

## Curriculum vitae

### PERSONAL INFORMATION

**Dr. Monica Saifi**

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💬 Skype [monica.saifi](#)

Gender Female | DOB 07.07.1989 | Nationality Indian

### OBJECTIVE

To gain more and more knowledge through continuous research, observations and learning processes and become a competent scientist and academician of international caliber.

### RESEARCH INTERESTS

Plant Metabolic Engineering; Plant Biotechnology, Plant Molecular Biology, Genetic Engineering, Genome Editing, Plant Tissue Culture, Nutraceutical Research, Medicinal Plants.

### RESEARCH EXPERIENCE

Hold more than twelve years research experience in plant biological sciences research field specifically Plant Metabolic Engineering of Medicinal plants, Plant Tissue Culture and Genome Editing

### RESEARCH INDEX

| Year         | No. of Research Papers | Minimum Impact Factor | Maximum Impact Factor | Average Impact Factor | Citation Index | h- index |
|--------------|------------------------|-----------------------|-----------------------|-----------------------|----------------|----------|
| 2015 to 2025 | 18                     | 1.2                   | 7.7                   | 3.56                  | 319            | 11       |

### EMPLOYMENT

#### Current Position

#### Assistant Professor

Department of Biotechnology, School of Chemical and Life Sciences and Centre for Environment and Sustainable Development, Jamia Hamdard, New Delhi-110062.

**Associated Faculty in Centre for Environment and Sustainable Development, School of Interdisciplinary Sciences and Technology, Jamia Hamdard as Faculty.**

|                      |   |
|----------------------|---|
| Nov, 2021-May, 2023  | <b>Research Scientist and Project Coordinator at M/s Hydrogreen Leaf Pvt. Ltd.</b><br>Genome editing in <i>Cannabis</i> spp. to develop THC free plants for improving their therapeutic efficacy.   |
| July, 2022-May, 2023 | <b>Guest Faculty, Department of Biotechnology, Jamia Hamdard</b><br>Teaching Plant Tissue Culture, Plant Biotechnology, Essentials of Genetic Engineering, Fundamentals of Biotechnology, Recombinant DNA Technology, Genetics to M.Sc. and B.Sc. Biotechnology students  |
| Aug, 2019-Nov, 2020  | <b>Senior Research Fellow, Department of Biotechnology, GoI funded project, Division of Plant Physiology, Indian Agricultural Research Institute, New Delhi, India</b><br>“Establishing an efficient platform for Precise Genome Edition in Rice” utilizing CRISPR/Cpf1 genome editing tool under the supervision of Dr. Viswanathan Chinnusamy, Joint Director of Research and Head, Division of Plant Physiology, Indian Agricultural Research Institute, New Delhi, India. |

## WORK EXPERIENCE

|                           |  |
|---------------------------|--|
| June, 2015 – July, 2018   | <b>PhD Student, Maulana Azad National Fellowship (Senior Research Fellow), University Grants Commission (UGC), New Delhi, India</b><br>“ <i>In silico</i> analysis, modulation and expression of miRNAs in <i>Stevia rebaudiana</i> to evaluate their impact on accumulation of steviol glycosides” under the supervision of Professor M. Z. Abdin, Jamia Hamdard, Hamdard Nagar, New-Delhi, India.  |
| May, 2013 – June, 2015    | <b>PhD Student, Maulana Azad National Fellowship (Junior Research Fellow), University Grants Commission (UGC), New Delhi, India</b><br>“ <i>In silico</i> analysis, modulation and expression of miRNAs in <i>Stevia rebaudiana</i> to evaluate their impact on accumulation of steviol glycosides”, under the supervision of Professor M. Z. Abdin, Jamia Hamdard, Hamdard Nagar, New-Delhi, India. |
| June, 2011 – May, 2013    | <b>Honorary Researcher, Jamia Hamdard, Hamdard Nagar, New Delhi, India</b><br>“ <i>A rapid and efficient high performance thin layer chromatographic (HPTLC) method for simultaneous analysis of stevioside and rebaudioside-A in Stevia rebaudiana</i> ” under the supervision of Professor M. Z. Abdin, Jamia Hamdard, Hamdard Nagar, New-Delhi, India.  |
| March, 2012 – March, 2012 | <b>Research Trainee, Jamia Hamdard, Hamdard Nagar, New Delhi, India</b><br>“ <i>Transgenic Technology: Methods and Applications</i> ” organized by the Centre for Transgenic Plant Development, Department of Biotechnology, Faculty of Science and Faculty of Engineering and Interdisciplinary Sciences, Jamia Hamdard, New Delhi, India.  |
| Jan, 2011 – June, 2011    | <b>Research Intern, Jamia Hamdard, Hamdard Nagar, New Delhi, India</b><br>“ <i>Analysis of genetic diversity among different species of Mentha using RAPD</i> ” under the supervision of Prof. P. S. Srivastava, Department of Biotechnology, Jamia Hamdard, Hamdard Nagar, New-Delhi, India.  |

