive bond strength.





## Urea Formaldehyde Resin

### Major Raw Materials:

Urea, Formaldehyde and others.

### Uses:

- ✚ Urea-formaldehyde resin is used by the industries which deal with forest products (ex. hard wood, plywood, particle board etc.) for a variety of purposes.
- ✚ It is also used as adhesive, coating etc.





## Energy saving and low cost domestic oven Industrial Physics Division

Product Name



**Domestic Oven**

Major Raw Materials

Aluminum Sheet

Application

Without any extra fuel system, you can make your choice of **cakes, biscuits, pudding, bread, bunny, patties, roasted** and other delicious meals, in a healthier way. Uses of it are very safe and durable.

Usage

In the new condition, to remove the odor from the inside of the oven, put a small amount of gas stove in the lid, and cover the lid for 2 hours and take 1 hour of heat for the lid. You can control the heat by observing the oven with triangular hole. Do not raise the oven as soon as the blaze rings around the burner. It has been found that under this condition the temperature of 350-450 degrees Fahrenheit (175-232 degrees Celsius) is generated in the oven.

Advantages

A gas oven gives you greater control over your cooking temperature. Warm-up time is less with gas. Once you turn off the oven, cooking stops almost immediately. The instant on-off feature with gas cooking gives you complete freedom in good cooking. With electricity you need to allow some time for the oven to cool down. Some dishes may be affected by the prolonged high temperatures. Natural gas also cooks food more evenly than electricity. Gas ovens will give you better results in cooking.

Patent Details

**Bangladesh Patent No. 1002228(1989)**

Commercialization Status

Ready for Commercialization

Precaution

To make any type of food it is necessary to keep the ignition of the stove gentle. If heat becomes high the food can be burnt and the oven is likely to be damaged. The oven lid should not be open until the food is ready. Use handle cloth while holding hot hen. Clean the inside of the oven sometimes.

Techno-Economics

Available on demand

Ecological/Environmental  
Impact

It has no adverse effect on the environment

Keywords

Domestic, Food, Natural

## 2. Production of Activated Carbon

<b>Process</b>	Activated Carbon
<b>Area</b>	Adsorbent
<b>Uses</b>	Purification of Water, Cosmetics, medicine, gas purification, air filtration for mask
<b>Salient Features</b>	<ul style="list-style-type: none"> <li>• Treatment of water</li> <li>• Treatment of sewage</li> <li>• Use in different cosmetics (lipstick, cleanser)</li> <li>• Use in medicine</li> </ul>
<b>Scale of Development</b>	Laboratory scale
<b>Major Raw Materials</b>	Pulp mill wastes liquor
<b>Major Plant Equipment/ Machinery</b>	Furnace, Chemical reactor
<b>Details of Specific application</b>	Purification of Water, Cosmetics, medicine, gas purification, air filtration for mask
<b>Status of Development</b>	Activated Carbon Prepared and tested
<b>Ecological/Environmental impact (If any, specify briefly)</b>	Prevent surface water pollution as used the pulp mill waste liquor for active carbon preparation. Make fresh and bad smell free environment
<b>Patenting details</b>	Not applied
<b>Commercialization status</b>	Ready for commercialization
<b>Techno-Economics</b>	Available in demand
<b>Key words</b>	Pulp mill liquor, lignin, Active Carbon

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<b>Patenting details</b>	Not applied
<b>Commercialization status</b>	Ready for commercialization
<b>Techno-Economics</b>	Available in demand
<b>Key words</b>	Pulp mill liquor, lignin, Active Carbon

### 3. Preparation of lignin based Resin

<b>Process</b>	Production of Resin from lignin (phenol formaldehyde)
<b>Area</b>	Plywood adhesives
<b>Uses</b>	Used as adhesives in plywood and particle board
<b>Salient Features</b>	Used as a glue for the preparation of <ul style="list-style-type: none"><li>• plywood</li><li>• particle board</li></ul>
<b>Scale of Development</b>	Laboratory scale
<b>Major Raw Materials</b>	Lignin, Phenol and Formaldehyde
<b>Major Plant Equipment/ Machinery</b>	Reactor
<b>Details of Specific application</b>	Used as a glue for the preparation of plywood and particle board
<b>Status of Development</b>	Lignin extracted from different biomass and 50% phenol substituted by lignin and resin prepared
<b>Patenting details</b>	Not applied
<b>Commercialization status</b>	Ready for commercialization
<b>Techno-Economics</b>	Available in demand
<b>Key words</b>	Lignin, resin, plywood, additives, particle board

## 4. Preparation of Rayon grade pulp

<b>Process</b>	Rayon grade pulp from lignocelluloses
<b>Area</b>	Rayon
<b>Uses</b>	Production of rayon and different chemicals
<b>Salient Features</b>	<ul style="list-style-type: none"><li>• Preparation rayon</li><li>• chemicals</li><li>• drug excipient</li></ul>
<b>Scale of Development</b>	Laboratory scale
<b>Major Raw Materials</b>	Biomass, Lignocelluloses
<b>Major Plant Equipment/ Machinery</b>	Digester, screener
<b>Details of Specific application</b>	Preparation rayon, biofuel, biochemicals and biomaterial
<b>Status of Development</b>	Rayon grade pulp produced
<b>Patenting details</b>	applied
<b>Commercialization status</b>	Ready for commercialization
<b>Techno-Economics</b>	Available in demand
<b>Key words</b>	Biomass, dissolving pulp, rayon



# Digital Water Bath

Uses	To incubate samples in water at a constant temperature over a long period of time.
Features	<ul style="list-style-type: none"><li>✚ Provide greater temperature uniformity, control and stability. Working temperature range from Room Temperature to 100 °C</li><li>✚ Four holes.</li><li>✚ Heater: 2 kW</li><li>✚ Temperature stability of <math>\pm 0.2</math> °C</li><li>✚ Capacity: 8 liters</li></ul>
Scale of Development	The product is standardized at Bench scale.
Major Raw Materials	Stainless steel sheet, Thermocouple, IC, Relay, Heater etc.
Major Plant Equipment	Lathe machine, Sheet cutter, Circuit board plotter.
Specific Application	<ul style="list-style-type: none"><li>❖ Typically used during incubation in microbiological laboratory work.</li><li>❖ Warming Reagents/ Routine Laboratory applications</li><li>❖ Bacteriological Examinations</li><li>❖ Cell cultivation</li></ul>
Status of Development	It is developed and tested.
Environmental impact	Process is environment friendly.
Commercialization Status	Ready for commercialization
Price (per Unit)	45,000/- (Forty five thousand taka only)
Key words	Water bath, temperature, heater, sample

## Fruit-flavoured Salt for Gastric comfort

Process	: A process for production of fruit-flavoured salt which relieves discomforts due to food intake.
Area	: Gastric comfort, Relieves acidity.
Uses	: The granules according to the invention are especially advantageous in relieving gastric acidity instantly occurring due to food intake.
Salient Features	: The stomach naturally secretes acid that is essential to prevent bacterial growth and also to aid digestion of foods. When there is excess production of acid by the gastric glands of the stomach, it results in the condition known as acidity. Excessive acid in stomach may result from eating habits, fad diets, stress, smoking and alcohol consumption, lack of physical activity, irregularity in eating pattern etc. This may cause several discomforting situation like burning in the stomach and throat, restlessness, belching, nausea, sour taste, indigestion, constipation etc. The action of the acid neutralizing food supplements basically results in the increase of the stomach pH. Due to this increase in the pH value the symptoms typical of hyperacidity are reduced or even eliminated.
Scale of Development	: The process is standardized at bench scale.
Major Raw Materials	: Sodium Bicarbonate, Citric Acid, Tartaric Acid, Aspartame, Food Grade Color, Food Grade Essence.
Major Plant Equipment/Machinery	: Dryer, pH meter, Weighing machine, Moisture analyser.
Details of Specific Application	: The main object of the invention is to find out a suitable effervescent food supplement which can relieve the symptoms of occasional gastric acidity defined herein as sour stomach, upset stomach, acid indigestion, belching, abdominal pain, heartburn, bloating, gas etc. with a pleasant taste on ingestion.
Status of Development	: The product has been developed and leased out to the local entrepreneur "M/S Grand Consumer" of Pabna.
Ecological/Environmental Impact	: The developed process is environment friendly. All raw materials used in the process are nontoxic. None of the consumables or procedures has adverse impact on ecology or environment.
Commercialisation Status	: Leased out to M/S Grand Consumer, Village: Fakirpoor, Post office: Malanchi, Upazila: Pabna Sadar, District: Pabna.
Price	10/- per 5 gram
Key words	: Fruit-flavoured salt, Gastric comfort, Food intake.

