Saiqa Ikram ***Ph.D.***
Associate Professor-in-Chemistry
Jamia Millia Islamia
(Central University), New Delhi-110025

Present Position & Responsibilities

Associate Professor : ***Feb 22, 2018 to till date, JMI***
Assistant Professor: ***Feb 22, 2006 to Feb 21, 2018, JMI***

Teaching Subject Specialization: (UG & PG)	***Inorganic Chemistry, General Elective Chemistry***
Research Specialization :	***Material Sciences particularly Biopolymers Modification of Biopolymers for Industrial & Therapeutical Sustainable Applications***

ACADEMIC ACHIEVEMENTS

- THROUGHOUT FIRST CLASS ACADEMIC CAREER (from premiere national institution)
- Ranking in Masters (PG)

Ph. D.	Faculty of Technology, University of Delhi	JRF (UGC) SRF (CSIR)
Post-Doc	CBME Indian Institute of Technology	RA (CSIR)

RESEARCH ACHIEVEMENTS

Modification of Biopolymers for Industrial & Therapeutical Sustainable Applications

Funded Research Projects	**07** **2.8 Crores** immobilized in Jamia	DBT, DST, Jamia Innovation Grant, SPARC-MHRD, UGC, USAID-TERI, ASRT- Egypt **Establishment of Antimicrobial Research Lab, funded by DBT, INR 55 lakhs**
Patent & Technology Transfer/ Commercialization	**Foundation for Innovation & Tech Transfer, IITD**	Polyvinyl alcohol Supported Resins for Arsenic Separation and the Product there of Commercialization of Material by CAS, Division of American Chemical Society
Publications 26 (2017- 2022)	Review and Research Articles Books-09, Book Chapters-35	Google Scholar : 110 Scopus: 80 Web of Science: 77 ***Cumulative Impact Factor: ~10 (2017-till date)***
Ph.D. Supervision	**12 Awarded + 03(01+02) Postdocs** **05 Currently working**	
Citations i-10 & h-index	6206 (July 10, 2022) 50 & 28	

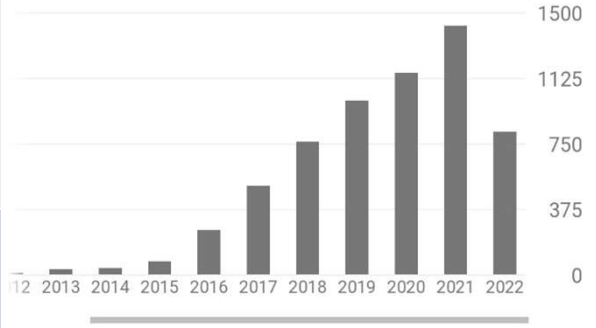
SAIQA IKRAM

Associate Professor Jamia Millia Islamia, New Delhi
Verified email at jmi.ac.in

Polymer Technology | Membrane Research | Chitosan | PVA

ARTICLES | CITED BY | PUBLIC ACCESS | CO-AUTHORS

	All	Since 2017
Citations	6206	5680
h-index	28	25
i10-index	50	40



Nominated for INSA FELLOWSHIP 2019 (NOMINATION IS IN 4TH STAGE)

Ongoing Research Activities

International Research Projects /Collaboration/MoA

- University of Bengkulu, Indonesia
- Durban University of Technology, South Africa

SPARC-MHRD **(Ongoing)**	**SPARC/2018-2019/P672/SL** dated 15.03.2019, in collaboration with **The University of Queensland, Brisbane, Australia**	**INR ~82,00,000**
INO-EGYPT **(Ongoing)**	**DST/INT/Egypt/P-05/2019** in collaboration with **Beni-Suef University Egypt** *Department of Science & Technology, Govt. of India and Academy of Scientific Research and Technology (ASRT), Egypt*,	**INR 13,50,000 + Egyptian Dimes 4,50,000)**
IIT Kharagpur **Scrutinized**	**GIAN 2020** **Northwest A & F University, Yangling, China**	**INR 12 Lakh**
DST-SERB (Submitted)	**Bio-Mimicked Polymer Surfaces for Carbonic Anhydrase Immobilization for CO_2 Mineralization towards Renewable Technologies** Reference No. : 162021003678POWER, DST 2022 (under technical review)	**~INR 42 Lakh**
MHRD (Submitted)	**Chitosan Nanocomposite as supports for Enzyme Immobilization: An Innovative Green Approach for CO2 Mineralization for Sustainability** MHRD SPARC with **RMIT University, Australia** SPARC/2020-21/P1276/SL (under technical review)	**~INR 49 Lakh**
TARE-DST **@stage of Sanctioning**	**Natural Gum based Exudate Retentive Hybrid Xerogels as Super Absorbents (SAPs) for Sustainable Sanitary Hygiene** TAR/2022/000335i (@Sanctioning by Aug 2022)	**~INR 45 Lakh**

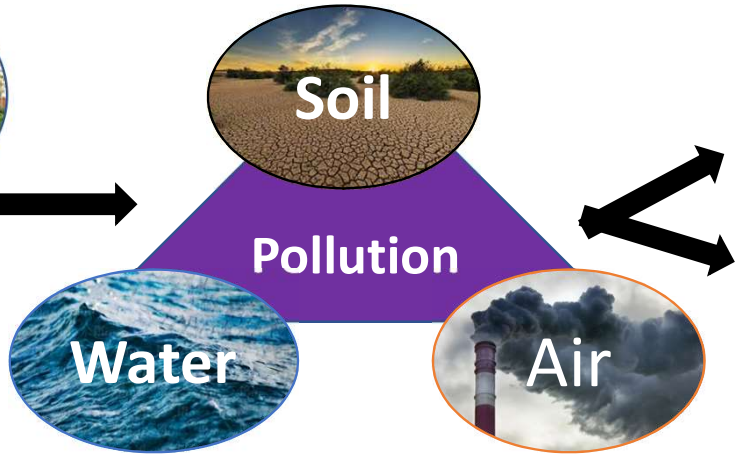
CHEMIST ?

ME ?

A pure chemist having understanding of basis and advanced chemistry

A Ph.D. in technology, from DCE & PostDoc in Biomedical Engineering, IIT Delhi
Research experience in pollution control & Environmental Engg
Ph.D. Thesis Title: Studies on Polymeric Membranes and their Application to Pollution Control

Research Field since my joining in Jamia establishing my own Research Group in Department of Chemistry, JMI
(Excluding the Ph.D & PostDoc Tenure)



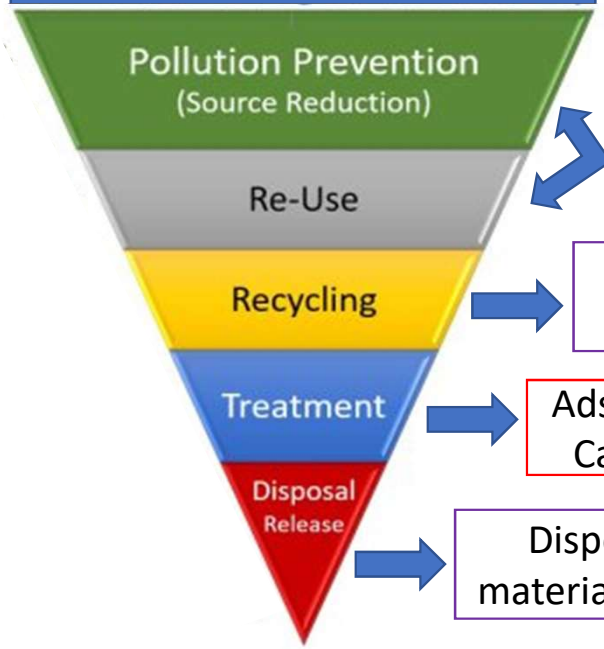
Biodegradable Pollutants

Non-Biodegradable Pollutants

Organic

Inorganic

SOLUTION OFFERED BY OUR RESEARCH GROUP



By the use of plant & animal-waste biopolymers (Chitosan, Carboxymethyl Cellulose) as Raw materials

