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- Pankaj Jha
- Parth Srivastava
- Prof. Gaur Shanker
- RAJU SAROJ BTECH
- RITIK KATIYAR betechstu...
- SANJIT PANDEY hbtu
- Shakti Katiyar
- SHASHIKANT BE
- Shravan Kumar
- SURAJ SINGH betechstu...
- TANMAY OJHA hbtu
- VARSHA YADAV betechst...

Grid of participants:

- Narayan Industries and Technical Services
- Shravan Kumar
- SHASHIKANT BE
- VIDHI SAXENA M.TECH.
- MOHIT NIGAM PHD
- AAKRITI SARKAR betechstudent2020-21@hbtu.ac.in
- BABY SHRUIT SHUKLA M.TECH.
- 21 others
- You

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Narayan Industries and Technical Services is presenting

BIOMATERIALS FOR FOOD PACKAGING - HBTU - Microsoft PowerPoint

Slide 1 of 70 | Office Theme | English (United States)

Slide content:

**BIOMATERIALS AND FOOD PACKAGING FOR EXTENDED SHELF LIFE**

S B Yadav  
Scientist 'G' (Retd)  
Defence Materials and Stores  
Research & Development Establishment,  
DMSRDE, (DRDO)  
G.T. Road, Kanpur -208013

PROPRITER  
Narayan Industries and Technical Services, (NITS)  
Rooma, Kanpur  
(Manufacturing of Garments and Testing Laboratory,  
Testing of Metals and Alloys, Building Materials and Textile)

Grid of participants:

- Shravan Kumar
- Narayan Industries and Techni...
- SHASHIKANT BE
- VIDHI SAXENA M.TECH.
- MOHIT NIGAM PHD
- AAKRITI SARKAR betechstude...
- VAISHNAVI TIWARI betechstud...
- 27 others
- You

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Shravan Kumar

Narayan Industries and...

BABY SHRUIT SHUKLA ...

VIDHI SAXENA M.TECH.

MOHIT NIGAM PHD

AAKRITI SARKAR betec...

VAISHNAVI TIWARI bot...

33 others

You

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- Head Bio-Chemical (You) Meeting host
- AAKRITI SARKAR betecs...
- Abhishek Kumar
- ANIL YADAV BTech
- ANSH GOYAL betechstud...
- APOORVA ANSHU JHA M...
- AYUSH KUMAR SRIVASTA...
- BABY SHRUIT SHUKLA M...
- DEVANSH SINGH betecs...
- Dilip Kumar BE

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VAISHNAVI TIWARI bot...

33 others

You

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In call

- DIVYA TRIVEDI hbtu
- DIVYANSHI SACHAN hbtu
- Dr Rajkamal Kushwaha
- HARSH VERMA betechstu...
- KAUSHAL KANNALJIA be...
- Mohit Kumar Yadav Bio C...
- MOHIT NIGAM PHD
- MUSKAN hbtu
- NAMAN SHARMA betech...
- Narayan Industries and Te...
- Narayan Industries and Te... Presentation
- Neha Zia

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Major natural biological materials used in food biobased packaging

Lipids Polysaccharides Proteins

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**Packaging**

- Packaging is an art, a technique by which stores are protected during storage and transit to ensure safe delivery of the content (product) to the ultimate consumer in a sound condition at a minimum over all cost.
- Packaging also refers to the process of design, evaluation, and production of packages.
- Packaging can be described as a coordinated system of preparing goods for transport, warehousing, logistics, sale and end use.
- Packaging contains, protects, preserves, transports, informs and sells

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- ANSH GOYAL betechstud...
- APOORVA ANSHU JHA M...
- AYUSH KUMAR SRIVASTA...
- BABY SHRUIT SHUKLA M...
- DEVANSH SINGH betechs...
- Dilip Kumar BE
- Divy Trivedi
- DIVYA TRIVEDI hbtu
- DIVYANSHI SACHAN hbtu

Shravan Kumar

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BABY SHRUIT SHUKLA ...

