

Activities of Bangladesh Council of Scientific and Industrial Research (BCSIR)



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Cairo, Egypt

Introduction to BCSIR



BCSIR Main Campus

BCSIR wings

1. BCSIR Laboratories, Dhaka
2. BCSIR Laboratories, Chittagong
3. BCSIR Laboratories, Rajshahi
4. Institute of Food Science and Technology (IFST)
5. Institute of Fuel Research and Development (IFRD)
6. Institute of Glass & Ceramic Research & Testing (IGCRT)
7. Pilot Plant and Process Development Centre (PP & PDC)
8. Leather Research Institute
9. Institute of Mining Mineralogy and Metallurgy
10. Designated Reference Institute for Chemical Measurements
11. Institute of Analytical Research and Services
12. Planning and Development
13. Biomedical and Toxicological Research Institute

BCSIR Management

- **Management of BCSIR** : The Chairman and 4 fulltime members
- **BCSIR Board** : The Chairman, 4 fulltime & 4 part time members
- **Advisory Council** : Formulates Policies
- **Research Units** : Headed by Directors

Introduction to BCSIR (Contd.)

R&D Areas

- Analytical chemistry
- Biological science
- Biogas technology
- Biomaterials
- Biorefinery
- Building materials
- Chemical technology
- Chemical metrology
- Fibre and polymer
- Food science & technology
- Glass & ceramics
- Herbal medicine & natural products
- Industrial physics
- Leather technology
- Microbiology
- Mining, mineralogy & metallurgy
- Nanotechnology
- Pharmaceutical chemistry
- Pulp and paper
- Renewable energy
- Soil, Water & environmental science

Activities of BCSIR: HRD

Since May 2017

- **HR**
 - Posts of scientists: 473 (approved)
741 (Under consideration)
 - PhD: 100
- **On going Higher Education (Ph. D)**
 - At Home – 45
 - From Abroad - 55
- **Fellowship offered to students: 50**

TRAINING

- ❖ In-house training on sophisticated laboratory instruments -15 training program per year (15-20 participants in each Training program)
- ❖ Training organize for army officers and Sanitary inspectors.
- ❖ Training organize for different technical persons in industry
- ❖ Training organize for rural people in different parts of the country

Capacity Building

Capacity Building through ADP

- ❖ Establishment of Physical Facilities for Technology Transfer and Innovation in BCSIR
- ❖ Strengthening of Leather Research Institute
- ❖ Capacity Building of IFST for Research on Milk and Dairy Products
- ❖ Establishment of designated reference institute for chemical measurements
- ❖ Establishment of Mineral Processing Center at IMMM of BCSIR

BIOMEDICAL AND TOXICOLOGICAL INSTITUTE

- **Implants**
- **Type 2 (mechanism of action)**
- **Brain cell development**
- **Cardio-protective/ Hepato-protectie**



ARSENIC REMOVAL TECHNOLOGY VERIFICATION

- **Institute of National Analytical Research and Service, BCSIR are mandated by the Government of Bangladesh to verify/reject the performance claims of Arsenic Removal Technologies (ART). This mandate allows no ART to be sold in Bangladesh without verification of its performance claims by BCSIR.**
- **INARS scientists have verified performance claims of 06 (Six) out of 14 Arsenic Removal Technologies (ART).**