**Process**

Production of oil from kernel of ripe mango

**Area**

Cosmetic Industries

**Uses**

useful in soap, shampoo, cream etc. manufacturing



**Mango Seed Oil**

Cholesterol balance, Lowers blood sugar, Reduce acne, Maintain healthy weight (Ref: Health Benefit times.com)

**Scale of Development**

Laboratory scale

**Major Raw Materials**

Ripe Mango seeds as wastes of mango processing industry, nHexane

**Major Plant Equipment/  
Machinery**

Soxhlet apparatus, solvent distillation plant

**Details of Specific application**

As an active ingredient in soap, shampoo, cream etc. manufacturing

**Status of Development**

Product developed, analyzed and process ready to be leased out

**Environmental Impact**

Not only environment friendly but also profitable as its raw material is a wastes of mango processing industry and it could be substitute of mineral oil

**Commercialized Status**

Mango kernel oil is being imported but there is a bright future for establishing this industry in our country

**Cost of Production**

around TK. 59 lakh for 30 M.T. production per year

**Key words**

Mango kernel oil, cosmetic ingredient



## A Process for the Production of Anhydrous Aluminum Chloride from Scrap Aluminum

### Process

#### Area



Anhydrous Aluminum Chloride

Lewis acid, polymerization.

Aluminium chloride ( $\text{AlCl}_3$ ) is the main compound of aluminum and chlorine. It is white, but samples are often contaminated with iron trichloride, giving it a yellow colour. The solid has a low melting and boiling point. It is mainly produced and consumed in the production of aluminium metal, but large amounts are also used in other areas of chemical industry. The compound is often cited as a Lewis acid. It is an example of an inorganic compound that "cracks" at mild temperature, reversibly changing from a polymer to a monomer.  $\text{AlCl}_3$  adopts three different structures, depending on the temperature and the state (solid, liquid, gas). Solid  $\text{AlCl}_3$  is a sheet-like layered cubic close packed layer.

#### Scale of Development

The process is standardized at bench scale

#### Major Raw Material

Aluminium and Hydrochloric acid

#### Major Plant Equipment/Machinery

S.S. Still container, mechanical stirrer and hot plate

#### Details of specific application

This product is mainly used for Friedel–Crafts reactions, isomerization, Production of detergents and ethylbenzene

#### Status of Development

This process is accepted by the BCSIR authority and it is ready for commercialization

#### Ecological/Environmental Impact(if any, specify briefly)

This process is environment friendly and after commercialization this product able to fulfill our national demand

#### Patenting details

Patented filed in future

#### Commercialization Status

Ready for commercialization

#### Techno-Economics

Available on demand

#### Cost of Production (Tk.)

900.0/kg

#### Key wards

Aluminum, Hydrochloric acid, isomer, polymer, detergent

## Process

## A process for the production of Production of Lead Acetate from Lead Oxide

Area

textile printing, dyeing, varnishing

Uses

Lead acetate is used as a mordant in textile printing and dyeing, as a drier in paints and varnishes, and in preparing other lead compounds



**Lead Acetate**

Lead acetate paper is used to detect the poisonous gas hydrogen sulfide. The gas reacts with lead (II) acetate on the moistened test paper to form a grey precipitate of lead (II) sulfide. An aqueous solution of lead acetate is the byproduct of the 50/50 mixture of hydrogen peroxide and white vinegar used in the cleaning and maintenance of stainless steel firearms suppressors (silencers). The solution is agitated by the bubbling action of the hydrogen peroxide, and the main reaction is the dissolution of lead deposits within the suppressor by the acetic acid, which forms lead acetate.

Scale of Development

The process is standardized at bench scale

Major Raw Material

Lead oxide and acetic acid

Major Plant Equipment/Machinery

S.S. Still container, mechanical stirrer, hot plate, round bottom flask, heating mantel

Details of specific application

This product is mainly used as a mordant in textile printing and dyeing, as a drier in paints and varnishes, and in preparing other lead compounds

Status of Development

This process is accepted by the BCSIR authority and it is ready for commercialization

Ecological/Environmental Impact(if any, specify briefly)

This process is environment friendly and after commercialization this product able to fulfill our national demand

Patenting details

Patented filed in future

Commercialization Status

Ready for commercialization

Techno-Economics

Available on demand

Cost of Production (Tk.)

700.0/kg

Key wards

Lead oxide, acetic acid, textile, dye, vernish

## Process

## A process for the production of phosphate based dry fire extinguishing agent

Area

Extinguish the ABC type fire

Uses

This product is used for Extinguish the ABC type fire



### Phosphate based fire extinguishing

Scale of Development

This process is leased out by BCSIR authority

Major Raw Material

Monoammonium phosphate and ammonium sulphate

Major Plant  
Equipment/Machinery

Grinding machine, mixing machine, S.S. still container

Details of specific  
application

Dry Chemical fire extinguishers (phosphate based) extinguish the fire primarily by interrupting the chemical reaction of the fire triangle. The multipurpose dry powder works by creating a barrier between the oxygen element and the fuel element on Class A, B & C fires.

Status of Development

This process is accepted by the BCSIR authority and leased out

Ecological/Environmental  
Impact(if any, specify  
briefly

This process is environment friendly and after commercialization this product able to fulfill our national demand

Patenting details

Patented filed in future

Commercialization Status

This process is leased out by BCSIR authority

Techono-Economics

Available on demand

Cost of Production (Tk.)

150.0/kg

Key wards

Phosphate, fire, extinguisher, dry chemical

## Process

## A process for the production of Production of Zinc Acetate from Zinc Oxide

Area

Zinc deficiencies, Antibiotic

Uses

Zinc acetate is commonly used as a dietary supplement and in lozenges used to treat the common cold. Zinc acetate can also use to treat zinc deficiencies and treatment of Wilson's disease.



**Zinc Acetate**

Zinc acetate is used in chemical synthesis for different pharmaceutical products and as a dietary supplement and in lozenges used to treat the common cold. It along is thought to be a more effective treatment than zinc gluconate. Zinc acetate can also use to treat zinc deficiencies. As an oral daily supplements it is used to inhibit the body's absorption of copper as part of the treatment of Wilson's disease. It is also sold as an astringent in the form of an ointment, a topical lotion or combined with an antibiotic such as erythromycin for the topical treatment of acne, furthermore zinc acetate is commonly sold as a topical anti-itchointment.

Scale of Development

The process is standardized at bench scale

Major Raw Material

Zinc oxide and acetic acid

Major Plant  
Equipment/Machinery

S.S.S till container, mechanical stirrer, hot plate, round bottom flask, heating mentel

Details of specific application This product is mainly used as a dietary supplement and in lozenges used to treat the common cold. Zinc acetate can also use to treat zinc deficiencies and treatment of Wilson's disease.