Recycling of the used material for consecutive use

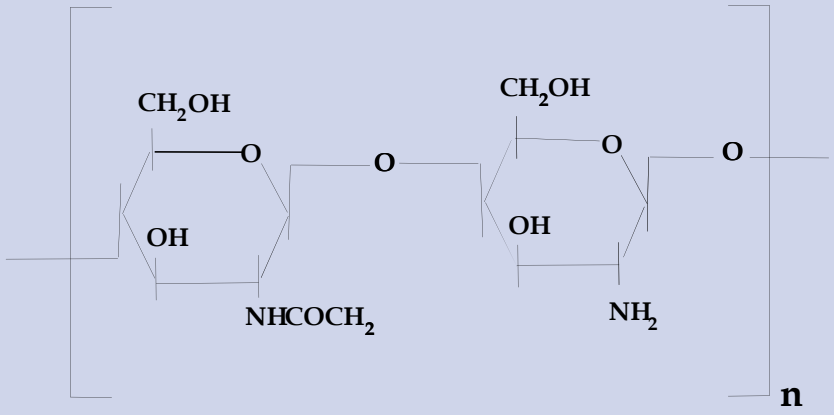
Adsorption, Absorption, Catalytic Degradation

Disposal of the used biodegradable material to enhance N-content in the soil

CHOICE OF MATERIAL ADAPTED TOWARDS SUSTAINABLE ENVIRONMENT

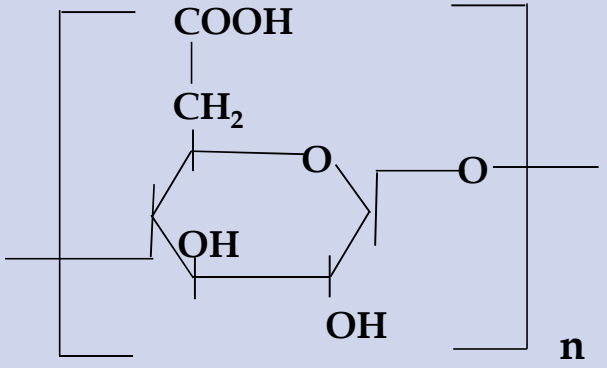
CHITOSAN (CS)

- Excellent biological properties
- Good gel and film forming ability
- pH sensitivity



CARBOXYMETHYL CELLULOSE (CMC)

- highly water-soluble anionic polysaccharide
- carrying protonable groups
- used as an emulsifying agent
- prevent the postoperative adherences & epidural scarring



Advancement in Wound Care Systems: Ordinary to Smart

1. Material development
2. Incorporation of thermosensitive nature
3. Development of antimicrobial nature
4. Drug immobilization
5. Animal testing

Development of Hydrogels Based Smart Wound Dressings: *Department of Biotechnology, Ministry of Sci & Tech, India,* **BT/PR10215/MED/32/24/2007** (LETTER-II)/ July 18, 2008

In-situ Nanosilver Formation based on Biopolymer Hydrogel Membranes for Antimicrobial Activity*: Jamia Millia Islamia–Innovative Funding,* **AC-6(15)/RO/2014** Dated: April 07, 2014

Modification of Carboxymethyl cellulose (CMC) & CS as Hydrogel Membrane

CMC

HIO_4

45°C, 2h

OCMC

+

CHITOSAN

2% Lactic Acid

CS/OCMC BLEND

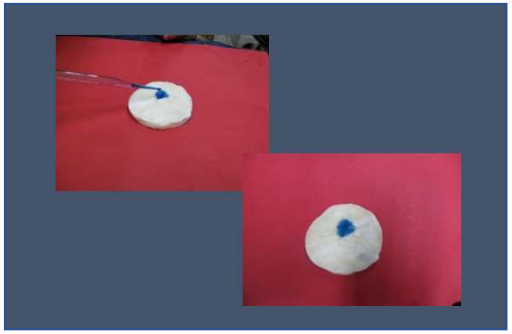
$AgNO_3$

2 h

CS/OCMC BLEND

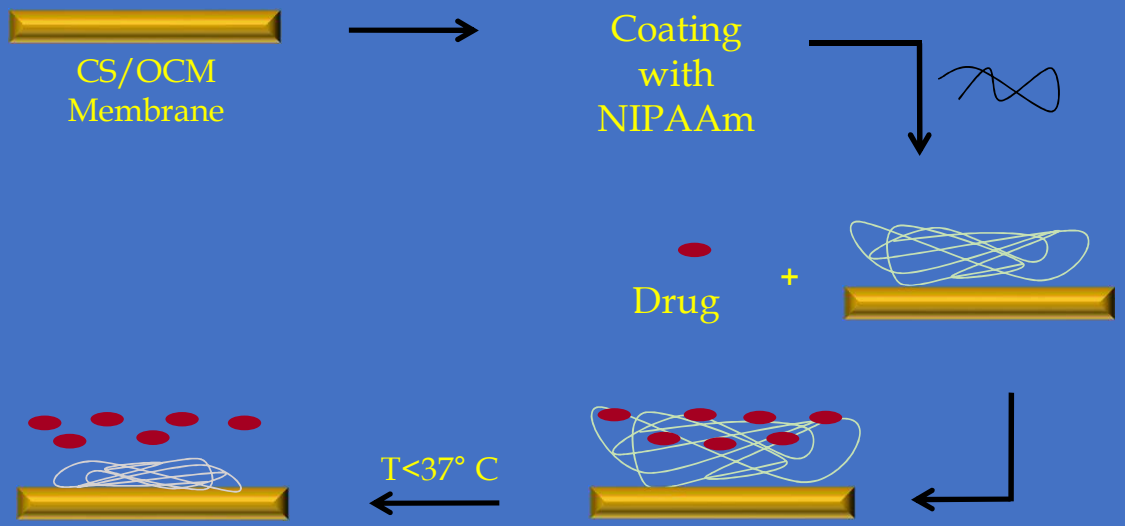
(immobilized with Nanosilver)

Nanosilver immobilized membrane



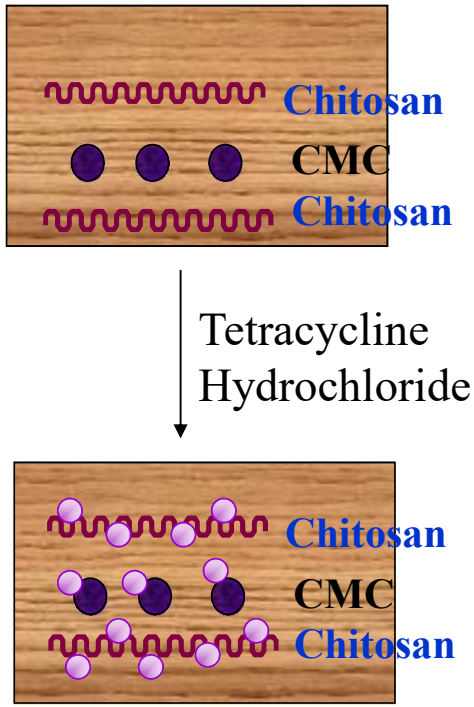
Absorption of liquid is an immediate process confirming its ability to serve for exudative wounds

CONVERSION OF CS-OCMC MEMBRANE INTO *SMART MEMBRANE TO SERVE AS DRESSINGS*



The schematic presentation of the NIPAAm coating, Drug Immobilization & Release

DRUG IMMOBILIZATION



DEPARTMENT OF BIOTECHNOLOGY
Ministry of Science & Technology
Government of India
(~INR 70 Lakhs)
BT/PR10215/MED/32/24/2007
(LETTER-II): July 2008