June, 2010 – July, 2010

**Research Trainee, Institute of Nuclear Medicine and Allied Sciences, Defense Research and Development Organization, New Delhi, India**

*“Optimization of physicochemical parameters for fast seed germination with enhanced enzyme activity”* under the supervision of Dr. Aseem Bhatnagar, Sci ‘F’ & HOD, Department of Nuclear Medicine, INMAS, DRDO, New Delhi, India.

## TEACHING EXPERIENCE

May, 2015 – Feb, 2019

Tutored various students ranging from Junior high to college undergraduates in Biology Online classes (Life Institute, Oman)

May, 2019 – Present

Teaching molecular biology, plant tissue culture and genetic engineering approaches to students at Institute of Eminence, Chirag Delhi, India (Special lectures, Weekend classes).

Dec, 2019- Jan, 2020

Conducted practical in World Bank funded National Agricultural Higher Education Project (NAHEP)-Centre for Advanced Agricultural Science and Technology (CAAST) sponsored training on “Genome editing of crops: Methods and Applications” jointly organized by ICAR-National Institute of Plant Biotechnology and Division of Plant Physiology and Division of Plant Pathology, ICAR-IARI, New Delhi.

## EDUCATION

2013-2018

**Ph.D**

Entitled: *“In silico analysis, modulation and expression of miRNAs in Stevia rebaudiana to evaluate their impact on accumulation of steviol glycosides”*, under the supervision of **Prof M. Z. Abdin**, Department of Biotechnology, School of Chemical and Life Sciences, Jamia Hamdard, Hamdard Nagar, New-Delhi, India.

2009-2011

**Masters of Science (M.Sc in Biotechnology) - Percentage 77.6 %**

**Department of Biotechnology, School of Chemical and Life Sciences, Jamia Hamdard, New-Delhi (India).**

Biochemistry, Cell Biology, Molecular Biology, Plant Physiology, Genomics, Proteomics, Immunology, Bioinformatics, Plant Biotechnology, Biostatistics

2005-2008

**Bachelor of Science (B. Sc) - Percentage 65.92 %**

**Chaudhary Charan Singh University, Meerut (India).**

Biochemistry, Biostatistics, Botany, Zoology, Chemistry, Bioinformatics, Genetics, Microbiology, Immunology

2004-2005

**Senior Secondary (XII Standard) - Percentage 66.8 %**

**Central Board of Secondary Education, (India).**

Physics, Chemistry, Biology, General English

2002-2003

**Secondary (X Standard) - Percentage 58.00 %**

**Central Board of Secondary Education, (India).**

Maths, Science, General English

## PERSONAL SKILLS

|                                       |         |               |         |                    |                   |         |
|---------------------------------------|---------|---------------|---------|--------------------|-------------------|---------|
| Mother tongue(s)<br>Other language(s) | Hindi   | UNDERSTANDING |         | SPEAKING           |                   | WRITING |
|                                       | English | Listening     | Reading | Spoken interaction | Spoken production |         |
|                                       |         | C1            | C2      | C2                 | C2                |         |
|                                       |         |               |         |                    |                   |         |