Status of Development

This process is accepted by the BCSIR authority and it is ready for commercialization

Ecological/Environmental  
Impact(if any, specify briefly)

This process is environment friendly and after commercialization this product able to fulfill our national demand

Patenting details

Patented filed in future

Commercialization Status

Ready for commercialization

Techno-Economics

Available on demand

Cost of Production (Tk.)

900.0/kg

Key wards

Zinc oxide, acetic acid, dietary supplement, lozenges.

**Process** Formulation and development of ultrasound gel from ingredients available in local market.

**Area** Hospital and Clinic

**Uses** Ultrasonography , ECG



**Ultrasound gel**

1. There will be no need to import
2. Valuable foreign currency will be saved
3. Easily availability will increase its sufficient use
4. It will be helpful to diagnosis system

**Scale of Development** The process is standardized at banch scale

**Major Raw Materials** Acrylic polymer, glycerine

**Major Plant Equipment/ Machinery** S.S. Still container, mechanical stirrer and water bath

**Details of Specific application** This product is mainly used for ultrasonography, FCG at hospital and clinic

**Status of Development** This process is clinically tested and ready for submission and it is ready for commercialization

**Environmental Inpact** This process is environment friendly and after commercialization this product able to fulfill our national demand

**Patenting details** Patented filed in future

**Commercialized Status** Ready for commercialization

**Cost of Production** 100 tk/kg

**Key words** Acrylic polymer, glycerine

## ***A Process for the Production of Herbal Body Oil***

### **Process**

Area

Baby Liquid Laundry Detergent is specialized for baby skins and sensitive skins.

Uses

For healthy looking skin.



Herbal Body oil is mainly intended for the purpose of skin care and Body messaging. Natural and aromatic range of Herbal body oils are used to gain a fresh feeling. Herbal Body Oils are made from natural oils and herbal extracts. It is aromatic and accentuates our senses. It has cleansing properties and antiseptic activities due to the presence of Turmeric and Neem

Body Oil

Scale of Development

The process is standardized at bench scale.

Major Raw Material

Vegetable oil, Turmeric extract, Neem oil etc.

Major Plant

Grinder, M.S. with all accessories, Mesh 40-80, Soxhlet extractor, Spring Balance and water bath.

Equipment/Machinery

Details of specific application

Herbal Body Oil is mainly intended for the purpose of skin care and Body messaging.

Status of Development

This process is verified by the BCSIR authority and it is ready for acceptance.

Ecological/Environmental Impact(if any, specify briefly)

This process is environment friendly and after commercialization this product able to fulfill our national demand.

Patenting details

Patented filed in future.

Commercialization Status

This process is ready for acceptance.

Techno-Economics

Available on demand.

Key words

Vegetable oil, Turmeric extract, Neem oil etc.

Cost of product

440 Tk/ L

## Process

Area

Uses



Face Wash

Scale of Development

Major Raw Material

Major Plant

Equipment/Machinery

Details of specific application

Status of Development

Ecological/Environmental Impact(if any, specify briefly)

Patenting details

Commercialization Status

Techno-Economics

Key wards

Cost of product

## ***A Process for the Production of Herbal Face Wash***

Men & Women

Clean, clear and healthy looking skin

This Face wash is rich anti bacterial, luxurious and moisturizing Face cleanser. Face wash leaves the skin with smooth, silky feeling while minimizing the irritation associated with some bar soaps.

Ready for submission for acceptance.

Aloevera & Neem Oil

Balance, Blender and water bath and Distilled water plant.

This process is a moisturizing Face cleanser due to its anti bacterial activities is also keeps Face germ free and save the people from diseases.

This process is already for Submission.

This process is environment friendly and after commercialization this product able to fulfill our national demand.

Patented filed in future.

Ready for submission for acceptance.

Available on demand.

Aloevera & Neem Oil

150 Tk/ kg

## Process

## A process for the production of chitin from shrimp industry waste

Area  
Uses

Pharmacy and Food  
Chitin is useful for several medicinal, industrial and biotechnological purposes.



Picture:Chiti

Chitin was first isolated and characterized in 1811 by the chemist and botanist Henry Braconnot. Chitin is structurally 2-acetamido-2-deoxy-D-glucose (*N*-acetylglucosamine) residues linked by  $\beta$ -(1-4) bonds, is the second richest polysaccharide of animal origin found in nature after cellulose and it is characterized by its fibrous structure. Chitin is extracted from the shells of shrimp, lobster, and crabs. It is a fibrous substance that might block absorption of dietary fat and cholesterol

Scale of Development

The process is standardized at bench scale

Major Raw Material

Shrimp processing waste (Head, body, Tail), Sodium hydroxide, Hydrochloric Acid

Major Plant  
Equipment/Machinery  
Details of specific  
application

S.S.Still container, mechanical stirrer and hot plate

Pharmaceutical industry and Biotechnology

Status of Development

This process is accepted by the BCSIR authority and it is ready for commercialization

Ecological/Environmental  
Impact(if any, specify  
briefly

This process is environment friendly and after commercialization this product able to fulfill our national demand

Patenting details

Patented

Commercialization  
Status

Ready for commercialization

Techno-Economics

Available on demand

Cost of Production

14000/Kg

Key wards

Chitin, Shrimp shell, Hydrochloric acid.

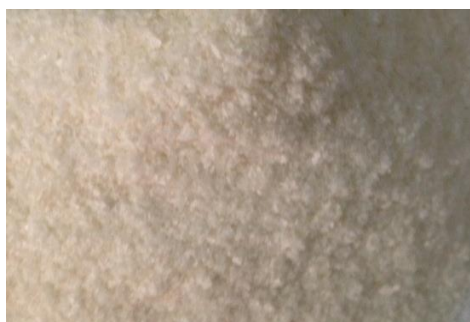


## Process

## Production of chitosan from shrimp shell waste

Area  
Uses

Food & Pharmaceutical Industry, ETP  
Agriculture, Food preservative, Drug delivery, Waste water treatment, Cosmetics etc



Picture: Chitosan Powder.

Chitosan is a cationic polysaccharide with linear chain consisting of  $\beta$ -(1,4)-linked 2-acetamino-2-deoxy- $\beta$ -D-glucopyranose and 2-amino-2-deoxy- $\beta$ -D-glucopyranose. It does not show any adverse effects when in contact with human cells and this property has attracted chemist's scientific attention to chitosan. The biological activities of chitosan make it promising agent in controlled drug delivery systems, which can control the release of drug for long period of time. Chitosan also has antimicrobial activity, wound- healing properties, and can decrease the level of cholesterol inhuman body

Scale of Development

The process is standardized at bench scale.

Major Raw Material

Shrimp processing waste (Head, body, Tail), Sodium hydroxide, Hydrochloric Acid.

Major Plant  
Equipment/Machinery

S.S.Still container, mechanical stirrer and hot plate.