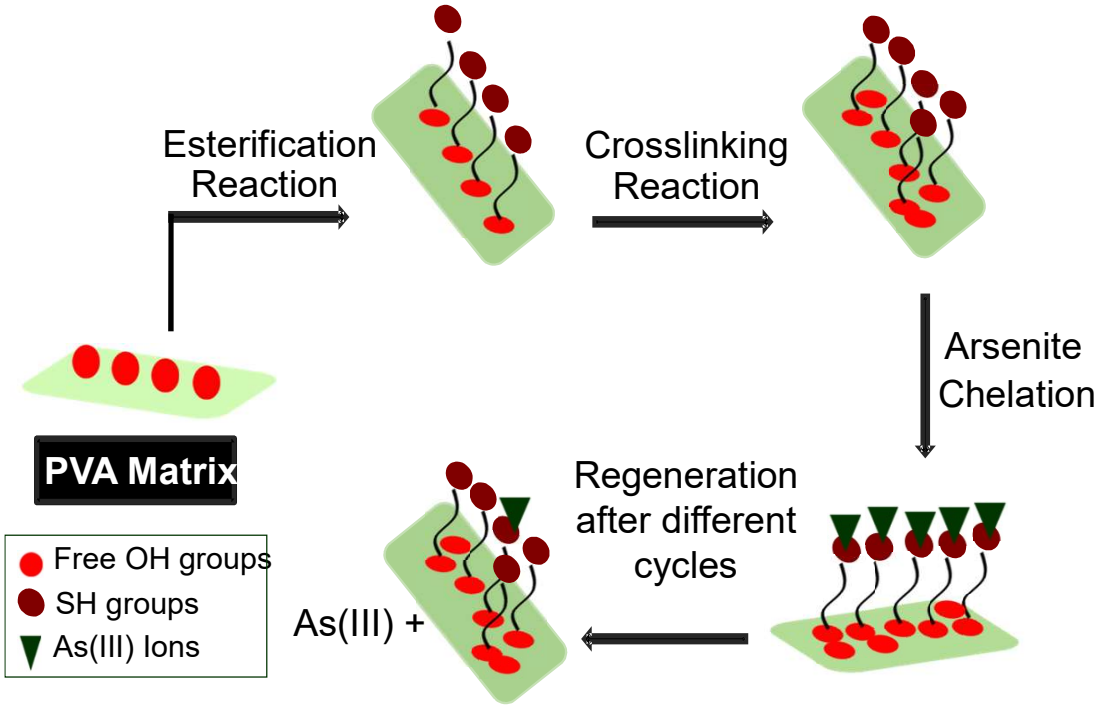
Polymeric Frameworks for the Removal of Toxic Organic & Inorganic Pollutants: Compostable Materials

Environmental Protection

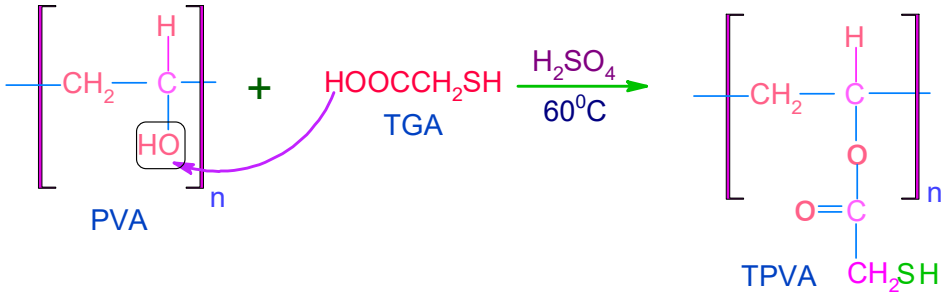
Solid Waste Management as well as Wastewater Management

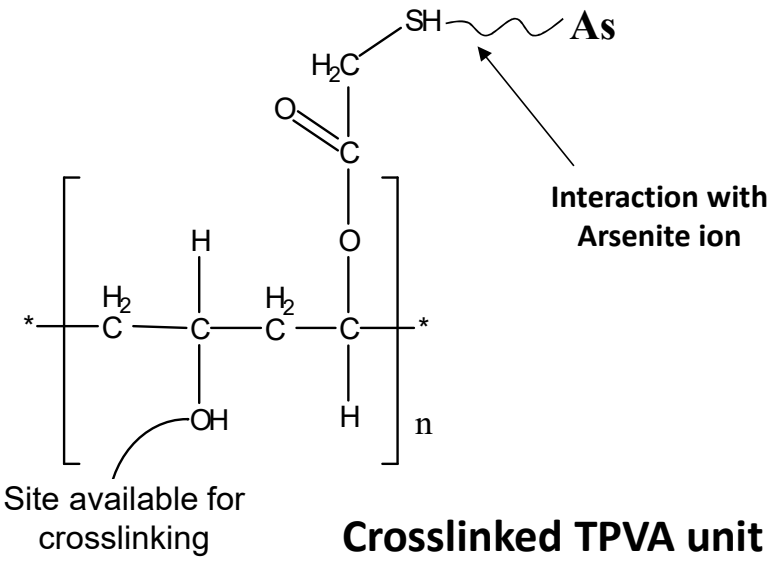
Tactics for reducing land fills & addressing the challenges of disposing the Post-use waste & Other Sanitary Hygiene Products