PICTORIAL VIEW OF VERIFIED & CERTIFIED 6 ARTS



Alcane



Nelima



Read-F



Swadesh



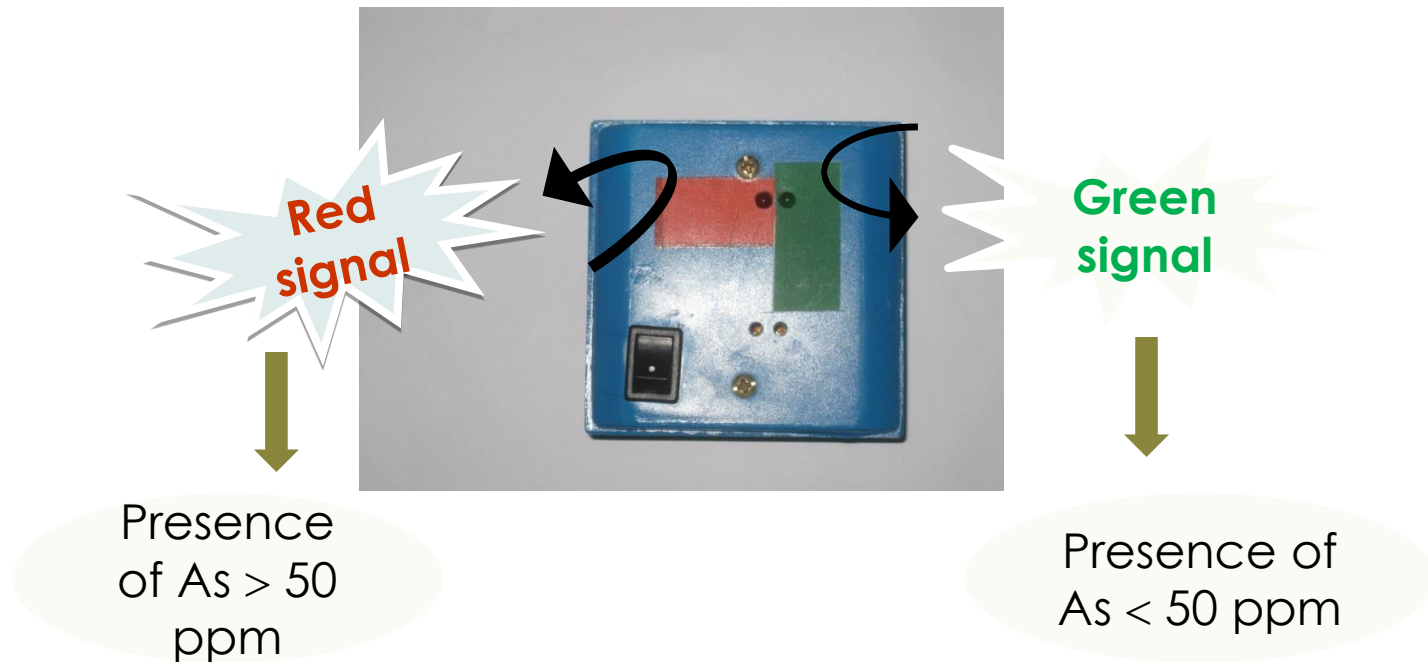
Sono



Sidko

R&D achievements

(1) Arsenic Test Kit

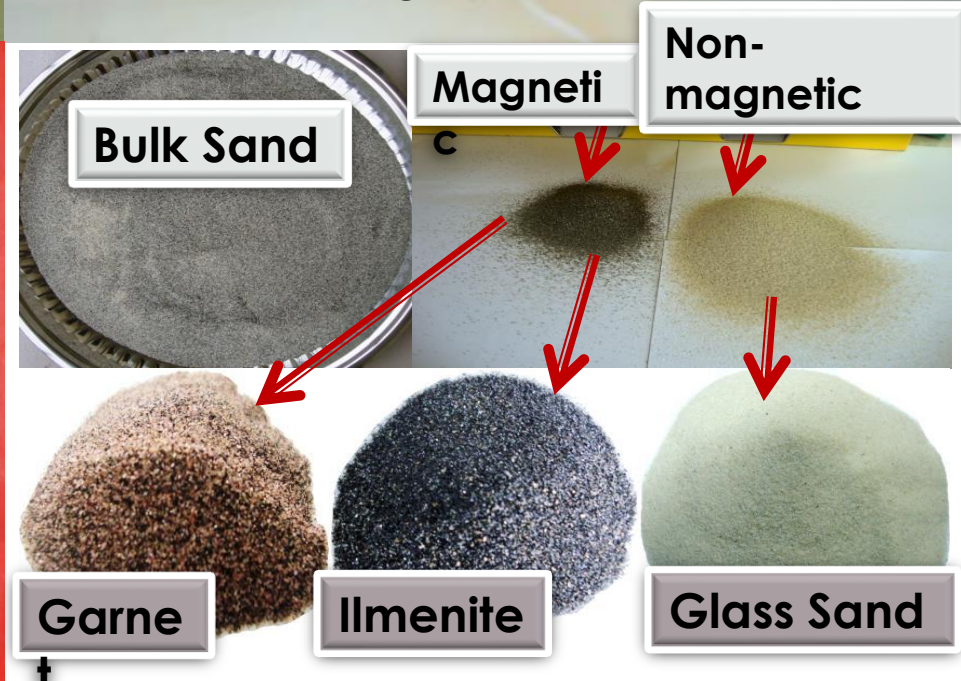
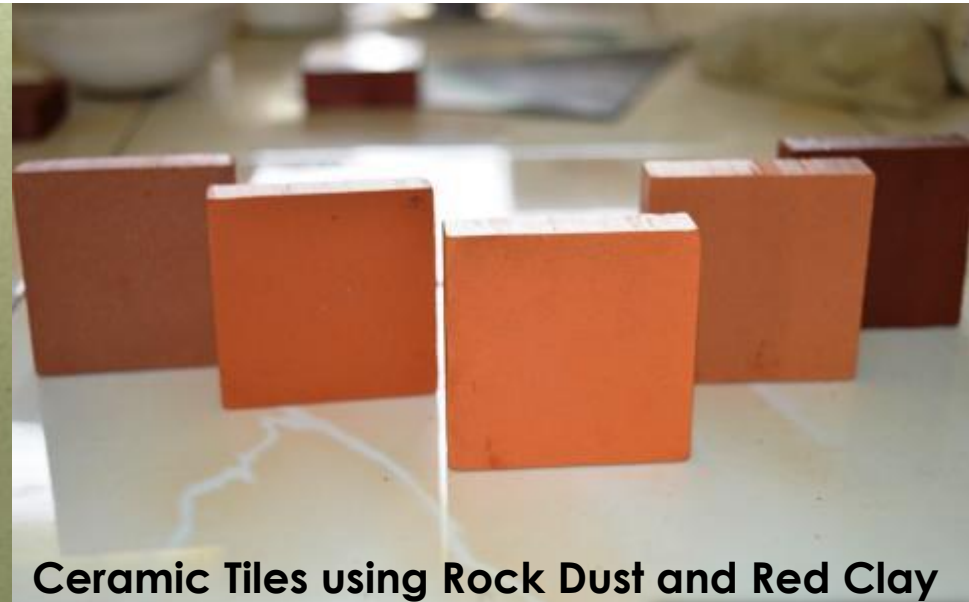


R&D achievements

(2) Development of Mineral water



Institute of Mining, Mineralogy and Metallurgy (IMMM)



High yielding bulb size with strong pungent aroma of *Allium cepa* L. at early harvest as influenced by plant growth regulators and organic fertilizer (Blood meal)

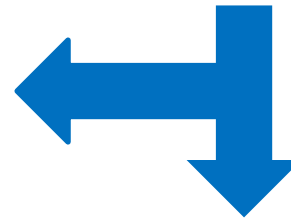


Large in size but less in pungency
(Hybrid onion)