Levels: A1 andA2: Basic user - B1 andB2: Independent user - C1 andC2: Proficient user  
IELTS Score-7

Common European Framework of Reference for Languages

## COMMUNICATION SKILLS

- ❖ Good communication skills gained through my experience as a research fellow to gain knowledge and share ideas with my mentors and other fellows.
- ❖ Excellent contact skills gained by presenting my work in national and international conferences and developing the attitude of learning.
- ❖ Strive for end results with patience and accuracy.
- ❖ Extensive co-operative approach in a team project.
- ❖ Excellent analytical and problem-solving skills.
- ❖ Expertise in handling laboratory tools.

## TECHNICAL SKILLS

### Bio-Software and Tools

BLAST, FASTA, Clustal W, ExPASy, miRanda, mfold, psRNA Target Analyser, RNA hybrid, Primer3, PrimerQuest, Mireval, multilocus sequence analysis (MLSA), MULTI-ALIGN, MEGA 5.1, PSIPRED SERVER, I-TASSER and PROCHECK, Small RNA-NGS data analysis, CHOP-CHOP, CRISPR-P, Transcriptome data analysis using CLC Genomics.

### Tissue Culture

Culture of various plants (*Stevia rebaudiana*, *Oryza sativa*, *Tinospora indica*, *Artemisia annua*) complete growth and monitoring of plants under greenhouse conditions.

### Molecular Biology

DNA: isolation and purification of DNA from plant tissues, Quantification of DNA, Gel Electrophoresis.

RNA: Isolation of total RNA from different plant tissue. Quantification of RNA by spectrophotometry/ agarose gel, stem-loop RT-PCR, RLM-RACE, semi quantitative PCR / quantitative Real time PCR with syber green chemistry.

Isolation and screening of bacteria depending on their sensitivity to antibiotics. Growth, preparation of competent cells and transformation of bacteria. Preparation of constructs and plant transformation via *Agrobacterium* mediated transformation. Southern blotting, BiFC.

CRISPR: Designing of guide RNAs, designing and preparation of constructs for CRISPR/Cas9 and Cpf1. Identification of edited plants by CRISPR; T7 endonuclease I based heteroduplex assay (T7EI), Sequence analysis of mutated regions, Restriction enzyme digestion-based PCR assay, Detection and validation of INDELS. Designing and construction of Homology directed repair templates.

#### **Analytical Techniques**

Paper Chromatography, thin layer chromatography, GCMS, HPLC, HPTLC

#### **Pathological techniques**

Compound and Stereo microscopy, Confocal Microscopy.

#### **Field Work**

Transfer of plantlets from tissue culture to greenhouse followed by net house to field conditions. Hardening of plants. Analysis of Transgenic/edited plants.

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### **ACHIEVEMENTS**

- ❖ Awarded **World Intellectual Property Accreditation Scholar Medal** as a recognition for the pioneering superior performance in “**Plant Molecular Biology**” by **Center for Professional Advancement**, Vijayawada, Andhra Pradesh, India (2021).
- ❖ Received **first prize** for best paper presentation in National Seminar Biotechnology in Health Care: Challenges and Opportunities (2017). **Jamia Hamdard, New Delhi, India.**
- ❖ Qualified **GATE** (Graduate Aptitude Test in Engineering-Life Sciences, 2011) with 90 percentiles, conducted by Indian **Institute of Technology, Government of India.**
- ❖ Awarded UGC-Maulana Azad National Fellowship, **University Grants Commission** (UGC), New -Delhi, India (2012).
- ❖ Awarded financial assistance from Science and Engineering Research Board (**SERB**) under **International Travel Support** Scheme (ITS/2008/2016-17).
- ❖ Awarded financial assistance from **DBT-CTEP** under **International Travel Support** Scheme (DBT/CTEP/02/201600690).
- ❖ Awarded **Nature Travel Grant** of 1500USD from **Nature group (2017), USA.**