REMOVAL OF ARSENIC FROM WATER



Schematic representation of arsenite removal and regeneration process





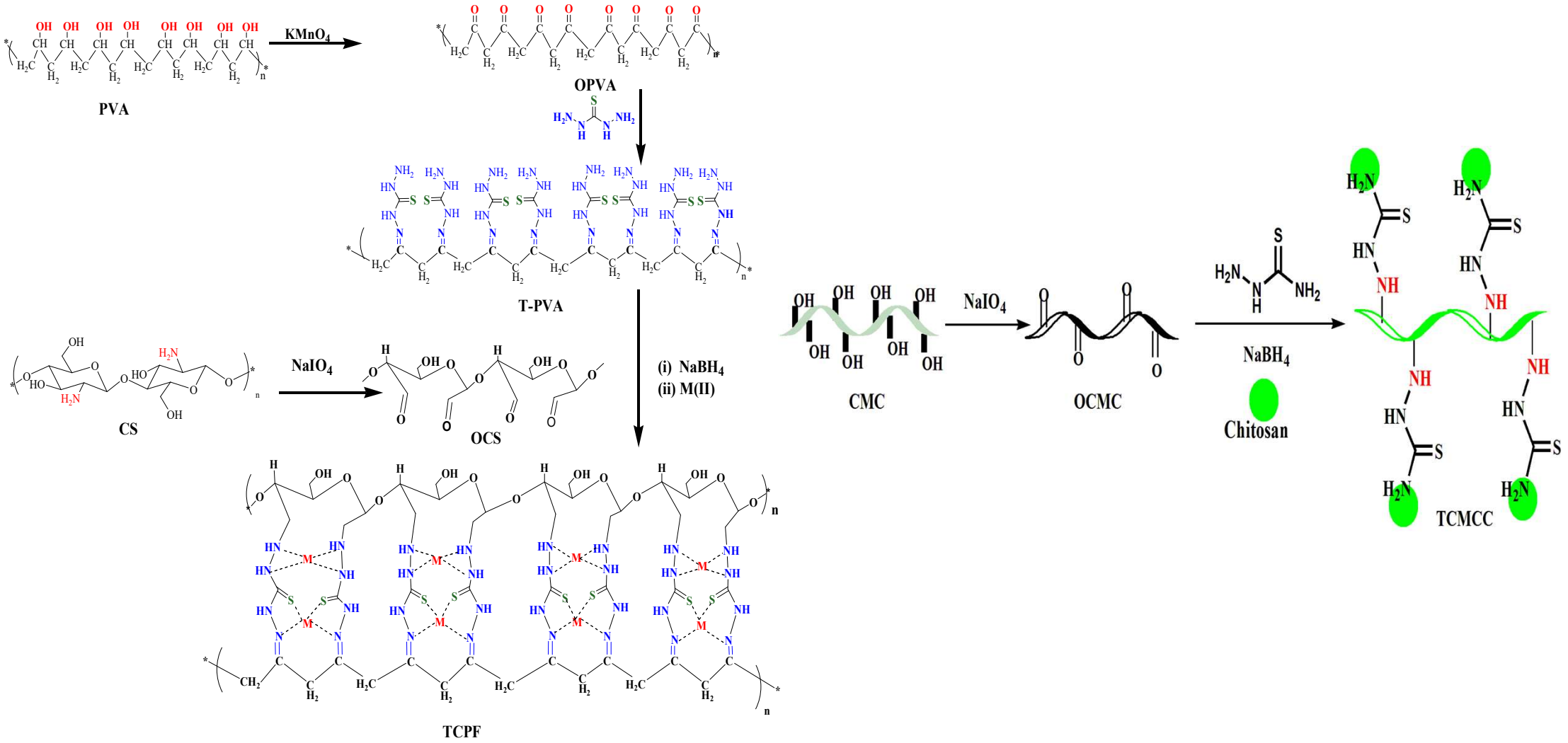
Crosslinked TPVA unit

PATENT & TECHNOLOGY TRANSFER by FITT, IIT Delhi :

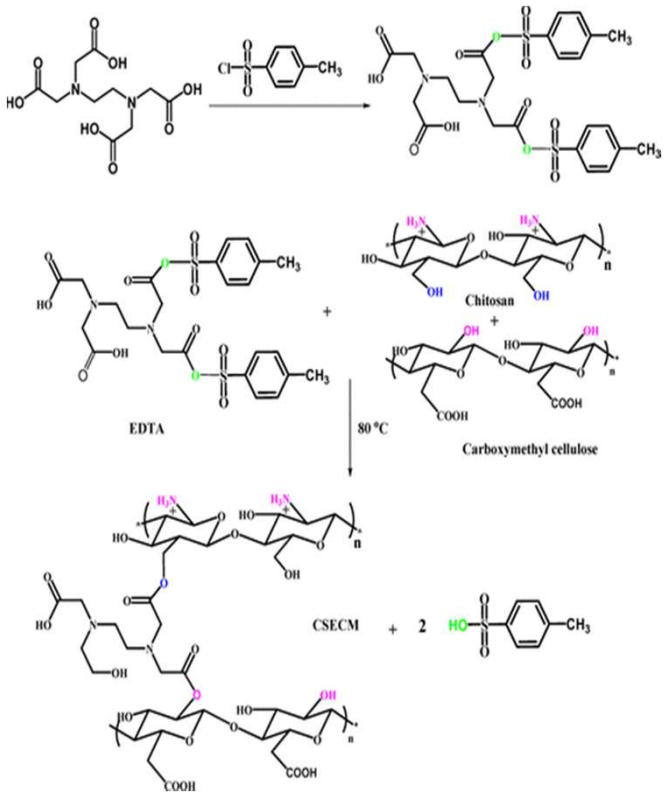
Polyvinyl alcohol Supported Resins for Arsenic Separation and the Product there of

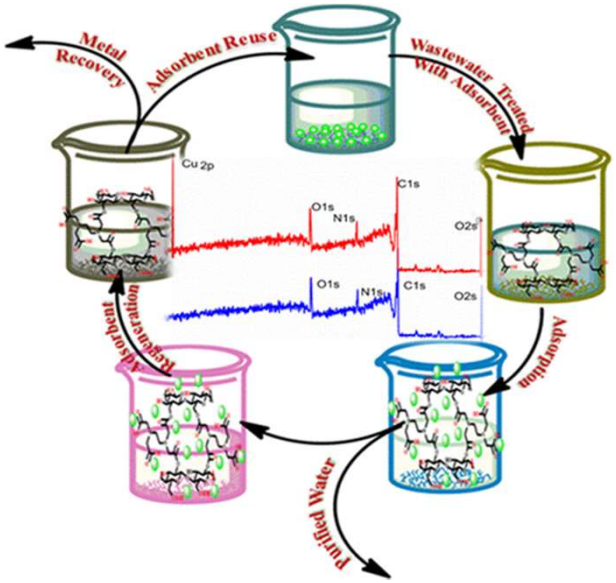
Funded by: University Grants Commission, 41-1321/2012(SR)/July 2012

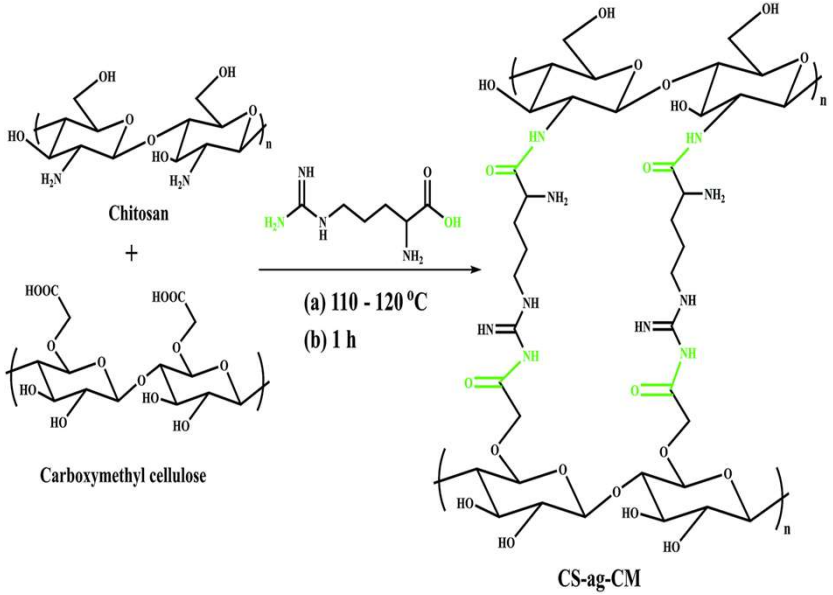
Thiocarbohydrazide & Thiosemicarbazide Crosslinked Oxidized (Chitosan and Polyvinyl alcohol): Green Framework as Efficient Adsorbent