Details of specific application  
Status of Development

Drug excipient, Preservative, water treatment.  
This process is accepted by the BCSIR authority and it is ready for commercialization

Ecological/Environmental  
Impact(if any, specify briefly)

This process is environment friendly and after commercialization this product able to fulfill our national demand

Patenting details

Patented

Commercialization Status

Ready for commercialization

Techono-Economics

Available on demand

Cost of Production

20000/Kg

Key wards

Chitin, Shrimp shell, Hydrochloric acid

## Process



**chitosan-charcoal  
bio-composite**

## Preparation of chitosan-charcoal bio-composite for chromium removal

A new composite biosorbent has been prepared by coating chitosan onto charcoal. Chitosan-charcoal composite has applied as the media of biological filters to treat tannery wastewater. Biopolymer chitosan-charcoal composite have been successfully prepared by a simple solution- evaporation method. The morphology and mechanical properties of the chitosan-charcoal composite have been characterized with scanning electron microscopy (SEM) and X-ray diffraction (XRD). The prepared chitosan-charcoal can remove chromium from tannery effluent more than 90% at optimum condition

Scale of Development

The process is standardized at bench scale

Major Raw Material

Shrimp processing wastes (head, shell and tail), charcoal, hydrochloric acid, sodium hydroxide, oxalic acid etc

Major Plant  
Equipment/Machinery  
Details of specific  
application

S.S.S till container, mechanical stirrer and hot plate  
Heavy metal removal

Status of Development

This process is accepted by the BCSIR authority and it is ready for commercialization

Ecological/Environmental  
Impact(if any, specify  
briefly

This process is environment friendly and after commercialization this product able to fulfill our national deman

Patenting details  
Commercialization  
Status

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Ready for commercialization

Techono-Economics

Available on demand

Key wards

Chitosan, Charcoal

Reference: BCSIR

# Cotton seed oil

Uses	Crude cottonseed oil has been used in toiletries (e.g. Soaps, facial wash, shampoo and lotions) industries.
Scale of Development	The product is standardized at Bench scale.
Major Raw Materials	Waste cotton seed.
Major Plant Equipment	Distillation equipment, Heating mantle etc.
Specific Application	<p>The main fatty acids found in crude cotton seed oil are palmitic acid, stearic acid, linoleic acid, caprylic acid, elaidic acid.</p> <p>Palmitic acid does display antioxidant properties. Also Palmitic acid can be used as surface active agents</p> <p>Caprylic acid is used in perfumery.</p> <p>Stearic acid is mainly used in the production of detergents, soaps and cosmetics such as shampoos and shaving cream products</p>
Status of Development	It is developed and tested.
Environmental impact	Process is environment friendly.
Commercialization Status	Ready for commercialization
Price (per Litre)	100/- (One hundred taka only)
Key words	Waste cotton seed, toiletries, distillation etc.

**Process**

Production of Pectin from ripe mango peel

**Area**

Food and Pharmaceuticals

**Uses**

as gelling, thickening and stabilizing agent in processed food and excipient in pharmaceuticals



**Ripe mango peel**

Gelling agent, thickener and stabilizer

**Scale of Development**

Laboratory scale

**Major Raw Materials**

Ripe Mango peel as wastes of mango processing industry, Ethanol (95%).

**Major Plant Equipment/ Machinery**

Drier, solvent distillation plant, grinder

**Details of Specific application**

Gelling agent in jam, jelly, marmalade etc. and excipient in pharmaceuticals

**Status of Development**

Product developed, analyzed and process ready to be leased out

**Environmental Impact**

Not only environment friendly but also profitable as its raw material is a waste of mango processing industry and it could be substituted for gelatin, an animal tissue extract

**Commercialized Status**

Pectin is being imported still but there is a bright future for establishing this industry in our country

**Cost of Production**

around TK. 2 crore for 30 M.T. production per year

**Key words**

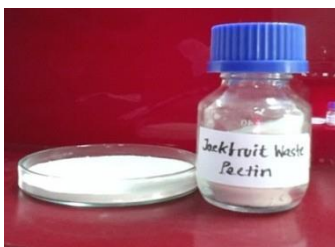
pectin, mango peel, gelling agent, thickener, stabilizer

**Process** Production of Pectin from ripe jackfruit waste

**Area** Food and Pharmaceuticals

**Uses** as gelling, thickening and stabilizing agent in processed food and excipient in pharmaceuticals

Gelling agent, thickener and stabilizer



**Ripe jackfruit waste**

**Scale of Development** Laboratory scale

**Major Raw Materials** Ripe Jackfruit rind (waste), Ethanol (95%).

**Major Plant Equipment/ Machinery** Drier, solvent distillation plant, grinder

**Details of Specific application** Gelling agent in jam, jelly, marmalade etc. and excipient in pharmaceuticals

**Status of Development** Product developed, analyzed and process ready to be leased out

**Environmental Impact** Not only environment friendly but also profitable as its raw material is a waste of mango processing industry and it could be substitute of gelatin an animal tissue extract

**Commercialized Status** Pectin is being imported still but there is a bright future for establishing this industry in our country

**Cost of Production** Around TK. 5.5 crore for 30 M.T. production per year

**Key words** pectin, jackfruit rind, gelling agent, thickener, stabilizer

<b>Process</b>	Production of Starch from ripe mango seed
<b>Area</b>	Food and Pharmaceuticals Industries and laboratory uses
<b>Uses</b>	As food additives and pharmaceutical excipients
	Thickener and stabilizer
	
Ripe mango seed	
<b>Scale of Development</b>	Laboratory scale
<b>Major Raw Materials</b>	Ripe Mango seeds as wastes of mango processing industry
<b>Major Plant Equipment/ Machinery</b>	Drier, solvent distillation plant, grinder
<b>Details of Specific application</b>	<ul style="list-style-type: none"> <li>• as thickening and stabilizing agent in foods such as puddings, custardsetc.</li> <li>☐ in the manufacture of various adhesives or glues for book-binding, wallpaper adhesives.</li> <li>☐ in the pharmaceutical industry, starch is also used as an excipient, as tablet disintegrant or as binder.</li> </ul>
<b>Status of Development</b>	Product developed, analyzed and process ready to be leased out
<b>Environmental Impact</b>	Not only environment friendly but also profitable as its raw material is a wastes of mango processing industry
<b>Commercialized Status</b>	Starch from discarded wastes of mango processing industries will obviously be profitable because we get valuable product with a very low cost
<b>Cost of Production</b>	Around TK. 34 lakh for 300 M.T. production per year
<b>Key words</b>	Starch, mango seed, thickener, stabilizer

## process

## *A Process for the Production of Herbal Hand Wash*

Area

Office, Hospital and House

Uses

Moisturizing hand cleanser



Scale of Development

The process is already under commercialization

Major Raw Material

Neem , Aloe vera & sodium laurel sulphate

Major Plant  
Equipment/Machinery

S.S. Still container, mechanical stirrer and water bath.

Details of specific  
application

This product is mainly used for Office, Hospital and House.

Status of Development

This process is accepted by the BCSIR authority and it is already commercialized

Ecological/Environmental  
Impact(if any, specify  
briefly)

This process is environment friendly and after commercialization this product is able to fulfill our national demand.

Patenting details

Patented filed in future.

Commercialization Status

This process is already commercialized.

Techno-Economics

Available on demand.

Cost of product

150 Tk/ L

Key words

Neem, Aloe vera & sodium laurel sulphate,

**Process**

**A Process for the Production of ALOE GEL**

Area

Men & Women

Uses

As moisturizing skin care gel



**ALOE GEL**

The people of our country use different herbal cosmetics and toiletries for their daily health care, most of these are imported at the cost of our foreign exchange. Herbal plants constitute an invaluable asset of a country. They play significant role in providing primary health care services and also to its overall economy.

Scale of Development

The process is already under commercialization

Major Raw Material

Aloevera, Cellulose, Glycerin

Major Plant Equipment/Machinery

Top load balance, Blender, SS Vat fitted with stirrer, Water bath

Details of specific application

This product is mainly used for Men & Women

Status of Development

This process is accepted by the BCSIR authority and it is already commercialized.

Ecological/Environmental Impact(if any, specify briefly)

This process is environment friendly and after commercialization this product able to fulfill our national dema

Patenting details

Patented filed in future

Commercialization Status

This process is already commercialized

Techno-Economics

Available on demand

Cost of product

135 Tk/ Kg

Key wards

Aloevera, Cellulose, Glycerin



## Process

## ***A Process for the Production of Herbal Shaving Foam***

Area

Saloon & Parlor

Uses

Antioxidant enriched Moisturizing Skin care Foam



**Herbal Shaving Foam**

To develop an appropriate technology & to find out better utilization of indigenous raw materials in the field of public health care. This Shaving Foam is rich ,anti bacterial, luxurious and moisturizing foam. Shaving Foam leaves the skin with smooth, silky feeling while minimizing the irritation associated with some local foam.