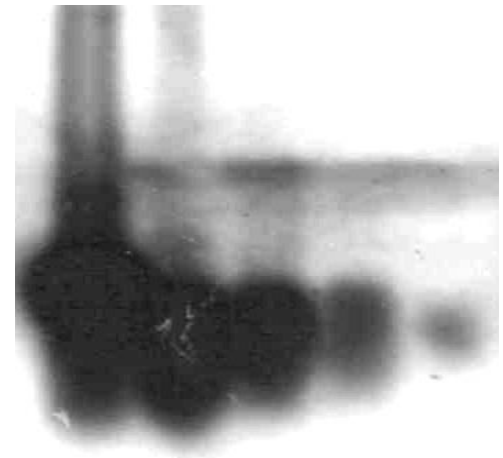
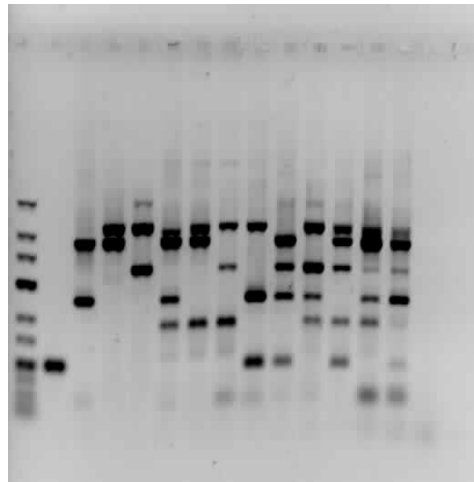
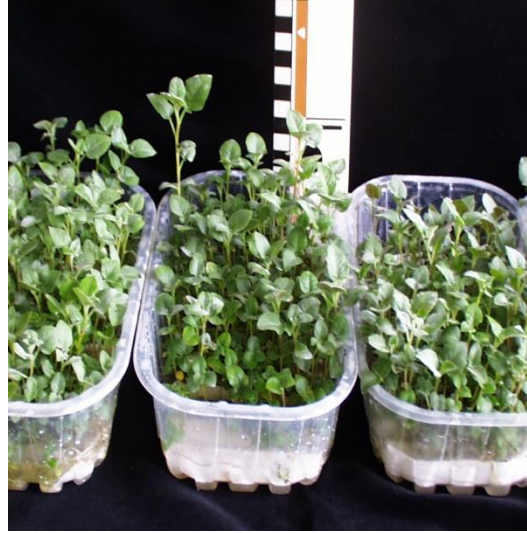
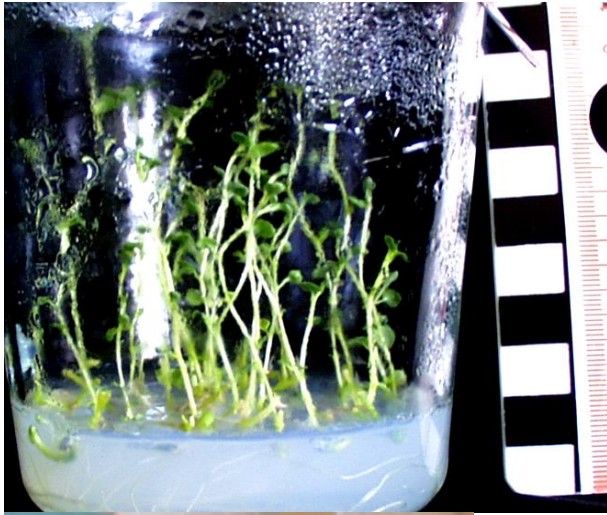
Small size with strong pungent aroma
(Local onion)

- ❖ Plant Growth Regulator(GA_3).
- ❖ Organic fertilizer (Blood meal)



Developed variety of onion(*Allium cepa* L.)
(High yielding bulb size with strong pungent aroma)

BCSIR had developed protocol for quality seed potato production and it has also been established 40 agro based industry to use our protocol in Bangladesh.



DRY STRENGTH AGENT FROM LEATHER SHAVINGS

- Everyday 20MT of leather shavings are generated in Bangladesh
- 10-12% protein is obtained from leather shavings.
- Complex formation with chitosan
- 10-15% papermaking properties are improved at pH 4.



OTHER IMPORTANT DEVELOPMENT

- Development of ammonia free deliming agent for leather processing.
- Development of technique of dyeing leather with natural dye.



- Design and Development of Diabetic Foot wear for Diabetic Patients.
- Production of Footwear Insole Material from Leather Shaving Dust.



BCSIR is successful in implementing renewable energy research

- ❖ Mitigation of Carbon Emission and Extension of Alternative Energy usage through dissemination of Biogas Plant and Improved Cook Stove.
- ❖ Biogas: In 980s IFRD, BCSIR started biogas research. BCSIR installed **29,791** biogas plants. Now it has been expanded to all parts of the country through NGOs, which were trained by IFRD, BCSIR.
- ❖ Improved stove: IFRD, BCSIR installed **2,08,421** improved stove. Now it has been expanded to all parts of the country through NGOs, which were trained by IFRD, BCSIR.