EDTA & Arginine Crosslinked Chitosan/ Carboxymethyl Cellulose as Green Adsorbent

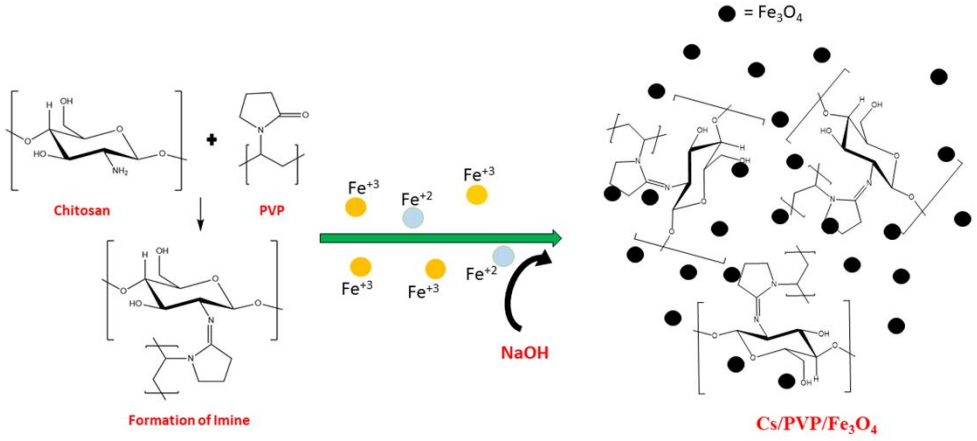


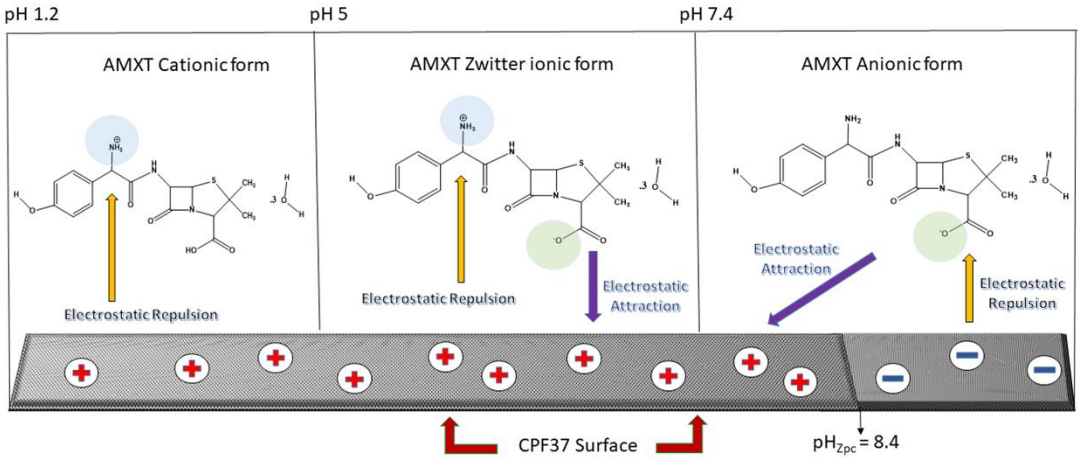




Product Commercialized by CAS, American Chemical Society (ACS)

Chitosan/PVP Magnetic Composites for Remediation of Antibiotics from Clinical Effluents





1.Critical Review on Adsorptive Removal of Antibiotics : Present Situations, Challenges & Future Perspectives: J Hazardous Materials, 2022 Impact Factor 14.25

2. Synthesis of Ecological Chitosan/PVP Magnetic Composites: Remediation of Amoxicillin Trihydrate from Aqueous Solutions, Reactive & Functional Polymers, 2022 Impact Factor 5.01

GREEN FRAMEWORK
AS
COMPOSTABLE ADSORBENT
FOR SUSTAINABLE ENVIRONMENT

Congratulations on your Contribution to Scientific Innovation Inbox

CAS, a division of the... 6:31 pm
to me

Dear Ikram,

Congratulations! CAS, a division of the American Chemical Society, has recently identified novel compounds from your published research, resulting in a unique CAS Registry Number® being added to the CAS content collection. Your discovery is now accessible to hundreds of thousands of research and development professionals worldwide.

To honor your scientific achievement of publishing (DOI: 10.1021/acsomega.9b02214), you may be eligible for a CAS REGISTRY® Innovators Program Certificate. We hope you can accept our invitation and take part in this Certificate Program.

- ***Development of Green Adsorbents for Removal of Copper, Lead, Mercury Metal Ions from Ground Water for Potability***
  USAID-TERI under SWASH Scheme, ***NIL/2016-2017*** *dated June 2016*

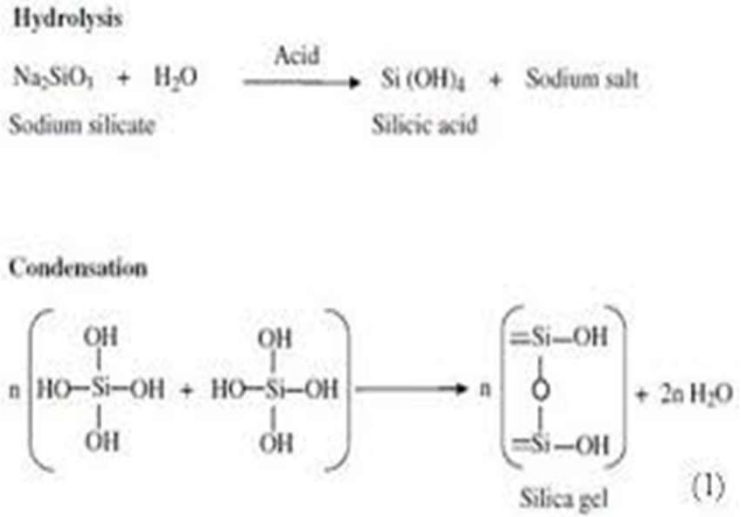
BEST INNOVATION AWARD: USAID & TERI 2017

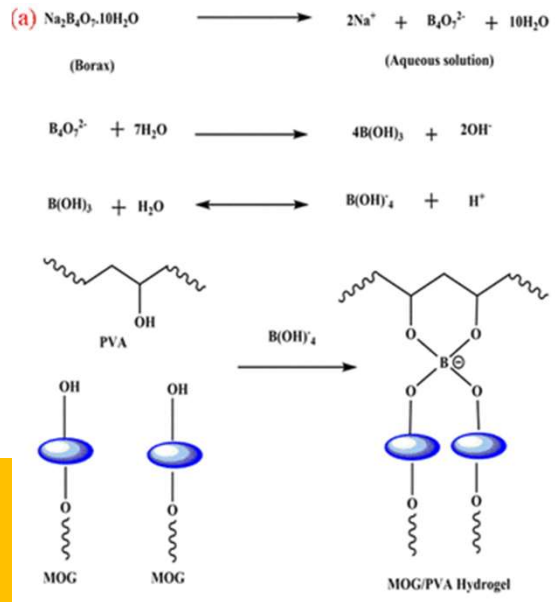
- ***Development of Green Adsorbents for Removal of Toxic Metal Ions from ground Water for Potability***

INNOVATIONS IN NATURAL GUM BASED HYDROGELS AS SUPER ABSORBENTS (SAPs)

- ***Preparation of Nanocellulose & Nanocomposites as Multifunctional Materials derived Biomass towards Sustainable Development : SPARC-MHRD,*** **SPARC/2018-2019/P672/SL** dated 15.03.2019, Feb 2019 to 2021-**(ONGOING):** INR **~82,00,000**) in collaboration with **The University of Queensland, Brisbane, Australia**
- **Natural Gum based Exudate Retentive Hybrid Xerogels as Super Absorbents (SAPs) for Sustainable Sanitary Hygiene** TAR/2022/000335i **(@ Sanctioning):** TARE –DST, India INR 45 Lakh

Gum Based Xerogels as Super Absorbents (SAPs)





Moringa Oleifera Gum/ PVA Hydrogels as Super Absorbents

1. A Review on Latest Innovations in Natural Gums based Hydrogels: Preparations & Applications, International J Biological Macromol, **2019, Impact Factor 8.15**

2. Morphological & Swelling Potential Evaluation of Moringa Oliefera Gum/PVA Hydrogels as Super Absorbents (SAPs), **ACS Omega Impact Factor 4.15**

Bio-Mimicked Polymer Surfaces for Carbonic Anhydrase Immobilization for CO_2 Mineralization Renewable Technologies for Air Quality Management

Biomineralization

context

Major role in carbon cycle:

$$Ca2+ + HCO_3 \rightarrow CaCO_3 + CO_2 + H_2O$$

Calcification can parallel photosynthetic activity:
As carbon dioxide is removed, equilibrium shifts favoring carbonate.
$CaCO_3$ deposited within cells: coral reefs.

Example of biomineralization as a secondary effect.