## PATENTS

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- ❖ *A method for production of modified Stevia sweetener with enhanced sweetening index (Grant No.-564590).*
- ❖ **Diethyl Ether Extract of *Achyranthes aspera* Seeds: A Potent Natural Remedy for Type 2 Diabetes (under communication for Indian Patent)**

## LIFE MEMBER

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- ❖ *Society for Plant Biochemistry and Biotechnology (Membership no.-L860).*
- ❖ *Indian Science Congress (Membership no. - L39791).*
- ❖ *Indian Society for Plant Physiology*
- ❖ *American Society for Plant Biology*

## MANAGEMENT EXPERIENCE

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- ❖ Representative of Research Council committee, School of Chemical and Life Sciences, Jamia Hamdard, New Delhi, India.
- ❖ Organizing Committee member for National Conference on Biotechnology for Sustainable Development and Human Welfare, held in Jamia Hamdard in November, 2022.
- ❖ Coordinator, International Day for Biological Diversity, 2023 organized by Centre for Environment and Sustainable Development, Jamia Hamdard.
- ❖ Coordinator, World Environment Day, 2023 organized by Centre for Environment and Sustainable Development, Jamia Hamdard.
- ❖ Coordinator, International Ozone Day, 2023 organized by Centre for Environment and Sustainable Development, Jamia Hamdard.
- ❖ Convener, International Conference on “Hunger to Hope: Building a Sustainable Future through Nutrition and Food Security” organized by the Centre for Environment and Sustainable Development (CESD), Jamia Hamdard on 16th October, 2023.
- ❖ Co-convener, two days hands-on workshop on “Applications of cutting-edge technologies in biotechnology research” at Jamia Hamdard, New Delhi organized by the Department of Biotechnology, School of Chemical and Life Sciences, Jamia Hamdard on 9th and 10th November, 2023.
- ❖ Co-convener, three days National Conference cum Workshop on “Sustainable Biotech Solutions for Global Challenges”, at Jamia Hamdard, New Delhi organized by the Department of Biotechnology, School of Chemical and Life Sciences, Jamia Hamdard from 19<sup>th</sup> to 21<sup>st</sup> February, 2025.

## EDITOR

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- ❖ Guest editor of a special issue “Functional Genomics of Secondary Metabolite Biosynthesis in Medicinal Plants’ in *Frontiers in Genetics*.

## BOOKS

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- ❖ Medicinal Plants: Qualitative Assessment, Methodology and Design with Stanford publications (under communication).

## ABSTRACTS IN NATIONAL AND INTERNATIONAL MEETINGS

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1. **M. Saifi**, M. Z. Abdin. (2019) Co-expression of anti-miR319g and miRStv\_11 lead to enhanced steviol glycosides content in *Stevia rebaudiana*. National Seminar on Biotechnology Research in India: Current status and future prospects. **Jamia Hamdard, New Delhi, India.**
2. **M. Saifi**, M. Z. Abdin. (2017) Genomic loss of miR319g and over-expression of miRStv\_11 lead to enhanced expression of steviol glycosides biosynthetic pathway genes and altered steviol glycosides contents in *Stevia rebaudiana*. Plant Metabolic Engineering Conference, GRC. **Waterville Valley, NH, USA.**
3. **M. Saifi**, N. Nasrullah, U. Nissar, I. Gul, M. Z. Abdin. (2017) Anti-miR319g mediate RNA- interference in *Stevia rebaudiana* resulting in enhanced steviol glycosides content, a potent metabolite with antihyperglycemic activity. International Conference on Agriculture, Environmental & Bio Sciences 2017. **Chandigarh, India.**
4. **M. Saifi**, N. Nasrullah, U. Nissar, I. Gul, M. Z. Abdin. (2017) miRNA interference: A novel approach for Inhibition or loss-of-function of miRNA by antisense technology. National Seminar Biotechnology in Health Care: Challenges and Opportunities. **Jamia Hamdard, New Delhi, India.**
5. **M. Saifi**, M. Z. Abdin. (2016). Positively correlated miRNA-mRNA regulatory network in *S. rebaudiana* resulting in enhanced steviol glycosides content, a potent metabolite with antihyperglycemic activity. **Cold Spring Harbor Laboratory, New York, USA.**
6. **M. Saifi**, N. Nasrullah, A. Ali, M. Z. Abdin. (2015) *In silico* analysis, expression profiling and correlation of miRNAs targeting genes of steviol glycosides biosynthesis with steviol glycosides contents in different tissues of *Stevia rebaudiana*. Oxford 2015: 15th Annual International Conference on the Science of Botanicals meeting, **Oxford, Mississippi, USA.**
7. **M. Saifi**, M. Z. Abdin. (2012) Establishment of rapid and efficient direct shoot regeneration protocol from nodal segment of medicinally important plant, *Stevia rebaudiana* Bertoni. National Seminar on Current trends in Secondary Plant Metabolite Research. **Jamia Hamdard, New Delhi, India.**
8. **M. Saifi**, M. Z. Abdin. (2014) A rapid and efficient High Performance Thin Layer Chromatographic (HPTLC) method for simultaneous analysis of stevioside