TRANSPARENT/BUILDING INTEGRATED SOLAR CELLS

- Nanostructured semiconducting metal oxides (e.g., ZnO Nanorods, Cu_2O , NiO, BaTiO_3 etc.)
- Theoretical studies for better understanding the experimental results

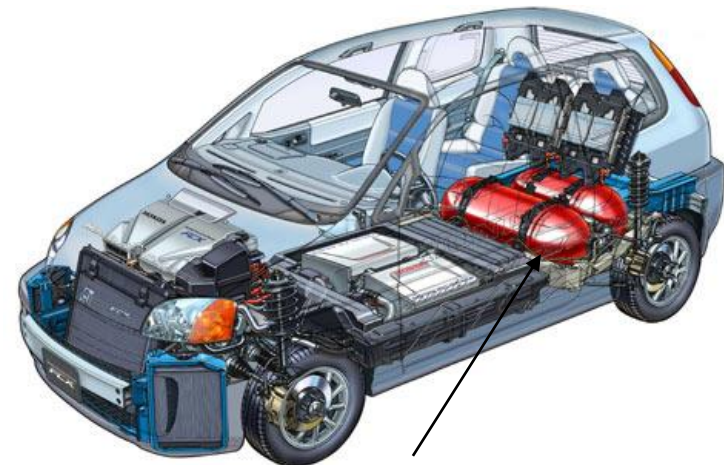
ENERGY STORAGE

- Photoelectrochemical water splitting for H_2 production (Target materials: Cu_2O , TiO_2 Nanotubes, Fe_2O_3 etc.)
- Graphene and reduced Graphene oxide based conducting inks

(a)



(b)