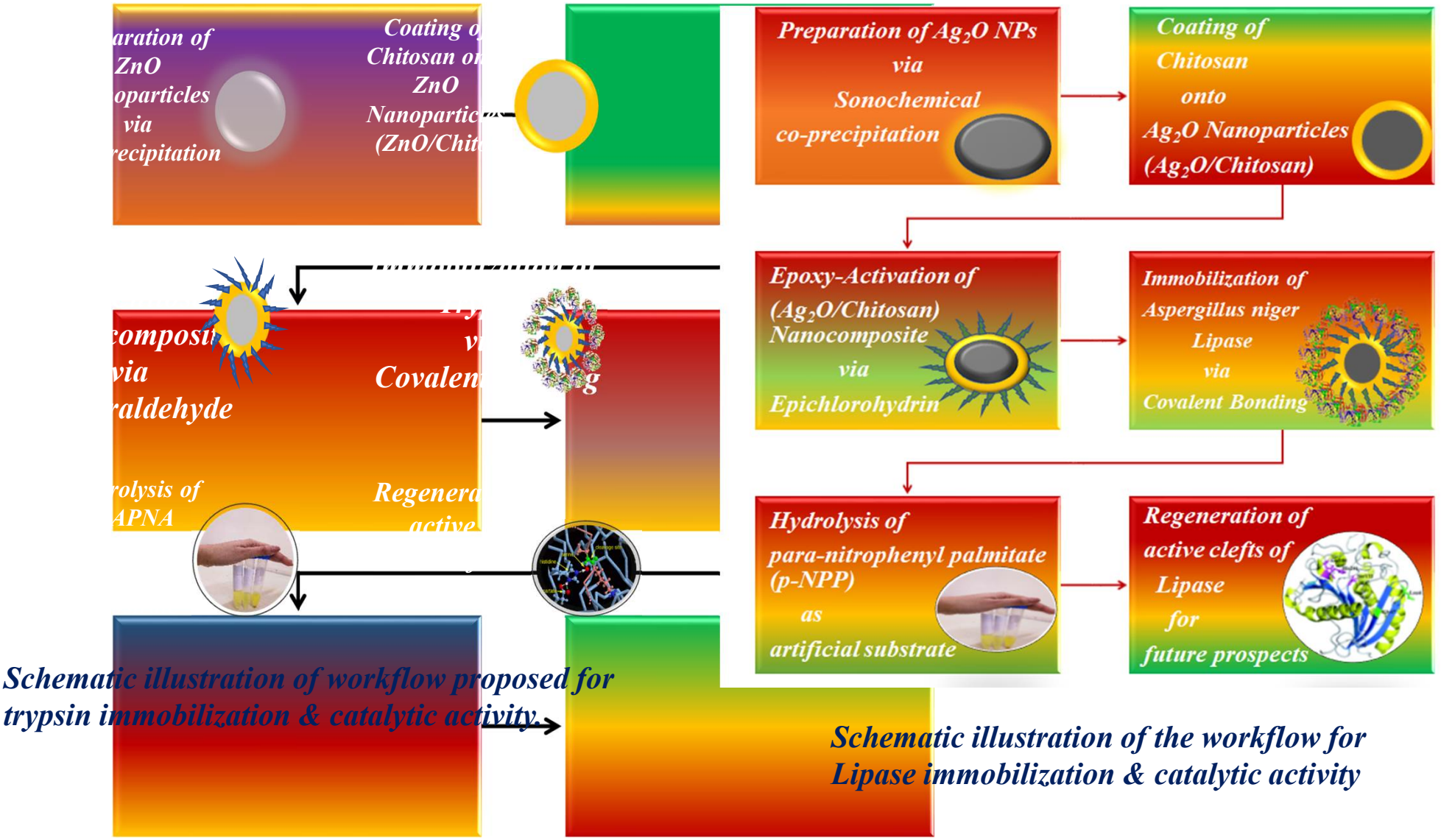
Another is FeS from sulfate reducing bacteria.

Biologically Induced Biomineralization

1. A Comprehensive Review on Incredible Renewable Carriers as Promising Platforms for Enzyme Immobilization & Thereof Strategies, International J Biological Macromol; **2021, Impact 8.25**

1. ZnO Nanoparticles-impregnated Chitosan Surfaces for Covalent Immobilization of Trypsine, International J Biological Macromol; **2022, Impact 8.25**

2. Silver oxide Nanoparticles-impregnated Chitosan Surfaces for Covalent Immobilization of Aspergillus niger Lipase via Epoxy activation; ***ACS Biomacromolecules, IF: 6.988, 2022***

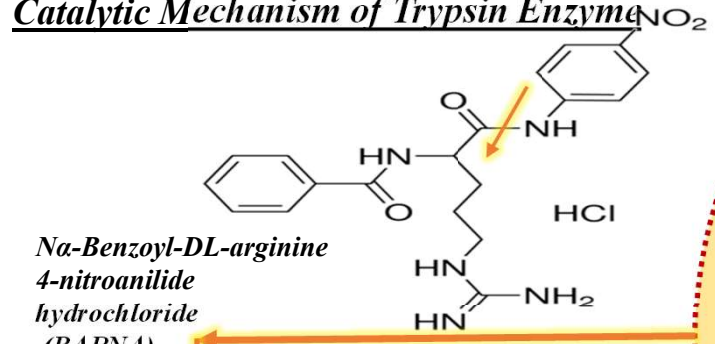


Schematic illustration of workflow proposed for trypsin immobilization & catalytic activity.

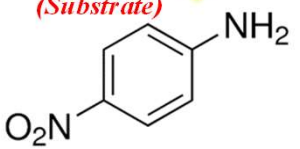
Schematic illustration of the workflow for Lipase immobilization & catalytic activity

Zinc oxide nanoparticles-impregnated chitosan surfaces for covalent immobilization of trypsin

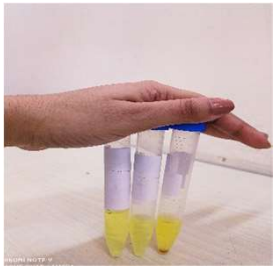
Catalytic Mechanism of Trypsin Enzyme



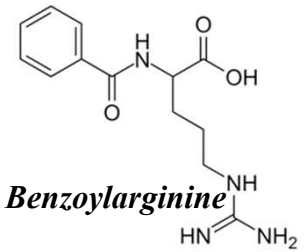
Nα-Benzoyl-DL-arginine 4-nitroanilide hydrochloride (BAPNA)
(Substrate)