and rebaudiosideA in *Stevia rebaudiana*. National Seminar on Plant Biotechnology: Challenges and Opportunities in 21st Century. **Jamia Hamdard, New Delhi, India.**

9. **M. Saifi**, M. Z. Abdin. (2015). *In silico* analysis and characterization of novel miRNAs from *Stevia rebaudiana* targeting genes of steviol glycosides. **State Forest Research Institute, Jabalpur, M.P., India.**

## CHAPTERS PUBLISHED

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- ❖ A Sharma, F Qamar, K Ashrafi, M.Z. Abdin, **M Saifi** (2025). Genetic Engineering as a Means to Maximize Secondary Metabolite Production in **Secondary Metabolites in Stress and Disease management: A Natural Alternative, Elsevier (Accepted).**
- ❖ **M Saifi**, S Khan, U Kiran, S Fatima, MZ Abdin (2020). Transgenic technology to improve therapeutic efficacy of medicinal plants. **Transgenic technology-based value addition in Plant Biotechnology, 207.**
- ❖ **Saifi M**, Jha RK, Nagar S, Chinnusamy V. Identification of genome edited mutants by Heteroduplex assay-T7 nuclease assay. **Genome editing of crops: Methods and Applications.:94.**
- ❖ Nagar S, Watts A, Kumar VS, **Saifi M**, Kumar S, Chinnusamy V. Restriction enzyme digestion suppressed PCR assay to identify targeted gene mutation. **Genome editing of crops: Methods and Applications.:106.**

## REVIEW ARTICLE

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- ❖ **Saifi, M., Ashrafi, K., Qamar, F., & Abdin, M. Z. (2024). Regulatory trends in engineering bioactive-phytocompounds. *Plant Science*, 112167. (IF:5.2; Citations: 01)**
- ❖ Ahmad, M. M., Qamar, F., **Saifi, M.**, and Abdin, M. Z. (2022). Natural inhibitors: A sustainable way to combat aflatoxins. *Frontiers in Microbiology*, 13 (IF: 6.0; Citations: 02)

## PUBLICATIONS

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1. Qamar, F., Mishra, A., Ashrafi, K., **Saifi, M.**, Dash, P. K., Kumar, S., & Abdin, M. Z. (2024). Increased artemisinin production in *Artemisia annua* L. by co-overexpression of six key biosynthetic enzymes. *International Journal of Biological Macromolecules*, 281, 136291. [IF: 7.7]
2. Ashrafi, K., Iqar, S., Qamar, F., **Saifi, M.**, Quadri, S. N., & Abdin, M. Z. (2024). Improving organoleptic and antioxidant properties by inhibition of novel miRst<sub>v7</sub> to target key genes of steviol glycosides biosynthetic pathway in *Stevia rebaudiana* Bertoni. *Plant Molecular Biology*, 114(5), 109. [IF: 4.6]