VIDHI SAXENA M.TECH.

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VAISHNAVI TIWARI bet...

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- shaili pal
- Shakti Katiyar
- SHASHIKANT BE
- Shravan Kumar
- SURAJ SINGH betechstu...
- TANMAY OJHA hbtu
- VAISHNAVI TIWARI betec...
- VARSHA YADAV betechst...
- VIDHI SAXENA M.TECH.
- vipul kumar

Shravan Kumar

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VIDHI SAXENA M.TECH.

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## Objectives of Packaging and Package Labeling

**Physical protection** – The objects enclosed in the package may require protection from, among other things, mechanical shock, vibration, electrostatic discharge, compression, temperature etc.

**Barrier protection** – A barrier from oxygen, water vapour, dust, etc., is often required.

**Permeation** is a critical factor in design. Some packages contain desiccants or oxygen absorbers to help extend shelf life.

Modified atmospheres or controlled atmospheres are also maintained in some food packages. Keeping the contents clean, fresh, sterile and safe for the intended shelf life is a primary function.

Shravan Kumar

Narayan Industries and Techni...

AMAN GUPTA btechstudent2...

ANSH GOYAL btechstudent2...

MOHIT NIGAM PHD

AAKRITI SARKAR btechstude...

VAISHNAVI TIWARI btechstud...

37 others

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### Anti-counterfeiting Packaging –

- Packages can be engineered to help reduce the risks of package pilferage or the theft and resale of products: Some package constructions are more resistant to pilferage and some have pilfer indicating seals.
- Packages also can include anti-theft devices, such as dye-packs, RFID tags, or electronic article surveillance tags that can be activated or detected by devices at exit points and require specialized tools to deactivate.

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### Package Characteristics

<b>Physical</b>	<b>Physico-chemical</b>
Physical State	Moisture
Weight	Oxygen
Stability	Temperature
Rigidity	Bacteria, Fungi
Surface Finish	

### Attributes of a Package

Easy to open	Recycle
Close	Identify
Dispose of	Pilfer-proof
Dispense	Informative
Eye appeal	Markings

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- **Prevention** – Waste prevention is a primary goal. Packaging should be used only where needed. A vital function of the package is to protect the product for its intended use.
- **Minimization** –The mass and volume of packaging can be measured and used as one of the criteria to minimize during the package design process. Usually “reduced” packaging also helps minimize costs.
- **Reuse** –Reuse of a package or component for other purposes is encouraged. Returnable packaging has long been useful and economically viable for closed loop logistics systems.
- **Recycling** – Recycling is the reprocessing of materials into new products. Emphasis is focused on recycling the largest primary components of a package: steel, aluminum, papers, plastics, etc.
- **Disposal** – Incineration, and placement in a sanitary landfill are needed for some materials. Packages for toxic contents, which have the potential to contaminate emissions and ash from incineration and leachate from landfill, should not be littered.

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### Corrugated Board

Board consisting of one or more sheets of fluted paper stuck to a flat sheet of paper or board or between several liners usually kraft. This has the following classifications.

- Single face corrugated
- 3- ply corrugated
- 5- ply corrugated
- 7- ply corrugated

The material is manufactured from paper as an alternative to wood. The origin, however, is wood as under,

Wood → Wood Pulp → Kraft Paper → Corrugated Board → Recyclable to paper pulp and back to board

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## Plastic Packaging: PROs and CONS



**PROs**

- Lower cost
- Lighter weight
- Less apt to break or shatter
- Transparency
- Flexibility



**CONS**

- High gas and water vapour permeability
- Low heat resistance
- Migration
- Food/beverage flavour
- Poor appearance

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## BIOBASED AND BIODEGRADABLE POLYMERS