p-nitroaniline
(Yellow)
Absorbs at 410nm

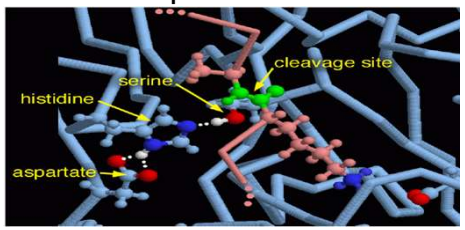


+

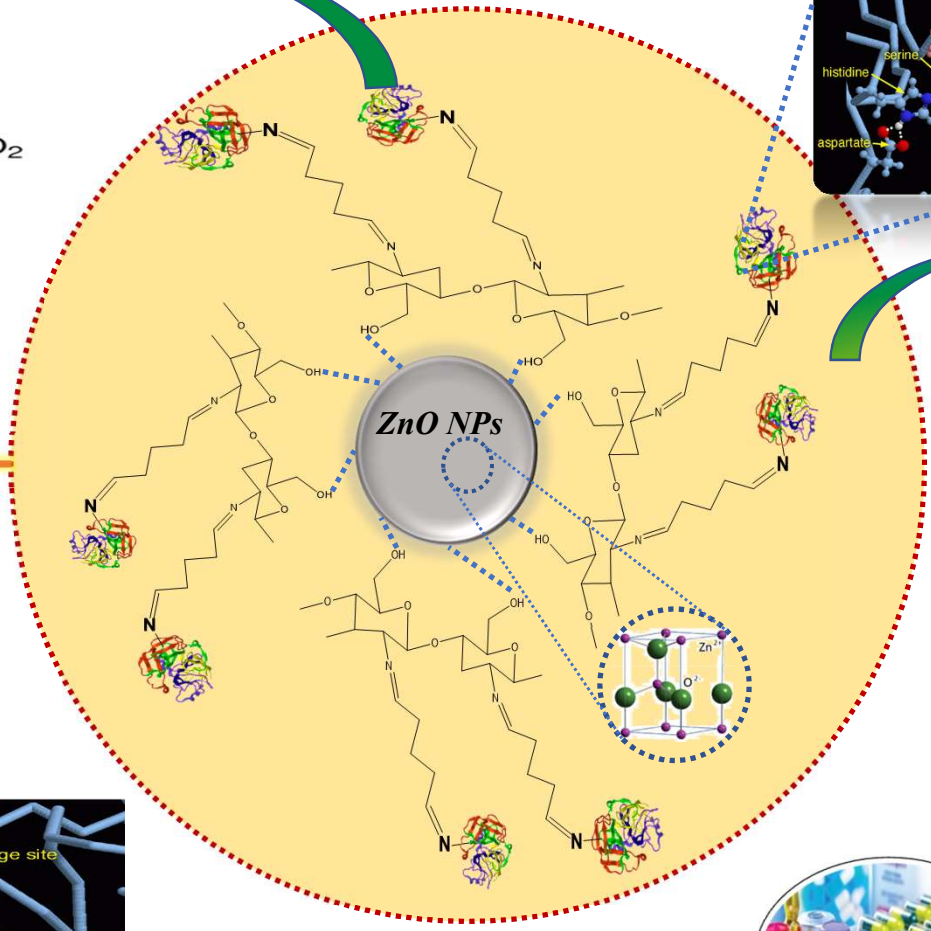


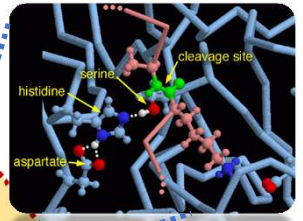
Benzoylarginine

+



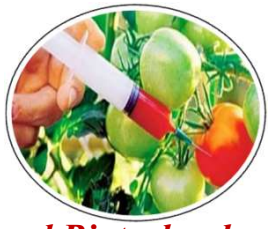
Active site of trypsin regenerated



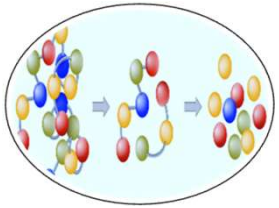


Catalytic Structure of Trypsin

Targeted Applications



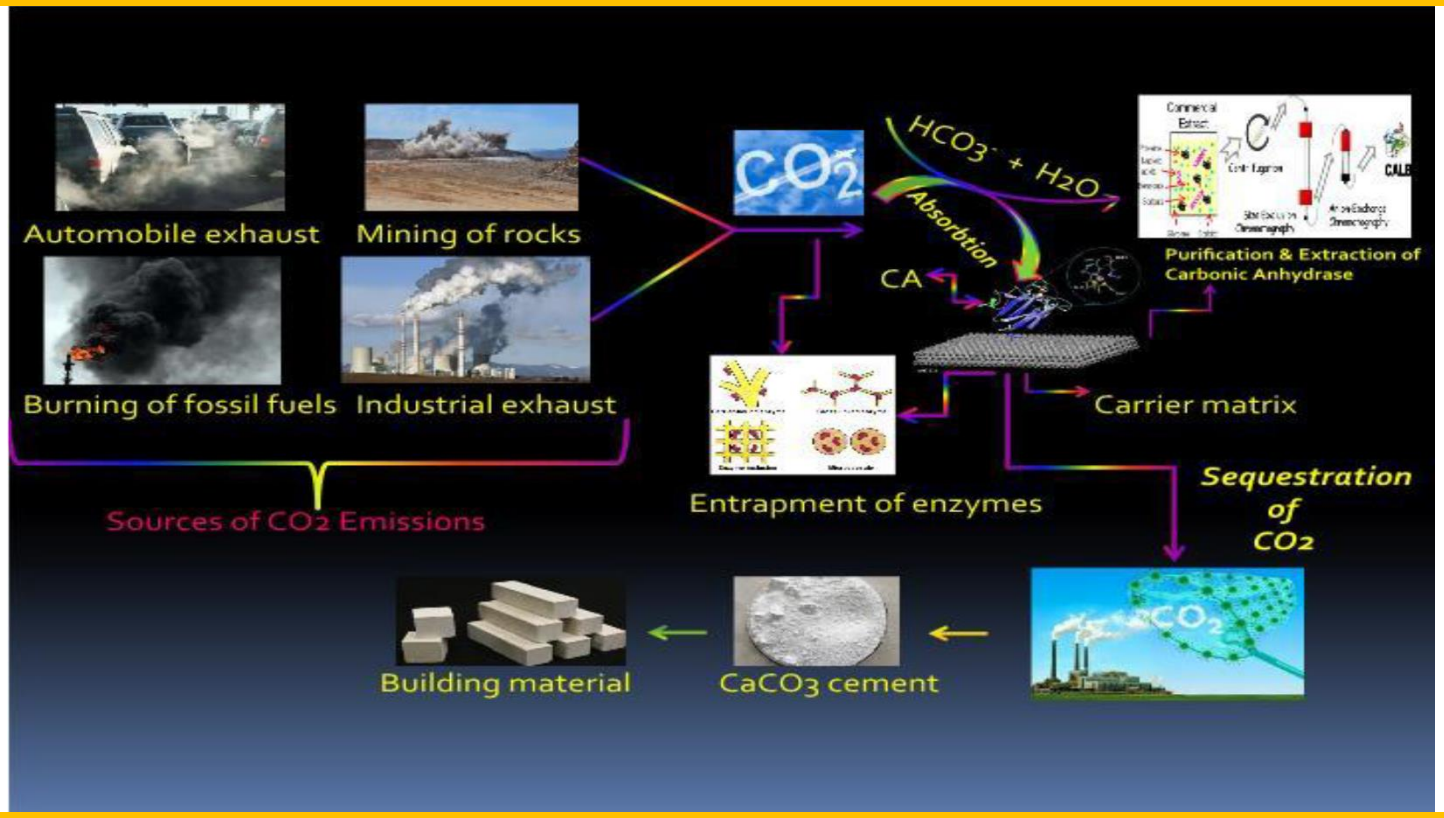
Food Biotechnology



Protein Digestion

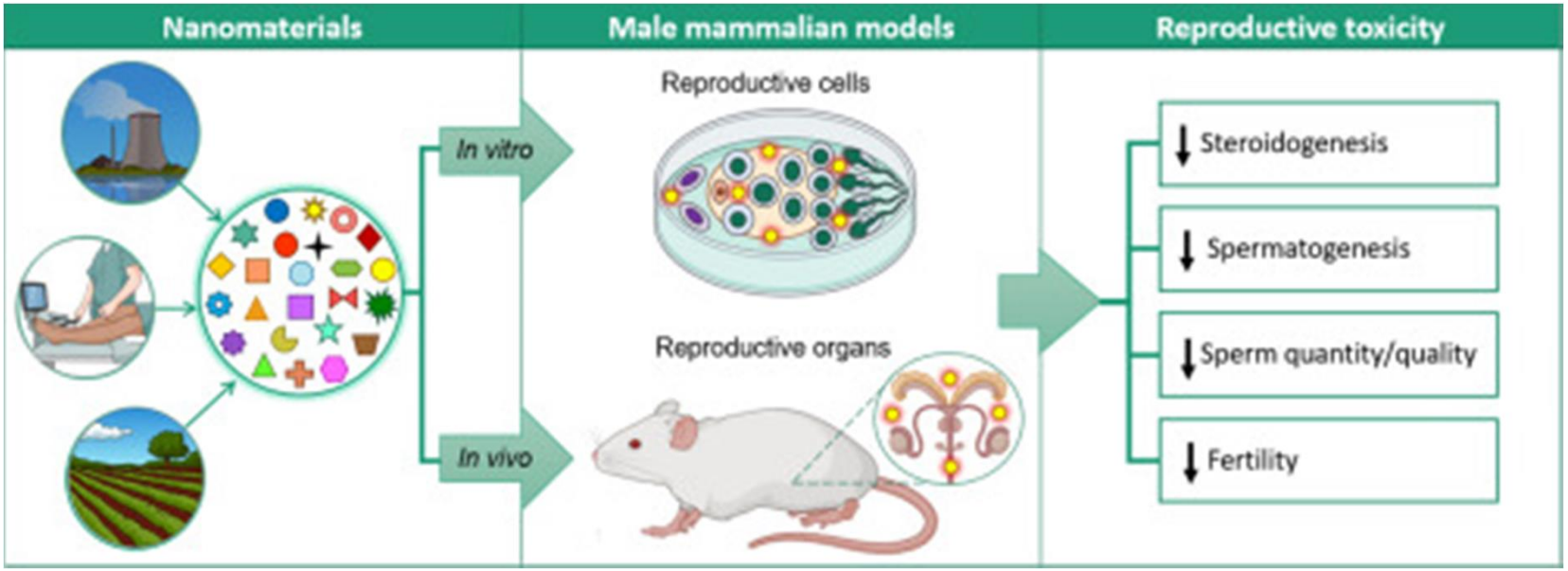
Pharmaceuticals

Immobilization of Carbonic Anhydrase on Biopolymeric surfaces for CO2 Sequestration