3. **Saifi, M.,** Khan, M. A., & Abdin, M. Z. (2023). Functional genomics of secondary metabolite biosynthesis in medicinal plants. *Frontiers in Genetics*, 14, 122392. **[IF: 2.8]**
4. Nasrullah N, Ahmad J, **Saifi M**, Shah IG, Nissar U, Quadri SN, Ashrafi K, Abdin MZ. Enhancement of diterpenoid steviol glycosides by co-overexpressing SrKO and SrUGT76G1 genes in *Stevia rebaudiana* Bertoni. *Plos one*. 2023 Feb 6;18(2): e0260085. **[IF:3.75]**
5. **Saifi M**, Ashrafi K, Nasrullah N, Bhardwaj U, Abdin MZ. Integrated miRNA, target mRNA, and metabolome profiling of *Tinospora cordifolia* with reference to berberine biosynthesis. *3 Biotech*. 2022 Nov;12(11):311. **[IF: 2.89]**
6. Qamar F, Khan S, Ashrafi K, Iqar S, Quadri SN, **Saifi M**, Abdin MZ. Germline transformation of *Artemisia annua* L. plant via in planta transformation technology “Floral dip”. *Biotechnology Reports*. 2022 Dec 1;36: e00761. **[IF:6.0]**
7. Ashrafi K, Iqar S, **Saifi M**, Khan S, Qamar F, Quadri SN, Mishra A, Abdin MZ. Influence of Plant Growth Regulators on Glandular Trichome Density and Steviol Glycosides Accumulation in *Stevia rebaudiana*. *ACS omega*. 2022 Aug 24;7(35):30967-77. **[IF: 4.13; Citations: 01]**
8. Iqar S, Ashrafi K, Khan S, **Saifi M**, Nasrullah N, Abdin MZ. Set of miRNAs Involved in Sulfur Uptake and the Assimilation Pathway of Indian Mustard (*B. juncea*) in Response to Sulfur Treatments. *ACS omega*. 2022 Apr 11;7(15):13228-42. **[IF: 4.13; Citations: 02]**
9. Khan S, Ali A, **Saifi M**, Saxena P, Ahlawat S, Abdin MZ. Identification and the potential involvement of miRNAs in the regulation of artemisinin biosynthesis in *A. annua*. *Scientific Reports*. 2020 Aug 12;10(1):13614. **[IF: 4.99; Citations: 20]**
10. **Saifi M**, Yogindran S, Nasrullah N, Nissar U, Gul I, Abdin MZ. Co-expression of anti-miR319g and miRStv\_11 lead to enhanced steviol glycosides content in *Stevia rebaudiana*. *BMC plant biology*. 2019 Dec; 19:1-3. **[IF: 5.3; Citations: 17]**
11. Rafiqi UN, Gul I, **Saifi M**, Nasrullah N, Ahmad J, Dash P, Abdin MZ. Cloning, identification, and in silico analysis of terpene synthases involved in the competing pathways of artemisinin biosynthesis pathway in *Artemisia annua* L. *Pharmacognosy Magazine*. 2019 Apr 1;15(Suppl 1): S38-46. **[IF: 1.2; Citations: 10]**
12. Nasrullah N, Ahmad J, **Saifi M**, Rafiqi U, Quadri N, Shah IG, Abdin MZ. Metabolic profiling and expression analysis of key genes during leaf maturation of *Stevia rebaudiana* bertoni. *Pharmacognosy magazine*. 2018 Jul 1;14(57):327-34. **[IF: 1.2; Citations: 10]**
13. Gul I, Nasrullah N, Nissar U, **Saifi M**, Abdin MZ. Development of DNA and GC-MS Fingerprints for Authentication and Quality Control of *Piper nigrum* L. and Its Adulterant *Carica papaya* L. *Food analytical methods*. 2018 Apr; 11:1209-22. **[IF: 3.49; Citations: 16]**
14. Kilam D, **Saifi M**, Agnihotri A, Abdin MZ. Development of an efficient high-performance thin layer chromatography method for determination of jasmonic acid in leaf tissue of *Stevia rebaudiana* (Bertoni) Bertoni. *Natural Product Research*. 2017 Jul 18;31(14):1713-6. **[IF: 2.48; Citations: 05]**