Scale of Development

The process is standardized at industry scale

Major Raw Material

Neem oil, Castor oil, sodium laurel sulphate

Major Plant  
Equipment/Machinery

S.S.Still container, mechanical stirrer, balance, feeling machine

Details of specific application

This product is mainly used for Saloon & Parlor

Status of Development

This process is accepted by the BCSIR authority and it is already commercialized

Ecological/Environmental  
Impact(if any, specify briefly)

This process is environment friendly and this product able to fulfill our national demand

Patenting details

Patented filed in future

Commercialization Status

Already commercialized

Techno-Economics

Available on demand

Cost of product

120 Tk/Kg

Key wards

Neem oil, Castor oil, sodium laurel sulphate

## Process

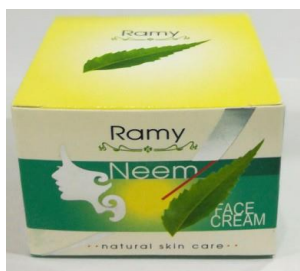
### ***A Process for the Production of Neem Based Cream***

Area

Men & Women

Uses

Antibacterial skin care cream



To develop an appropriate technology & to find out better utilization of indigenous raw materials in the field of public health care. This Neem Based Cream is rich ,anti bacterial, luxurious and moisturizing cream. Neem Based Cream leaves the skin with smooth, silky feeling while minimizing the irritation associated with some local Cream

Scale of Development

The process is already under commercialization

Major Raw Material

Neem , Stearic acid, Cetyl alcohol and Glycerin

Major Plant  
Equipment/Machinery

SS Vat fitted with stirrer, balance, feeling machine & water bath.

Details of specific application

This product is mainly used for Men & Women

Status of Development

This process is accepted by the BCSIR authority and it is already commercialized

Ecological/Environmental  
Impact(if any, specify briefly)

This process is environment friendly and after commercialization this product able to fulfill our national demand

Patenting details

Patented filed in future

Commercialization Status

Already commercialized

Techno-Economics

Available on demand

Cost of product

200Tk/kg

Key wards

Neem , Stearic acid, Cetyl alcohol and Glycerin

**Process**

***A Process for the Production of Baby Liquid Laundry Detergent***

Area

Baby Liquid Laundry Detergent is specialized for baby skins and sensitive skins

Uses

Liquid detergent specialized for baby skin



**Baby Liquid Laundry Detergent**

Baby Liquid Laundry Detergent is a laundry cleaning product which is specialized for baby skins and sensitive skins. Every parent want to give best to their babies and nowadays people became more cautious about their babies health. Baby Liquid Laundry Detergent is one of the most popular and demandable products among new parents. The kind of chemicals and irritants that can be found in the regular detergents are terrifying

Scale of Development

The process is already under commercialization.

Major Raw Material

Coco Betain, glycerin etc

Major Plant Equipment/Machinery

S.S.S till container, mechanical stirrer and water bath

Details of specific application

This product is mainly used for Baby Liquid Laundry Detergent is specialized for baby skins and sensitive skins

Status of Development

This process is accepted by the BCSIR authority and it is already commercialized

Ecological/Environmental Impact(if any, specify briefly)

This process is environment friendly and after commercialization this product able to fulfill our national demand



## Herbal Aloe Shampoo



Process	A process for the production of Herbal Aloe Shampoo
Area	Cosmetic and Toiletries Industries
Uses	The product is used as a herbal hair care product.
Salient Features	Aloe vera is rich in amino acids and protein, which is good for a healthy hair. Since hair comprises of protein called keratin, you need more protein to help in hair growth. It is important that new hair takes place of old hair after it falls off naturally. Aloe vera contains something called proteolytic enzymes which repairs dead skin cells on the scalp. It also acts as a great conditioner and leaves your hair all smooth and shiny. It promotes hair growth, prevents itching on the scalp, reduces dandruff and conditions hair.
Scale	The process is standardized at bench scale
Major Raw Materials	Aloe vera
Major Plant Equipment	SS Vat with stirrer, filling machine
Details of specific application	<ul style="list-style-type: none"> <li>➤ <i>Makes hair smooth, soft, healthy and shiny</i></li> <li>➤ <i>Nourishes hair and scalp the natural way</i></li> <li>➤ <i>Enhances hair growth, repairs damaged hair</i></li> </ul> <i>Helps to balance the pH level as well cleans</i>
Status of development	The process is standardized at laboratory.
Patenting details	Patent Earned
Commercialization Status	Leased out for commercialization
Techno- economics	Available on demand
Key words	Aloe vera, Shampoo, Aloe vera, Healthy & Shiny Hair, Herbal Cosmetic
Production cost	50Tk/ 100 ml

## Aloe Lemon Drink



Process	Aloe Lemon Drink
Area	Food & Beverage Industries
Uses	The product is used as Beverage
Salient Features	Aloe vera has 150 different elements including 12 vitamins A, B1, B2, B3, B12 C and E as well as Ca, Na, Cl, Mn, Mg, Cu, Cr, Zn, Se, Ge, K, P, Fe, tanins and more than 18 amino acids. The gel contains among other things acemannan which improves cellular oxygenation as well as blood circulation. Hence, when taken internally, aloe vera juice aids the digestion and absorption of nutrients, helps control blood sugar, increases energy production, promotes cardiovascular health, improves liver function, and boosts the immune system.
Scale	The process is standardized at bench scale
Major Raw Materials	Aloe vera
Major Plant Equipment	SS Vat with stirrer, filling machine
Details of specific application	<ul style="list-style-type: none"> <li>➤ Provide instant energy</li> <li>➤ Helps in digestion</li> <li>➤ As a natural vitamin, protein and mineral enrich soft drink.</li> <li>➤ Strengthens Immune System</li> <li>➤ As an antioxidant</li> </ul>
Status of development	The process is standardized at laboratory.
Patenting details	Patent Earned
Commercialization Status	Leased out for commercialization
Techno- economics	Aloe vera lemon drink, Aloe vera, Antioxidant
Key words	Aloe vera
Production cost	20Tk/ 250ml



## Aloe vera syrup



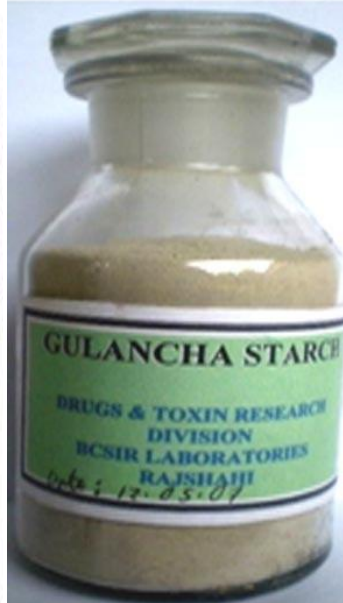
Process	Aloe vera syrup
Area	Food & Beverage Industries
Uses	The product is used as Beverage
Salient Features	Aloe vera has one of the amusing compositions, consisting like a cactus of more than 99% water. The remaining 1% is a very powerful synergy of 150 different elements including 12 vitamins A, B1, B2, B3, B12 C and E as well as Ca, Na, Cl, Mn, Mg, Cu, Cr, Zn, Se, Ge, K, P, Fe, tanins and more than 18 amino acids. The gel extracted from Aloe vera is the most important part of the plant and contains among other things acemannan which improves cellular oxygenation as well as blood circulation. Hence, when taken internally, aloe vera juice aids the digestion and absorption of nutrients, helps control blood sugar, increases energy production, promotes cardiovascular health, improves liver function, and boosts the immune system.
Scale	The process is standardized at bench scale
Major Raw Materials	Aloe vera
Major Plant Equipment	SS Vat with stirrer, filling machine
Details of specific application	<ul style="list-style-type: none"> <li>➤ Provide instant energy</li> <li>➤ Helps in digestion</li> <li>➤ As a natural vitamin, protein and mineral enrich soft drink.</li>   <li>➤ Strengthens Immune System</li> </ul> <p>As an antioxidant</p>
Status of development	The process is standardized at laboratory.
Patenting details	Patent Earned
Commercialization Status	Leased out for commercialization
Techno- economics	Aloe vera lemon drink, Aloe vera, Antioxidant
Key words	Aloe vera
Production cost	80Tk/ 250 ml