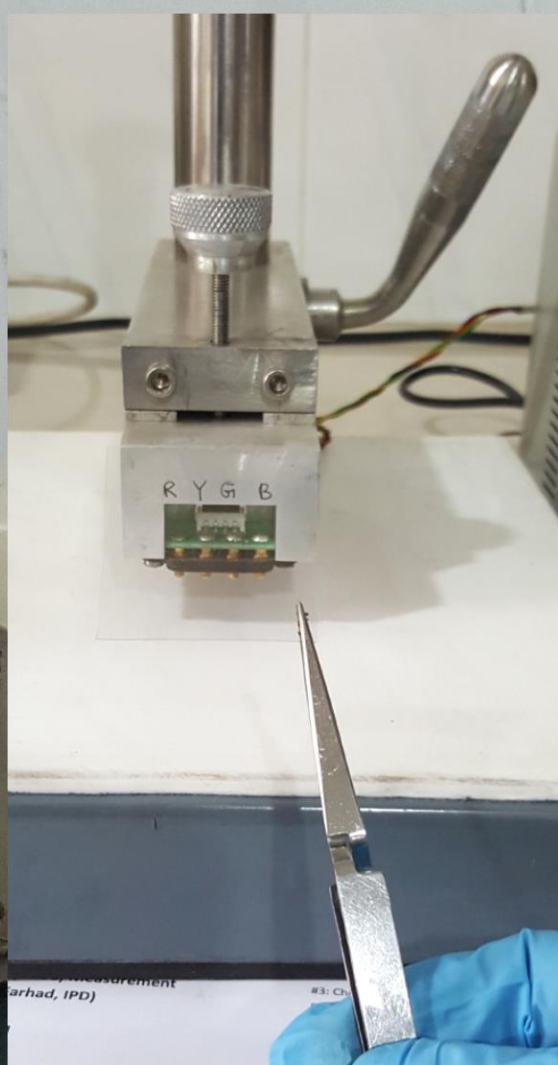
Hydrogen fuel cell car



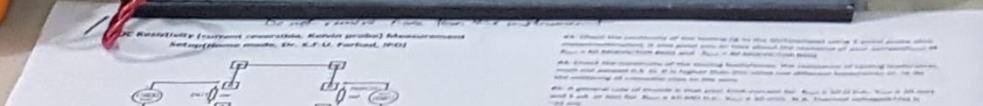
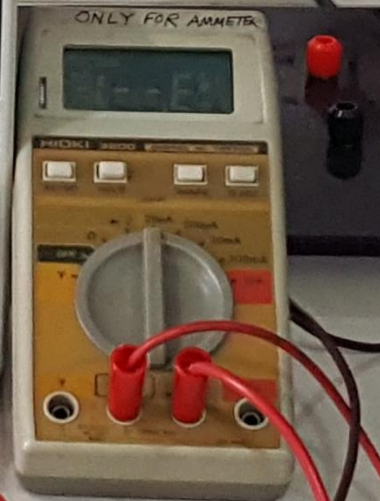
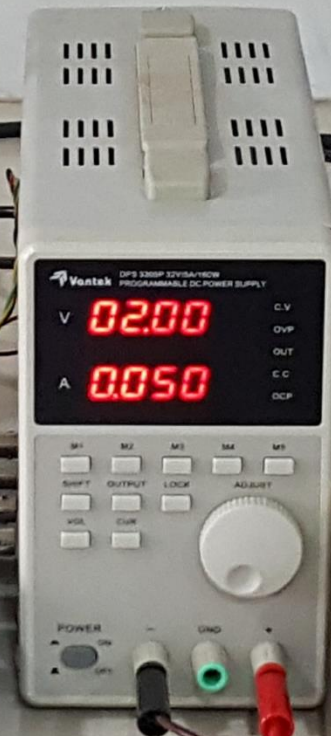
Four Point Collinear Probe(IPD)

R : 5Ω - $1\text{ M}\Omega$

Approx. Cost BDT 50000



2 cm



Universal Adaptor/Test Jig

Solid test fixture

Gold Electrode

1 cm

Liquid test fixture

R : 1Ω - $10\text{ M}\Omega$

Target > R : $1\text{ m}\Omega$ - $1\text{ G}\Omega$

Energy saving brick



Bio-ceramic materials



Polymer modified bitumin (60-70 grade)



Some sophisticated instruments in F&PRD



FT-MIR/NIR Spectrometer with Diamond ATR & NIRA Accessories



UPLC-MS-MS System



Centrifugal Partition Chromatograph



FT-Raman Spectrometer with Ge Detector

Some State of the Art Equipment....



Size Exclusion/gel Permeation Chromatograph



Gel Permeation Chromatograph



Hyphenated TG-GC-MS System



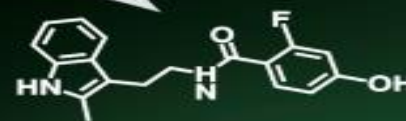
Particle Size & Zeta Potential Analyzer

Computer-aided design: striving towards more rational drug discovery at BCSIR laboratories- Chittagong