15. Kilam D, **Saifi M**, Abdin MZ, Agnihotri A, Varma A. Endophytic root fungus *Piriformospora indica* affects transcription of steviol biosynthesis genes and enhances production of steviol glycosides in *Stevia rebaudiana*. Physiological and Molecular Plant Pathology. 2017 Jan 1;97 :40-8. [IF: 2.74; Citations: 21]
16. **Saifi M**, Nasrullah N, Ahmad MM, Ali A, Khan JA, Abdin MZ. *In silico* analysis and expression profiling of miRNAs targeting genes of steviol glycosides biosynthetic pathway and their relationship with steviol glycosides content in different tissues of *Stevia rebaudiana*. Plant Physiology and Biochemistry. 2015 Sep 1; 94:57-64. [IF: 6.5; Citations: 27]
17. Kilam D, **Saifi M**, Abdin MZ, Agnihotri A, Varma A. Combined effects of *Piriformospora indica* and *Azotobacter chroococcum* enhance plant growth, antioxidant potential and steviol glycoside content in *Stevia rebaudiana*. Symbiosis. 2015 Jul; 66:149-56. [IF: 3.10; Citations: 39]
18. **Saifi M**, Ali A, Saini M, Nasrullah N, Khan S, Abdin MZ. A rapid and efficient high performance thin layer chromatographic (hptlc) method for simultaneous analysis of stevioside and rebaudioside-A in *Stevia rebaudiana*. Int J Pharm Pharm Sci. 2014;6(5):455-64. [IF: 1.5; Citations: 19]

## PERSONAL PARTICULARS

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|                        |   |
|------------------------|---|
| <b>Name:</b>           | Dr. Monica Saifi  |
| <b>Strength:</b>       | Diligent, optimistic, self-motivated, and self-disciplined. |
| <b>Date of Birth:</b>  | 07-07-1989  |
| <b>Sex:</b>            | Female  |
| <b>Nationality:</b>    | Indian  |
| <b>Language Known:</b> | English, Hindi  |

## REFERENCES

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- ❖ **M. Z. Abdin, Ph.D**  
 Professor and Head  
 Centre for Transgenic Plant Development  
 Department of Biotechnology  
 School of Chemical and Life Sciences  
 Director, Centre for Environment and Sustainable Development  
 Jamia Hamdard, New Delhi  
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 Phone-09818462060  
 E-mail- [mzabdin@jamiahamdard.ac.in](mailto:mzabdin@jamiahamdard.ac.in)
  
- ❖ **Dr. Viswanathan Chinnusamy**  
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 Indian Agricultural Research Institute

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❖ **Dr. Anamika Pandey**  
Assistant Professor  
Department of Soil Science and Plant Nutrition  
Selcuk University  
Turkey  
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E-mail- [anamika@selcuk.edu.tr](mailto:anamika@selcuk.edu.tr)

I hereby declare that information given above is true to the best of my knowledge.

**Dr. Monica Saifi**

### SUMMARY OF MY PREVIOUS RESEARCH WORK

Currently, as an Assistant Professor in the Department of Biotechnology at Jamia Hamdard, I am actively engaged in cutting-edge research and teaching endeavors. My research primarily focuses on plant molecular biology, genome editing, and the exploration of miRNAs for enhancing secondary metabolite production in medicinal plants. I continue to lead innovative projects, mentor students, and contribute to the department's academic and research missions. My role allows me to blend my passion for advancing scientific knowledge with my dedication to nurturing the next generation of scientists.

In my previous research endeavors, I have made substantial contributions to the field of plant molecular biology and genome editing:

**1. Genome Editing in Amaranth**

Working in the area of genome editing on different amaranth spp. in order to enhance its organoleptic quality and therapeutic potential. We have identified various miRNAs responsible for the same and now through genome editing, we are knocking down these miRNAs in order to enhance its organoleptic quality and therapeutic potential, by specifically targeting flavonoid biosynthetic pathway.