## Amloki Powder Drink



Process	Amloki Powder Drink
Area	Food & Beverage Industry
Uses	
Salient Features	<p>The Indian Gooseberry belongs to the Euphorbiaceae family. It provides remedies for many diseases, so it is widely used in Ayurvedic treatment. Gooseberry is very rich in Vitamin C, and contains many minerals and vitamins like Calcium, Phosphorus, Iron, Carotene and Vitamin B Complex. Amla is also a powerful antioxidant agent. Many health problems are caused by oxidative damage (when body cells use oxygen, they produce by-products called free radicals that can cause damage). Antioxidant agents prevent and repair these damages. Vitamin-C is a good antioxidant agent, which makes gooseberries a powerful tool against a variety of conditions, including various types of cancer.</p>
Scale	
Major Raw Materials	Amloki fruits
Major Plant Equipment	Plant Crusher, filling machine
Details of specific application	<ul style="list-style-type: none"> <li><input type="checkbox"/> Aids in digestion</li> <li><input type="checkbox"/> Improves immunity</li> <li><input type="checkbox"/> Helps body absorb calcium</li> <li><input type="checkbox"/> Improves eyesight</li> <li><input type="checkbox"/> Eliminates free radicals associated with aging</li> </ul>
Status of development	The process is standardized at laboratory.
Patenting details	Patent Earned
Commercialization Status	Ready for commercialization
Techno- economics	Amloki, Powder Drink, Antioxidant
Key words	Amloki fruits
Production cost	50Tk/ 250g

## Gulanha Starch



Process	Gulanha Starch
Area	Unani and Ayurvedic medicine Industry
Uses	Gulanha starch is used in Unani and Ayurvedic medicine Industry for the production of different Unani and Aurvedic products.
Salient Features	Gulanha is a famous Ayurvedic herb, used extensively in treatment for fever, diabetes, urinary tract disorders, anemia, jaundice, asthma, cardiac disorders, etc. Guduchi is highly rich in anti oxidants. It has wound healing property, antipyretic (fever- reducing) and anti- viral properties.
Scale	
Major Raw Materials	Gulanha plant
Major Plant Equipment	Plant Crusher, filling machine
Details of specific application	This product has been prepared by the isolation of starch from stem of gulanha plant.
Status of development	The process is standardized at laboratory.
Patenting details	Patent Earned
Commercialization Status	Ready for commercialization
Techno- economics	Gulanha Strach, Gulanha, Unani and Aurvedic ingredients
Key words	Gulanha plant
Production cost	100Tk/ 250g

## Aloe ToothPaste



Process	Aloe ToothPaste
Area	Personal care products Industries
Uses	Used as herbal toothpaste
Salient Features	<i>Aloe vera</i> ( <i>Aloe barbadensis</i> ) is a plant that belongs to <i>Liliaceae</i> family. It contains various minerals and vitamins. It has got various properties such as immunomodulatory, antiviral and antiinflammatory in nature. <i>A. vera</i> can play a significant role in dentistry in treatment of lichen planus, oral submucous fibrosis, recurrent aphthous stomatitis, alveolar osteitis, periodontitis, etc. Aloe vera toothpaste is effective in controlling bacteria that causes cavities than other commercially available toothpaste. <i>A. vera</i> gel's ability to kill and remove harmful microorganisms is due to compounds called anthraquinones, which are antiinflammatory.
Scale	
Major Raw Materials	Aloe vera
Major Plant Equipment	SS Vat with stirrer, filling machine
Details of specific application	
Status of development	
Patenting details	Patent Earned
Commercialization Status	Leased out for commercialization
Techno- economics	Available on demand
Key words	Toothpaste, Aloe vera, minty taste, non-abrasive formula
Production cost	70Tk/ 100 g

## Anti-fungal Ointment from Herbal Source



Process	Anti-fungal Ointment from Herbal Source
Area	Unani/Aurvedic/Herbal Medicine Industry
Uses	Anti-fungal ointment
Salient Features	Garlic's rich antibacterial, antifungal, and antiviral properties make it a natural healing agent as well. Turmeric oil is additionally utilized in numerous skincare formulas for making skin appear younger. It protects the skin from harmful bodies and gives a flawless fair complexion. Its antimicrobial properties help to prevent and also treat acne and other skin infections. In the cosmetic industry, it is used in the anti-spot and anti-marks creams. Other skin issues that turmeric essential oil addresses include wounds, eczema, wrinkles, pigmentation of skin, pimples, acne, psoriasis, cuts, burns and other skin infections.
Scale	
Major Raw Materials	Oil of garlic, curcuma, eucaliptus
Major Plant Equipment	SS Vat with stirrer, filling machine
Details of specific application	<ul style="list-style-type: none"> <li><input type="checkbox"/> This anti-fungal ointment used to treat <u>skin</u> infections such as <u>athlete's foot</u>, <u>jock itch</u>, <u>ringworm</u>, and other fungal skin infections (<u>candidiasis</u>).</li> <li><input type="checkbox"/> This <u>medication</u> is also used to treat a skin condition known as pityriasis (<u>tinea versicolor</u>), a <u>fungal infection</u> that causes a lightening or darkening of the skin of the neck, chest, arms, or legs.</li> </ul>
Status of development	
Patenting details	Patent Earned
Commercialization Status	Leased out for commercialization
Techno- economics	Available on demand
Key words	Anti-fungal Ointment, Essential oil
Production cost	125Tk/ 250g

## Cracked heel Cream



Process	Cracked heel Cream
Area	Cosmetics and personal care products Industries
Uses	
Salient Features	This product has been developed using the extract of medicinally important plant like Aloe vera, licorice root extract, mango stone and sesame oil as an active herbal ingredients. The combined ingredients synergistically act as an inflammation and wound healing action on the crack of the heel and soothe Cracked, Dry, Rough, Hard Heels and Restore Soft Skin Instantly.
Scale	
Major Raw Materials	Aloe vera powder, Licorice extract
Major Plant Equipment	SS Vat with stirrer, filling machine
Details of specific application	<ul style="list-style-type: none"> <li><input type="checkbox"/> Intensive cream with different fruit extract deeply replenishes skin to deliver 24 hours of moisture.</li> <li><input type="checkbox"/> Creates a protective barrier for dry, cracked feet.</li> </ul>
Status of development	
Patenting details	Patent Earned
Commercialization Status	Leased out for commercialization
Techno- economics	Available on demand
Key words	Cracked Heal Cream, Aloe vera, Licorice extract
Production cost	120Tk/ 250 g



## Herbal medicated hair oil from sesame oil



Process	A process for the preparation of herbal medicated hair oil from sesame oil.
Area	Hair care and cosmetics
Uses	For hair and skin care
Salient Features	Our herbal medicated hair oil is prepared from sesame oil along with various kinds of indigenous plants extracts. So it has no adverse effect on the hair and skin. Moreover, it keeps the head cool, removes dandruff, protects the falling of hair and keeps the hair soft, healthy and smooth .
Scale	The process is standardized at lab scale.
Major Raw Materials	Sesame oil
Major Plant Equipment	Mixing Vessel, Filter.
Details of specific application	For preventing the hair fall, removing the dandruff, keeping the hair health, glossy and fresh.
Status of development	
Patenting details	Patent pending
Commercialization Status	Leased out for commercialization
Techno- economics	Ready for commercialization.
Key words	Hair oil, Herbal.
Production cost	100Tk/ 250 ml

