Anulina Manna
Advanced Laboratory for Plant Genetic Engineering
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Academic Qualification:

Examination	Univ./Board	Year	Percantage	Subjects
Matriculation	West Bengal Board of Secondary Education	2000	82.75	Bengali, English, Mathematics, Physical Science, Life Science, Geography, History, Biology (Additional)
Higher Secondary	West Bengal Council of Higher Secondary Education	2002	59.1	Bengali, English, Mathematics, Physics, Chemistry, Bio-sciences
Graduation	Vidyasagar University	2005	67.125	Botany Hons., Zoology, Chemistry
Post-Graduation	Vidyasagar University	2007	72.1	Botany with specialization in Cytogenetics and Molecular Biology
Awards or fello-wship	• Received gold medal in B. Sc or graduation level • Qualified GATE Examination 2010			

Experience :

Organisation Name	From	To	Description of Work
Indian Institute of Technology Kharagpur	2011	2013	Junior Research Fellow in ICAR funded project (Project title: Development of pod borer resistant transgenic pigeon pea and chickpea plant lines)
Indian Institute of Technology Kharagpur	2014	2018	Junior Research Fellow in ICAR funded project (Project title: Development of pod borer resistant transgenic pigeon pea and chickpea plant lines)
Midnapore City College	2018 AUGUST	2019 MARCH 2ND	Assistant Professor of Botany (Co-ordinator), Dept. of Biological science
Dr. D S Kothari Post Doctoral Fellowship from University of Hyderabad(On lien)	2019 MARCH 8th	2020 November 27th	Post doctoral research on promoter editing of Tomato β-carotene gene through CRISPR/Cas9 mode for nutritional improvement of Tomato
Midnapore City College	2021 till date		Assistant Professor of Botany (Co-ordinator), Dept. of Biological science
Specialized Subject	Crop Biotechnology; Plant molecular biology; Genetic transformation; Plant cell and tissue culture.		

Post Doctoral Experience (2019 – 2020) : Availed Dr. D S Kothari Post doctoral Fellowship under the mentorship of Prof. R P Sharma in University of Hyderabad . The project title – "**Strategic Development of CRISPR/Cas9- mediated Targeted Mutagenesis in Tomato (*Solanum lycopersicum* L.) for Enhanced Level of *β*-carotene Production"**

Doctoral Degree (2018) Completed Ph.D. from Advanced Laboratory for Plant Genetic Engineering, Advanced Technology Development Centre, Indian Institute of Technology, Kharagpur, India. Thesis entitled- **"Development of Pod Borer Tolerant Transgenic Chickpea (*Cicer arietinum* L.) using *Bacillus thuringiensis Cry1*Ab Gene"**.

Doctoral (2011 – 2018) : Completed doctoral research work under the supervision of Late Prof. Soumitra Kumar Sen, Advanced Laboratory for Plant Genetic Engineering, Indian Institute of Technology, Kharagpur and Prof. Nirupama Mallick, Department of Agriculture and Food Engineering, Indian Institute of Technology, Kharagpur. India.

- Standardization of highly reproducible suitable *in vitro* regeneration protocol of different genotypes of chickpea for routine laboratory practices
- Optimization of efficient transformation strategy for both *Agrobacterium* mediated and Biolistic mode of alien gene transfer for chickpea genotypes
- Molecular cloning of Bt-toxin gene (Novel *Cry1*Ab) for plant and bacterial expression
- Molecular cloning of codon optimized *Cry1*Ab under the tissue specific RuBisCo small sub unit promoter (*rbcS*) with chloroplast targeting sequence for *in vitro* chickpea transformation encouraging high toxin production in green tissue
- Molecular analysis and expression study of toxin gene *Cry1*Ab of selected chickpea transgenic plants and their progenies to confirm its stable integration
- Monitoring the efficacy of the selective chickpea transgenic lines on *Helicoverpa armigera* H.
- Generation of pod borer (*Helicoverpa armigera* H) tolerant transgenic chickpea cultivars

M.Sc. level

2007: Hands on experience of cytological study of some agricultural crops for partial fulfillment of post graduate course. M.Sc Dissertation entitled '***Impact of Fly ash on the Growth and Cytological Properties of some Agricultural Crop'*** under the guidance of Dr. Asis Kumar Nandi, Department of Botany and Forestry, Vidyasagar University, West Benga

Publications

1. Bhattacharyya J, Chakraborty A, Roy S, Pradhan S, Mitra J, Chakraborty M, **Manna A**, Sikdar N, Chakraborty S and Sen SK (2015). Genetic transformation of cultivated jute (Corchorus capsularis L.) by particle bombardment using apical meristem tissue and development of stable transgenic plant. Plant Cell Tissue and Organ Culture, 121(2), 311-324.

2. Bhattacharyya J, Chakraborty A, Mitra J, Chakraborty S, Pradhan S, **Manna A**, Sikdar N, Sen SK (2015). Genetic transformation of cultivated sesame (Sesamum indicum L. cv Rama) through particle bombardment using 5-day-old apical, meristematic tissues of germinating seedlings. plant. Plant Cell Tissue and Organ Culture, 123(3), 455-466.