**Synthetic biopolymers**  
Synthesized from bio-derived monomers

**Synthetic polyesters**  
Polylactic acid  
Poly(butylene succinate)  
Poly(butylene succinate) adipate  
Etc.

**Microbial biopolymers**  
Produced by microorganisms

**Microbial Polyesters**  
Polyhydroxyalkanoates  
Etc.

**Exopolysaccharides**  
Bacterial cellulose  
Bacterial alginate  
Xanthan  
Etc.

**Natural biopolymers**  
Extracted from biomass

**Polysaccharides**  
Alginate  
Carrageenan  
Cellulose  
Chitosan  
Pectin  
Starch  
Etc.

**Proteins**  
Casein  
Gelatin  
Soy protein  
Zain  
Etc.

VARSHA YADAV betechstudent2020-21@bbtu.ac.in has left the meeting

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## Characteristics of BBFCMs

- Many BBFCMs exhibit biodegradability which is generally considered advantageous in comparison to the fossil-based plastics which generally do not.
- A hydrolysable linkage is a common feature in most biodegradable polymers and most are polyesters.
- Biodegradable materials degrade to carbon dioxide, water and residual biomass due to microbial metabolism and other mechanisms.
- The process is influenced by environmental conditions and with variable outcomes.

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- One approach to enhance packaging for prevention of microbiological proliferation is by the application of antimicrobial packaging films (active packaging).
- These agents can include but are not limited to: organic acids, bacteriocins, enzymes, essential oils and phenolic compounds.

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Further risks from biopolymers may include the presence of allergens or allergenic epitopes (the regions or allergen molecules capable of stimulating an allergic response), especially if protein based materials are used for construction of packaging or used as food films.

- These may be present in the initial feedstock or be generated during subsequent processing of the feedstock to produce the packaging.
- It is also possible that repeated exposure to allergenic materials may result in sensitization although the likelihood of this is uncertain.

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- Prof. S. K. Srivastava
- Santosh Kumar
- Shalinee Singh
- SHALINI PAL hbtu
- SHASHIKANT BE
- Shravan Kumar
- TANYA SRIVASTAVA M.TE...
- VAIBHAV TRIPATHI betech...
- VAISHNAVI SRIVASTAVA b...
- VAISHNAVI TIWARI betech...
- VIDHI SAXENA M.TECH.
- vipul kumar

Shalinee Singh

Narayan Industries and...

SHALINI PAL hbtu

Prof. S. K. Srivastava

Dilip Kumar BE

Brajesh Singh

Shravan Kumar

29 others

You

HIMANSHU SINGH hbtu has left the meeting

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- AIMAN
- ANSH GOYAL betechstud...
- ANURAG PAL betechstud...
- APOORVA ANSHU JHA M...
- BABY SHRUTI SHUKLA M...
- Brajesh Singh
- Dilip Kumar BE
- DIVYA TRIVEDI hbtu
- DIVYANSH VERMA hbtu
- DIVYANSHI SACHAN hbtu
- Dr Rajkamal Kushwaha
- HARSH VERMA betechstu...

Shalinee Singh

Narayan Industries and...

SHALINI PAL hbtu

Prof. S. K. Srivastava

Dilip Kumar BE

Brajesh Singh

Shravan Kumar

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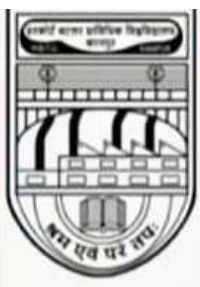
Participants (Grid):

- Shalinee Singh
- Narayan Industries and...
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- Dilip Kumar BE
- AAKRITI SARKAR betec...
- Shravan Kumar
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**BIOCHEMICAL ENGINEERING  
DEPARTMENT**

Presents

# EXPERT LECTURE



## Mr S.B. Yadaw

Scientist 'G' (Retd.)

DMSRDE (DRDO) Kanpur

Mr Yadaw has completed his B.E ( Metallurgical Engg) in 1983 from University of Roorkee, Roorkee (Now IIT Roorkee) and M. Tech (Materials Technology) in 1989 from IIT Bombay

Topic: Biomaterials and Food Packaging For Extended Shelf Life

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November 30, 2022  
(Wednesday)



11:00 AM