## Herbal After shave lotion from lemon leaves oil.



Process	A process for the production of Herbal After shave lotion from lemon leaves oil.
Area	Skin care and cosmetics
Uses	Skin care product
Salient Features	It is used for cleaning greasy skin and hair as well as removing dead skin cells, easing painful cold sores, mouth ulcers, herpes and insects bites. It helps to give a healthier, clearer and smoother skin by removing acne, pimples and other bacterial and fungal infection. Hence, a herbal after shave lotion has been produced by using lemon leaves oil which has a lot of benefits in keeping our facial skin smooth and fresh.
Scale	The process is standardized at lab scale.
Major Raw Materials	Lemon leaves oil .
Major Plant Equipment	Microwave gravity extraction system, Mixing Vessel, Filter.
Details of specific application	Keeping the skin fresh, prevents fungal infections and itching.
Status of development	The process has been verified.
Patenting details	Patent pending
Commercialization Status	
Techno- economics	Now it is ready for commercialization.
Key words	
Production cost	50Tk/ 250 ml

## Carboxymethyl Cellulose from Corncob




Process	A process for the preparation of Carboxymethyl Cellulose (CMC) from Corncob.
Area	Food, pharmaceuticals and textiles.
Uses	Used as thickener, stabilizer, emulsifier , binder etc.
Salient Features	CMC is widely used in food, pharmaceuticals and textile industries. The novelty of this work is to produce good quality low cost CMC from corncob as an agricultural waste with higher DS (Degree of substitute) value as well as higher purity so that it can be used for food and pharmaceutical based products.
Scale	The process is standardized at lab scale.
Major Raw Materials	Corncob (Waste of corn)
Major Plant Equipment	Water bath, grinding machine, stirrer, Mixing Vessel, Filter.
Details of specific application	Food, pharmaceuticals and textile industries.
Status of development	The process has been accepted and ready for lease out.
Patenting details	Patent pending
Commercialization Status	Ready for commercialization.
Techno- economics	
Key words	CMC, purity, DS, pharmaceutical
Production cost	60Tk/ 250 g

### Potash alum from Banana tree ash



Process	A process for the production of Potash alum.
Area	Chemical pharmaceutical and textile industries.
Uses	Used as mordant in textile industries, used as food additive and raw materials in pharmaceuticals industries.
Salient Features	In Bangladesh, these industries fully depend on imported potash alum. Literature showed that banana tree ash is rich in potash content whereas every year about 42000-43000 tons of waste banana tree stems are generated in our country. In this process potash alum is produced from banana tree ash.
Scale	The process is commercialized at laboratory scale.
Major Raw Materials	Waste Banana tree, Milk of lime, Spent aluminium and Acid.
Major Plant Equipment	Balance, Specially designed oven, Stainless steel beaker.
Details of specific application	Potash alum is an essential chemical used in textile dyeing(as mordant), sizing paper, production of fire proofing materials, paints, purification of water, medicine and as tanning agent and food additive.
Status of development	The process is 2commercialized at laboratory.
Patenting details	Potash alum is prepared form natural source (waste banana tree) so that the process has an impact in waste commercial.
Commercialization Status	Patented.
Techno- economics	Ready for commercialization.
Key words	Available on demand.
Production cost	10Tk/ 100 g

<b>Papaya Jelly</b>		
		
Process	A Process for the Production of Papaya Jelly	
Area	Fruits Preservation	
Uses	Development of Papaya fruit product.	
Salient Features	<p>Papaya contains carbohydrates, protein, minerals and vitamins. It is mostly consumed as fresh or decent fruit. Jelly prepared from papaya extract provides an article of food stamina. Due to lack of preservation technology, great quantities of papaya become wasted each year. It has a food demand in the local market as well as export potential.</p>	
Scale	The process is standardized at laboratory scale	
Major Raw Materials	Papaya pulp, Sugar, Citric acid etc.	
Major Plant Equipment	pH Meter, Refractometer, oven, blender, saucepan etc.	
Details of specific application	Used as fruits based energy product.	
Status of development	The product has been tested for nutritional values and microbial load. It is ready for commercialization.	
Patenting details	Papaya Jelly is very delicious, tasty and very useful food for patients. The process and the equipments used are environment friendly. The production cost is in affordable level and it will create employment opportunities.	
Commercialization Status	Patented	
Techno- economics	Ready for commercialization.	
Key words	Available on demand	
Production cost	120Tk/ 500g	

### Ripe Mango Pulp Powder



Process	A Process for the Production of Ripe Mango Pulp Powder for Instant Drink.
Area	Fruits Preservation
Uses	Preparation of Soft Drinks, Squash, Nectar etc.
Salient Features	Mango fruit is perishable in ripe condition. Every year large quantities of mangoes become wastage due to lack of proper preservation knowledge. The economic utilization of this valued fruit is to preserve by drying the mango pulp to powder form to produce stable bulky and easily handled material
Scale	The process is standardized at laboratory scale
Major Raw Materials	Ripe Mango Pulp, Sugar, Citric acid etc.
Major Plant Equipment	Oven, pH Meter, Refractometer, blender, saucepan etc.
Details of specific application	Used for production of instant Drinks, Squash, and Nectar.
Status of development	The product has been tested for nutritional values and microbial load. It is ready for commercialization.
Patenting details	The raw material used herein is seasonal natural products that are available in large amounts. The raw material is environment friendly and cost effective. The equipments used and production procedure followed here are also environment friendly.
Commercialization Status	Patented
Techno- economics	Ready for commercialization.
Key words	Available on demand
Production cost	125Tk/ 250 g



## Green Mango Pulp Powder



Process	A Process for the Production of Green Mango Pulp Powder for Instant Drink.
Area	Fruits Preservation.
Uses	Production of instant drinks from green mango pulp powder.
Salient Features	Green mango is highly nutritious fruits that can be used for production of pickles, juice etc. But due to storm large amount of green mango have been wasted each year. If is possible to develop proper preservation technology for this economic potential fruits then it will create a great opportunity to establish small industries throughout the country and to export in foreign countries.
Scale	The process is standardized at laboratory scale
Major Raw Materials	Green Mango Pulp, Sugar, Citric acid etc.
Major Plant Equipment	pH Meter, Refractometer, oven, blender, saucepan etc.
Details of specific application	For Production of Soft Drinks, Squash etc.
Status of development	The product has been tested for chemical and microbial parameters. It is ready for commercialization.
Patenting details	The raw material used herein is seasonal products that are perishable and available in large amounts. The raw material is environment friendly and cost effective. The equipments used here are also environment friendly.
Commercialization Status	Patented
Techno- economics	Ready for commercialization.
Key words	Available on demand
Production cost	100Tk/ 250 g

## Herbal Fish Feed



Process	A process for the preparation of herbal fish feed in the remedy of catla fish diseases
Area	Fish feed production for aquaculture
Uses	Used as fish feed for major carps as well as in the remedy of fish disease.
Salient Features	Fish disease is the great threat in our fish culture system. Fishes affected by various types of disease decreases production significantly. The parasites, bacteria and fungus are most important pathogen for diseases outbreak. Now-a-days, different medicines, antibiotic and chemical are used for remedy of fish disease. This synthetic chemical insecticides and pesticides are reported to have residual toxicity which affects aquatic food chain. So, the use of medicine derived from plants for checking fish disease is necessary. The main features of this process are production of herbal fish feed in the remedy of fish diseases and preparation of herbal fish feed commercially.
Scale	The process is standardized at laboratory scale.
Major Raw Materials	Guava leaves , Garlic ,maize bran, mustard cake, wheat bran, soybean cake, ground nut cake, crushed oyster, etc.
Major Plant Equipment	Grinding mill, Balance (Conventional) and other.
Details of specific application	Used as fish feed produced from locally available raw materials which is cheap and safe for health vigor of fishes. In addition, it will facilitate prevention and remedy of fish diseases.
Status of development	The process is standardized at laboratory.
Patenting details	This herbal fish feed have no side effect to fish and its environment.
Commercialization Status	Not patented.
Techno- economics	Ready for commercialization.
Key words	Available on demand.
Production cost	30Tk/ kg