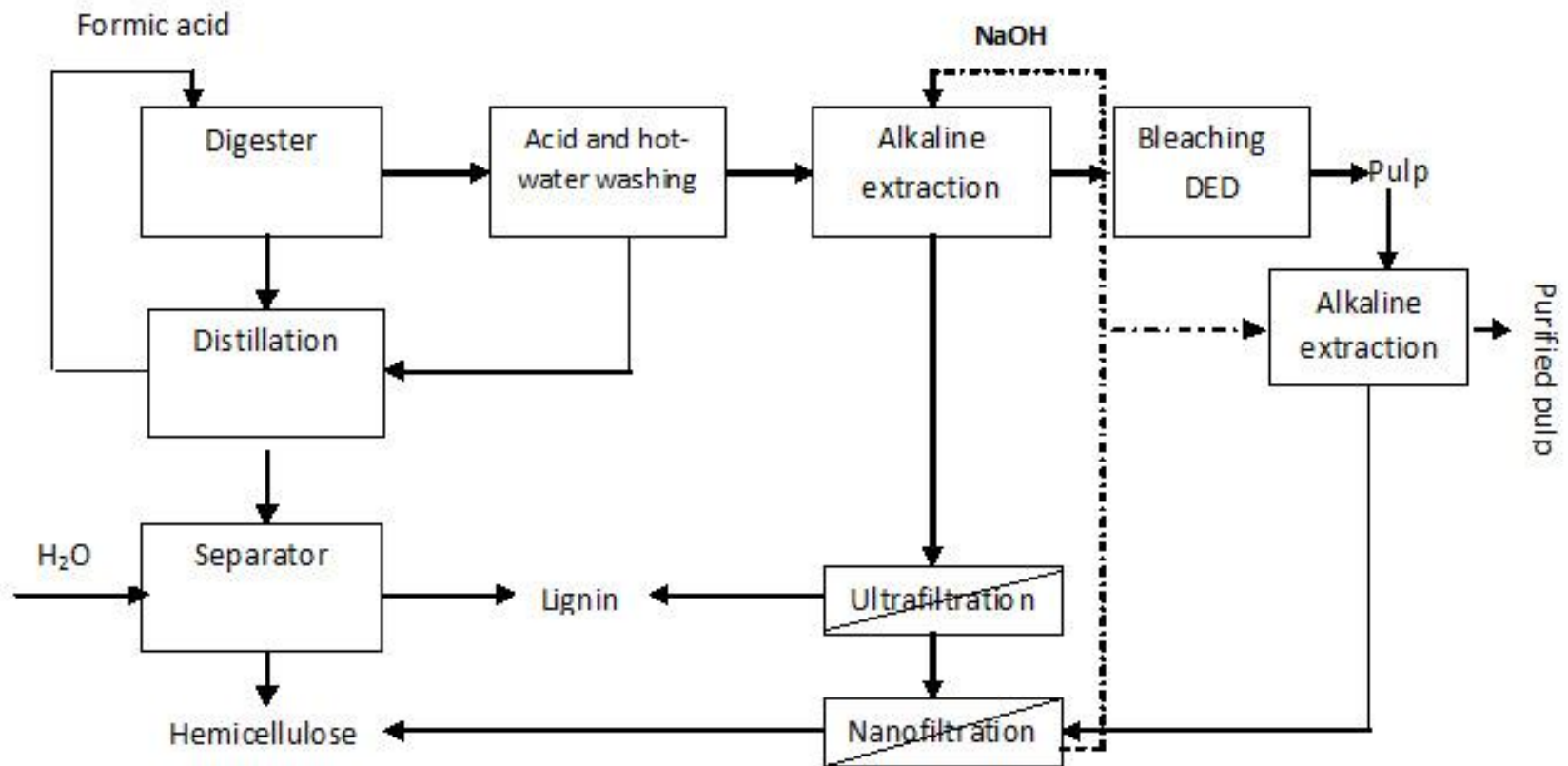
- The goal is to speed up the rational pre clinical drug design and discovery research by minimizing cost and time.