**2. Genome Editing in Medicinal Cannabis**

I led a research project focused on the development of a novel THC-free variety of Cannabis for medicinal purposes. Using advanced CRISPR/Cas9 genome editing technology, our primary objective is to enhance the production of CBD, a valuable compound with medicinal properties. This research has significant implications for the pharmaceutical and medical cannabis industries.

**3. Establishing an efficient platform for precise genome edition in rice**

Here I was broadly responsible for research in the area of Molecular biology and genome editing for the development of new varieties of rice crop (*Oryza sativa*) for Abiotic stress tolerance. I conducted various gene manipulation experiments for preparation of genome editing constructs by restriction digestion and ligation experiments. Prepared recombinant micro-organisms such as *E. coli* XL1 Blue and *Agrobacterium tumefaciens* EHA105 carrying genome editing constructs for gene manipulation in *Oryza sativa*. Also, I was Involved in establishment of an efficient platform for precise genome editing in rice. Designed homology directed repair templates for abiotic stress tolerant as well as herbicide tolerant genes. Used various computer-based tools to design homology directed repair templates and guide RNAs like benchling, CRISPR P, CHOPCHOP etc. Apart from this, I was also Involved in optimization of plant transformation protocol for regeneration of *Oryza sativa* carrying the genome editing construct. Performed various experiments for identification of the best suitable tissue culture media composition for optimum growth of the plant. Also optimized various other parameters effecting the plant growth such as light, temperature and humidity under controlled conditions. Conducted cloning of CRISPR/Cpf1 based guide RNAs in pUC19 based cloning vector harboring sequence for cpf1. Furthermore, identified miRNAs for CBP20 genes using computational tools like psRNA Target analyzer and carried out real-time based expression analysis of both miRNAs as well as target genes. In addition to this, prepared various tissue culture medias like callus induction media, selection media, regeneration media, shooting and rooting media.

#### 4. *In silico* analysis, modulation and expression of miRNAs in *Stevia rebaudiana* to evaluate their impact on accumulation of steviol glycosides

- The overall goal of this work was to **enhance the secondary metabolite production** in medicinally and industrially important plant *Stevia rebaudiana*. Here, we for the **first time identified and functionally characterized miRNAs in *Stevia rebaudiana* targeting steviol glycosides biosynthetic pathway genes**. For identification of the miRNAs computational biology was used as a tool. And for functional characterization of the same various molecular biology techniques were used. During this work, we found an unexpected striking positive correlation pattern among a novel micro-RNA and its target gene. Our results indicated the more complex nature of miRNAs where they can function as a transcription factor. To the best of our knowledge, it was the **first report where miRNA can upregulate gene expression in case of plants**. We also **developed an innovative strategy, the miRNA interference approach** to stably inhibit the function of miRNAs. This approach can efficiently and irreversibly silence their target miRNAs thus resulting in de-repression of target gene. Overall, our study revealed more complex nature and fundamental importance of miRNAs in biosynthetic pathway related gene networks and hence, these miRNAs can be successfully employed to enhance the ratio of rebaudioside-A to stevioside, thus enhancing the sweetening indices of this plant and making it more palatable. The **transgenic plants thus developed, were transferred and acclimatized to the green house and then to the field conditions**.
- We also developed a rapid and efficient **high performance thin layer chromatographic (HPTLC)** method for simultaneous analysis of stevioside and rebaudioside-A in *Stevia rebaudiana*.
- **Integrated miRNA, target mRNA and metabolome profiling of *T. cordifolia* with reference to berberine biosynthesis:** In this study, we did simultaneous miRNA/target gene expression and metabolome analysis which opens a way for initiating new proposition and prioritization of miRNAs/genes/metabolites for targeted follow-up metabolic engineering experimentations.

In addition to my extensive experience in plant molecular biology, genome editing, and miRNA research, I have also developed expertise in the use of Sequence Characterized Amplified Region (SCAR) markers. SCAR markers are powerful tools in molecular genetics, allowing for the specific amplification of DNA fragments associated with particular genes or regions of interest. My proficiency in utilizing SCAR markers adds another dimension to my research capabilities.