## Aloe vera body lotion



Process	A process for the production of Aloe vera body lotion
Area	Cosmetic and Toiletries Industry
Uses	Used as skin care product
Salient Features	Aloe gel can be applied topically to heal wounds and soothe <u>skin</u> . Aloe moisturizes the skin without giving it a greasy feel, so it's perfect for oily skin. For mineral-based make-up, aloe vera acts as a moisturizer and is great for the face prior to the application to prevent skin drying. In addition, aloe vera stimulates fibroblasts, the skin cells responsible for wound healing and the manufacture of collagen, the protein that controls the aging process of the skin and wrinkling. It appears to help the pores of the skin open and receive the moisture and nutrients of the plant.
Scale	The process is standardized at bench scale
Major Raw Materials	Aloe vera
Major Plant Equipment	SS Vat with stirrer, filling machine
Details of specific application	The process is used as a natural moisturizer for the body.
Status of development	The process is standardized at laboratory.
Patenting details	Patent Filed
Commercialization Status	Ready for commercialization
Techno- economics	Available on demand
Key words	Body lotion, Aloe vera, Herbal cosmetic
Production cost	50Tk/ 100 g

## Aloe Vera Vanishing Cream



Process	A process for the production of Aloe vera Vanishing Cream
Area	Cosmetic and Toiletries Industry
Uses	
Salient Features	<i>Aloe vera</i> has been used for centuries for its medicinal and healing properties. It contains vitamins, minerals, amino acids and antioxidants that work wonders for the skin. It has antioxidant and antibacterial properties and hence it accelerates the healing of burns, helps prevent wrinkles, can reduce acne and lighten blemishes and works as a natural moisturizer.
Scale	The process is standardized at bench scale
Major Raw Materials	Aloe vera
Major Plant Equipment	SS Vat with stirrer, filling machine
Details of specific application	<ul style="list-style-type: none"> <li><input type="checkbox"/> Give skin extra moisturization, and to keep it soft and supple.</li> <li><input type="checkbox"/> Its Aloe Vera protects the skin from bacteria, and regenerates damaged tissues.</li> <li><input type="checkbox"/> It is also an excellent sunscreen, guarding the skin against harmful UV rays of the sun.</li> <li><input type="checkbox"/> Its extra rich moisturizer gives the skin a smooth, satin finish.</li> </ul> <p>Oil and pH balancing Formula</p>
Status of development	
Patenting details	Patent Filed
Commercialization Status	Ready for commercialization
Techno- economics	Available on demand
Key words	Vanishing Cream, Aloe vera, Herbal cosmetic
Production cost	80Tk/ 100 g

## Shatamuli Powder Drink



Process	A process for the production of Shatamuli Powder Drink
Area	Unani and Ayurvedic medicine Industry
Uses	The process is used as a natural dietary supplement.
Salient Features	<i>Asparagus racemosus</i> (satavar, shatavari, or shatamull) is a species of asparagus common throughout <u>Nepal</u> , <u>Srilanka</u> , <u>India</u> and the <u>Himalayas</u> . <i>Asparagus racemosus</i> (Shatavari) is recommended in Ayurvedic texts for the prevention and treatment of gastric ulcers and dyspepsia, and as a galactogogue. <i>A. racemosus</i> has also been used by some Ayurvedic practitioners for nervous disorders.
Scale	The process is standardized at bench scale
Major Raw Materials	Shatamuli Roots
Major Plant Equipment	Plant Crusher, filling machine
Details of specific application	<ul style="list-style-type: none"> <li>➤ Useful in general disability, dyspepsia, dysentery, hyperacidity, stomachic, digestive and respiratory system.</li> <li>➤ As a cooling, nervine tonic.</li> <li>➤ Promotes healthy energy levels and strength</li> <li>➤ Supports the immune system</li> </ul> <p>Natural antioxidant properties</p>
Status of development	The process is standardized at laboratory.
Patenting details	Patent Earnd
Commercialization Status	Ready for commercialization
Techno- economics	Available on demand
Key words	Powder drink, Shatamuli, Herbal tonic
Production cost	80Tk/ 250 g

## Herbal Tulsi Tea



Process	A process for the production of Herbal Tulsi Tea
Area	Unani and Ayurvedic medicine Industry
Uses	The process is used as a herbal tea.
Salient Features	<i>Ocimum tenuiflorum</i> , also known as <i>Ocimum sanctum</i> , holy basil, or <i>tulasi</i> or <i>tulsi</i> is an aromatic plant in the family <u>Lamiaceae</u> . <i>Tulsi</i> has been used for thousands of years in <u>Ayurveda</u> for its diverse healing properties. <i>Tulsi</i> is considered to be an <u>adaptogen</u> , balancing different processes in the body, and helpful for adapting to stress. It is regarded in Ayurveda as a kind of "elixir of life" and believed to promote longevity. Traditionally, <i>tulasi</i> is taken in many forms: as herbal tea, dried powder, fresh leaf or mixed with <u>ghee</u> . Essential oil extracted from <i>Karpoora tulasi</i> is mostly used for medicinal purposes and in herbal cosmetics.
Scale	The process is standardized at bench scale
Major Raw Materials	Tulsi plant
Major Plant Equipment	Plant Crusher, filling machine
Details of specific application	<input type="checkbox"/> Enhances energy, stamina and endurance. <input type="checkbox"/> Boosts the immune system. <input type="checkbox"/> Provides a rich supply of antioxidants and other important nutrients. <input type="checkbox"/> Balances the healthy digestive system
Status of development	The process is standardized at laboratory.
Patenting details	Patent Earned
Commercialization Status	Ready for commercialization
Techno- economics	Available on demand
Key words	Tulsi Tea, Herbal Tea, Tulsi Plant
Production cost	100Tk/ 250 g

## Aloe vera Powder



Process	A process for the production of Aloe vera powder
Area	Unani/Ayurvedic/Cosmetics and Pharmaceutical Industry
Uses	The process is used as a raw material for the production of cosmetics and pharmaceuticals.
Salient Features	<ul style="list-style-type: none"> <li>➤ It's easier to store</li> <li>➤ It's easier to mix with other medicinal and cosmetic compounds.</li> <li>➤ It's easier to ship.</li> <li>➤ It's ready to use right away.</li> </ul>
Scale	The process is standardized at bench scale
Major Raw Materials	Aloe vera
Major Plant Equipment	Plant Crusher, filling machine
Details of specific application	<ul style="list-style-type: none"> <li>➤ <i>All skin care products, soothing creams &amp; lotions, sun care &amp; after-sun products, shampoos &amp; conditioners.</i></li> <li>➤ <i>As an important ingredients in pharmaceutical (tablets, capsule, peel etc.).</i></li> </ul> <p><i>It has also a longer shelf life than liquid Aloe vera.</i></p>
Status of development	The process is standardized at laboratory.
Patenting details	Patent Earned
Commercialization Status	Ready for commercialization
Techno- economics	Available on demand
Key words	Aloe vera Powder, Aloe vera, Cosmetic & Pharmaceuticals ingredients
Production cost	125Tk/ 250 g