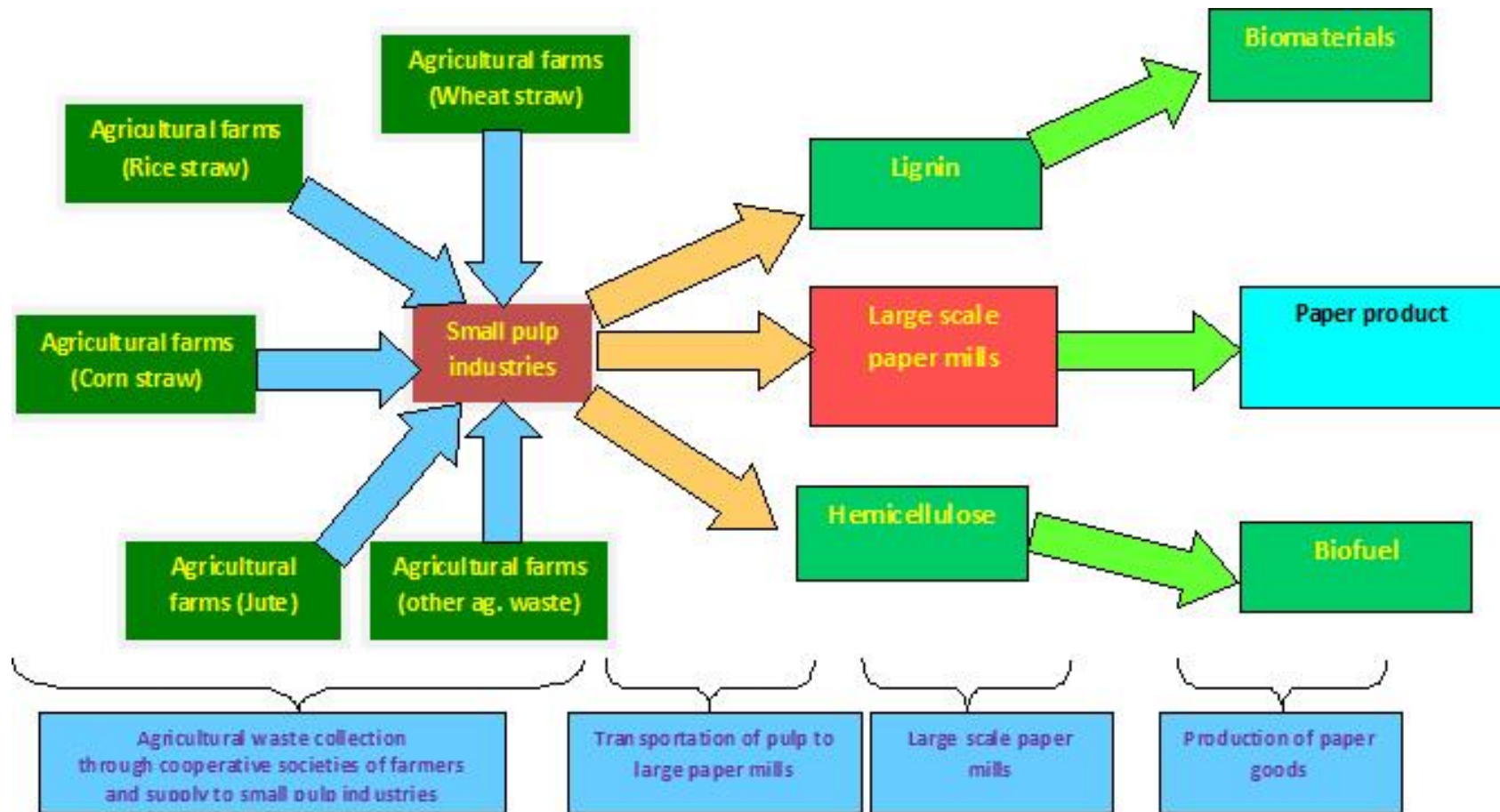
Molecular Modeling and Drug Design Laboratory
Pharmacology Research Division
Bangladesh Council of Scientific & Industrial Research Laboratories, Chittagong



FRACTIONATION OF AGRICULTURAL WASTES IN BIOREFINERY INITIATIVE



BIOREFINERY IN COOPERATIVE CONCEPT



DR. MOHAMMAD NAZRUL ISLAM BHUIYAN

SENIOR SCIENTIFIC OFFICER
INSTITUTE OF FOOD SCIENCE AND TECHNOLOGY
(IFST)
BCSIR

Award

- Infectious Disease Fellow-2017
- American Society for Microbiology (ASM)
- **Description:** This fellowship is a very prestigious awards offers from ASM. This Fellowship offers fellows to engage in clinical infectious diseases, medical diagnostic microbiology, or infectious disease pharmacy research in an experience specifically tailored to education development.

Prospective collaborative Research

- **Nanotechnology**
- **Renewable Energy**
- **Food Science and Technology**
- **Herbal Medicine and Medicinal Plant**
- **Biorefinery**
- **Biotechnology**



Offering collaborative research with other centre of excellences of COMSATS

- Mineral and mineralogical services
- Renewable energy
- Bioequivalence study
- Biomaterials, Biochemicals and Biofuel (biorefinery)
- Materials and metallurgical science and engineering

THANK YOU