3. Pradhan S, Chakraborty A , Sikdar N, Chakraborty S, Bhattacharyya J , Mitra J , **Manna A** , Dutta Gupta S, Sen SK (2016). Marker-Free Transgenic Rice Expressing the Vegetative Insecticidal Protein (Vip) of Bacillus Thuringiensis Shows Broad Insecticidal Properties. Planta, 244(4), 789-804.
4. Chakraborty, S., Bhattacharyya, J., **Manna, A**., Sikdar, N., Chakraborty, A., Sen, S. K., Pati, B.R. (2016). A rapid and efficient protocol for in vitro plant regeneration of Lathyrus sativus L. (Grass pea) through multiple shooting. International Journal of Current Research. 8(11):41556-41564.
5. Chakraborty, S**.**, Mitra, J., Samanta, M., Sikdar, N., Bhattacharyya, J., **Manna, A**., Pradhan, S., Chakraborty, A., Pati, B.R. (2018). Tissue specific expression and *in-silico* characterization of a putative *cysteine synthase* gene from *Lathyrus sativus* L. **Gene Expression Patterns**. 27: 128-134.
6. **A rapid, efficient and repeatable protocol for direct rooting of chickpea cultivars. *(****Manuscript under preparation****)***
7. **Effect of different factors during *in vitro* growth, multiplication and establishment of chickpea cultivars**. *(Manuscript under preparation)*
8. **Development of efficient transformation protocol for chickpea cultivars through both *Agrobacterium* and Biolistic method.** *(Manuscript under preparation)*
9. **Recent Advances in Nutritional Improvement of Crop Plants Through CRISPR/Cas9 Strategy : A Short Review.** *(Manuscript under preparation)*
10. **Promoter Editting : A Potent Method of Reviling Functional Genomics of Plant** *(Manuscript under preparation)*

Conference

Doctoral

International Conference on Emerging Trends in Biotechnology (ICETB 2014). Biotech Research Society, India. Poster presentation entitled ***" Research Leading to Overcome Acute Problem of in vitro Rooting of Chickpea in Transgenic Investigation- A Success Story"***

M.Sc Level

International Conference on Biodiversity: Issues and Concerns. Biological Science Division, Indian Statistical Institute, Kolkata, India. Poster presentation entitled ***"Cytotoxicity in the Fly Ash Grown Plants: A Possible Cause of Loss of Biodiversity in the Affected Area"***

Technical Expertise

Plant cell and tissue culture

- *In vitro* plant regeneration through direct organogenesis
  Chickpea (*Cicer arietinum*), Pegion pea (*Cajanus cajan*), Grass pea (*Lathyrus sativus*), Jute (*Corchorus capsularis*), Til (*Sesamum indicum*)
- *In vitro* plant regeneration through callus formation (Rice, Cotton)
- Somatic embryogenesis
- *In vitro* regeneration of Tobacco

Transgenic technology

- *Agrobacterium* mediated gene transformation
- Alien gene transformation through Biolistic mode (Gene-gun method)
- Alien gene transformation applying 'in planta' method

Molecular Biology

- DNA and RNA isolation from plant and bacteria

- Analysis DNA and RNA for quality and quantity using Bioanalyser
- Purification of mRNA from total RNA
- Polymerase Chain Reaction (PCR), Reverse transcriptase-PCR (RT-PCR), genomic PCR,
- Real-Time PCR
- Gene cloning (Genomic, cDNA, TA cloning of PCR products and restriction cloning)
- Southern Hybridization, Northern Hybridization, Colony Hybridization (Basic knowledge), Dot blot
- Rapid Amplification of cDNA ends (RACE) (Basic knowledge)
- Genome Walking (Basic knowledge)
- Insect bioassay
- Heterologus gene expression in prokaryotic system (*E.Coli* using pRSET vectors)
- Chemical transformation and electroporation (Basic knowledge)

Protein biology

- Protein extraction from plant and bacterial sources
- Over expression of protein in bacterial cells
- Western blotting
- Enzyme-Linked Immuno Sorbent Assay (ELISA)
- Ion exchange chromatography (Basic knowledge)

Cell Biology

- Histology (plant, flower tissue)
- Cytological study (different mitotic stages, mitotic index)

Microscopy

- Bright field microscopy
- Fluorescence microscopy

Bioinformatics

- Nucleic acid and protein analysis with Jellyfish version 3.3.1 and Sequencher 4.7 software
- Densitometry gel scanning, plasmid drawing
- BLAST, Plant CARE, PLAC.
- Plant Breeding (Basic knowledge)

Others: Scientific project writing and reporting; maintenance of resources of scientific laboratory

Personal Details

Communicating Address:
C/O- Prof. Asit Baran Manna
Flat 2B, 40-Mahendra Bagchi Road
Word No. 9, Bally
Howrah (WB), PIN-711 201

Permanent Address:
C/O- Asit Baran Manna
Padumbasan, Tamluk
Purba Medinipur
West Bengal, PIN-721636

Others:

Date of Birth 21.03.1985.
Writing skills English and Bengali
Speaking skills English, Bengali and Hindi.