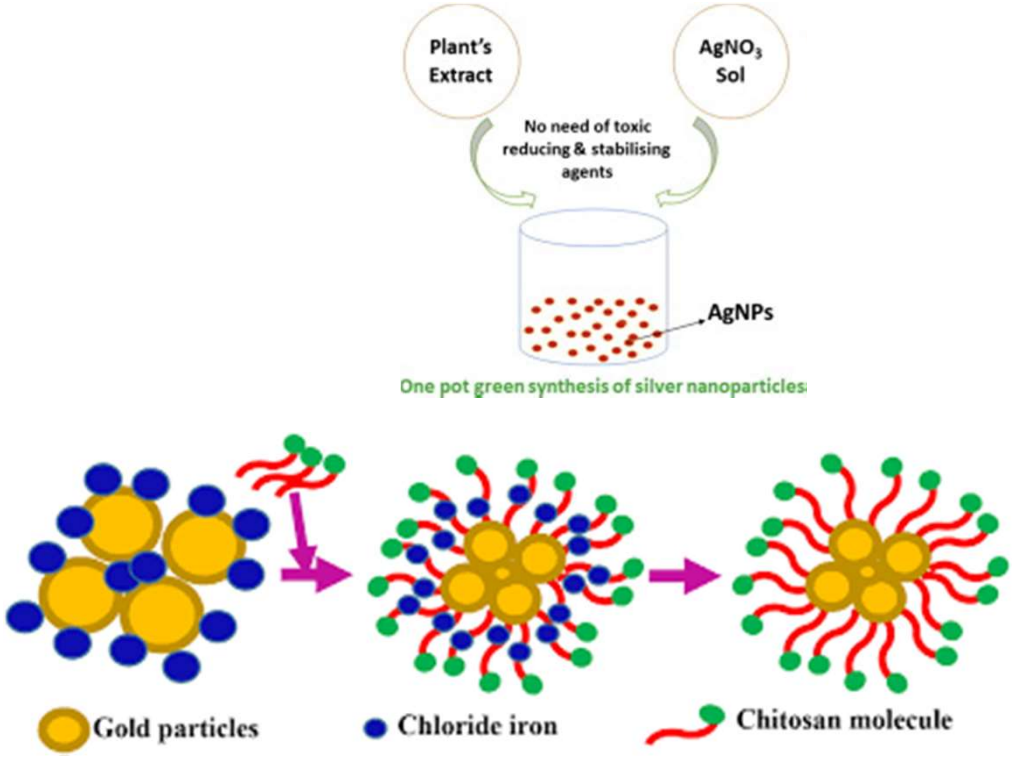
1. **Bio-Mimicked Polymer Surfaces for Carbonic Anhydrase Immobilization for CO_2 Mineralization towards Renewable Technologies;** Reference No. : 162021003678**POWER, DST 2022 (under review)** ***INR ~42 Lakh***
2. **Chitosan Nanocomposite as supports for Enzyme Immobilization: An Innovative Green Approach for CO2 Mineralization for Sustainable Environment;** MHRD SPARC; with RMIT University, Australia; SPARC/2020-21/P1276/SL (under technical review)

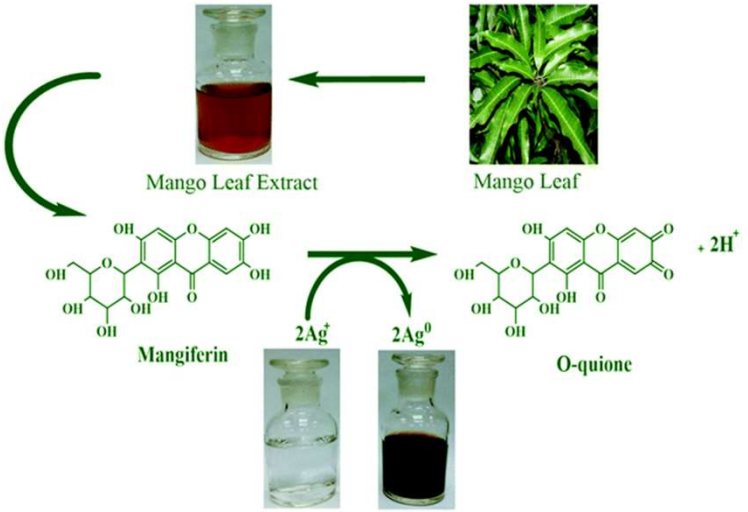
Innovation in Designing in Biomass Mediated Nano-Carriers & Evaluation of their effects on Domestic Animals Spermatozoa in In-vitro Fertilization



1. Single / Binary Metal Nanoparticles Loaded Nano-Carriers using Medicinal Plants Extracts & Their Application in Tissue Culture Medium as Media Additive for Optimizing Laboratory Production of Bovine Embryos, **DST/INT/Egypt/P-05-2020 (ONGOING) Indo-Egypt Grant; DST, India & ASRT, Egypt, INR 13,50,000+ EGYPTIAN Dimes 4,50,000**

2. **Phytochemical Analysis of Bioactive Constituents of Commonly used Plants & Development of Antimicrobial Activities Thereof; University Grants Commission 42-269/2013(SR) dated March 2013 INR ~8Lakh**





- A Review on plant Extract mediated Synthesis of Silver Nanoparticles for Antimicrobial Applications: A Green Expertise, J of Advanced Research, **2016 Impact Factor : 12.83 Highest cited Articles for this Journal since 2016 (~2000)**

- Green synthesis of Chitosan/nanosilver Hybrid Bionanocomposites with Promising Antimicrobial, Antioxidant and Anti-cervical Cancer Activity**;** **Polymer & Polymer Composite; 2021 Impact Factor: 3.12**

- Evaluation of the Antioxidant, Antibacterial and Anticancer (lung cancer cell line A549) Activity of Punica granatum mediated Silver Nanoparticles; **Toxicology Research, RSC, 2018 Impact Factor: 4.01**

	Year	Publications	Impact Factor
1	2021	A comprehensive review on incredible renewable carriers as promising platforms for enzyme immobilization & thereof strategies, International Journal of Biological Macromolecules	8.025
2	2021	Execution and viable applications of face shield “a safeguard” against viral infections of cross-protection studies: A comprehensive review, Journal of Molecular Structure	3.841
3	2021	Green synthesis of chitosan/nanosilver hybrid bionanocomposites with promising antimicrobial, antioxidant and anticervical cancer activity, polymer and polymer composites	2.12
4	2021	Critical review on adsorptive removal of antibiotics: Present situation, challenges and future perspective, Journal of Hazardous Materials	14.224
5	2022	Zinc oxide nanoparticles-impregnated chitosan surfaces for covalent immobilization of trypsin: Stability & kinetic studies, International Journal of Biological Macromolecules	8.025
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