Satpal, PhD

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Current affiliation: School of Life Sciences, Jawaharlal Nehru University New Delhi-110067.

Employment and Education:

April 2019-continued: CSIR Scientific Pool Officer, School of Life Sciences JNU New Delhi

June 2017-March 2019: Research Associate, School of life sciences, Jawaharlal Nehru University New Delhi-110067

Feb, 2017-May 2017: Research associate, International Centre for Genetic engineering and Biotechnology, New Delhi-110067

April, 2016-Jan 2017: Research associate, National Research Centre on Plant Biotechnology, IARI Pusa New Delhi-110012

Sept, 2014-Feb 2016: Postdoctoral Research Fellow, Estonian University of Life Sciences, Tartu, Estonia-51014.

Dec, 2011-Nov, 2013: Postdoctoral Research Fellow, Synthetic Biology and Biofuel Group, ICGEB, New Delhi-110067.

Aug, 2010-Nov, 2011: Postdoctoral Research Fellow, Department of Plant Molecular Biology, University of Delhi, South Campus, New Delhi, India

May, 2010-Aug, 2010: Visiting Research Scholar, Forschungszentrum Jülich, Germany.

July, 2004-April, 2010: PhD, School of Life Sciences, Jawaharlal Nehru University, New Delhi
Supervisor: Prof B C Tripathy

Thesis title: Impact of Salinity Stress on Chloroplast Biogenesis and Photosynthesis

Aug, 2002- July, 2004: M. Phil, School of Life Sciences, Jawaharlal Nehru University, New Delhi, **Supervisor:** Prof B C Tripathy

Thesis: Impact of Salinity Stress on Chloroplast Biogenesis and Greening process (CGPA=6.95)

Sept, 2001-March, 2002: Part-time Biotechnology teacher at Guru Nanak Khalsa College Yamunanagar, Haryana, India

July, 1999-June, 2001: **M.Sc**. Master of Science, (72.8% Marks; First division) Biotechnology, Guru Jambheshwar University of Science & Technology, Hisar, Haryana, India

Aug, 1996-June, 1999: **B.Sc**. Bachelor of Science, (72.48% Marks; First division) Biochemistry, University College Kurukshetra, Kurukshetra University, Haryana, India.

Awards/Achievements:

i) Qualified GATE 2001 (Graduate Aptitude Test in Engineering), **89.76** Percentile, Subject: Life Sciences. National level test for PhD/MTech. Admission/fellowship
ii) Qualified Council of Industrial and Scientific Research, CSIR-JRF-NET June, 2001 (Conducted by Indian Government for PhD Fellowship and Lecturership Eligibility)
iii) Availed fellowships from Department for Science and technology (DST), and Department of Bio-technology (DBT) during PhD.
iv) **School Topper** in Government Senior Secondary School, during 12^{th} standard/class.
v) **2^{nd} Topper** of University during MSc.
vi) Awarded Dr D S Kothari postdoctoral fellowship by University Grant Commission, Government of India after PhD **(Higher stipend than regular RA/postdoc fellowship)**.

Detailed research experience:

CSIR Scientific Pool Officer at School of Life Sciences JNU New Delhi-110067. (April 2019-continued).

Here my work is on increasing photosynthetic capacities in rice by producing transgenic plants for higher rate of photosynthesis.

Research associate at School of life sciences JNU New Delhi-110067. **(June, 2017 – 31 March 2019)**

Here I have worked on evaluation of elevated CO_2 on Black rice in terms of photosynthesis, yield, and others physiological and molecular parameters. I have observed higher photosynthetic capacity in plants growing at higher CO_2 level than grown at ambient level.

Research associate at International Center for genetic engineering and Biotechnology New Delhi-110067. (Feb, 2017 – May 2017)

Here I worked on maize tissue culture and transformation for producing herbicide tolerant maize plant.

Research associate at National research Centre on plant biotechnology New Delhi-110067. (April, 2016 – Jan 2017)

I worked here on improving biological nitrogen fixation in rice by expressing genes for nodulation from *Medicago truncatula*. Agrobacterium mediated transformation in rice was carried out.

Postdoctoral Research Fellow at Estonian University of Life Sciences, Tartu, Estonia-51014. (Sept, 2014 –Feb 2016)

Here I worked to characterize terpene synthases and measurement of heat stress induced biogenic volatile organic compounds (BVOCs) in plants. I worked on various plants *Tobacco*, *Capsicum annum*, *Quercus ilex*. Main emphasis was to see quantitative relationship between heat stress and induced volatiles. Study on tobacco shows that Lipoxygenase (LOX) products emission peak temperatures varies depending upon intensity and duration of heat stress applied.

Postdoctoral fellow at Synthetic Biology and Biofuel Group, ICGEB New Delhi-110067 (12th Dec, 2011 - 30th Sept, 2013)

Here my project was to develop an efficient regeneration and transformation system for Guayule (*Parthenium argentatum*), a hypoallergenic rubber plant and, metabolic engineering of Guayule for enhanced level of substrates (Isopentenyl pyrophosphate and dimethylallyl diphosphate) for natural rubber production by expressing six enzymes of yeast mevalonate pathway into Guayule chloroplast. Synthetic DNA cassette of six genes with promoter and chloroplast signal sequence was cloned into binary vector and *Agrobacterium* mediated transformation system was used to produce transgenic plants.
Callus based *Agrobacterium* mediated transformation was developed as new protocol in Guayule. This protocol can open scope for chloroplast transformation in Guayule.

Postdoctoral Fellow at the Department of Plant Molecular Biology, University of Delhi South Campus, Dhaula Kuan-110021 (20th Aug, 2010-30 Nov, 2011).

Here I worked on cloning of rice heat shock proteins (HSPs) genes and transformation of bacteria for studying growth, morphology, and unique role of heat shock proteins against various abiotic stresses. 2-dimensional gel electrophoresis was carried out of rice seedlings in control and heat stress conditions.

Research visit at Forschungszentrum Jülich (20th May, 2010-17thAug, 2010).

During the research visit I worked on Arabidopsis on pigments turnover (Chlrophyll and β-carotene) with help of 14-Carbon radioactive labelling and radio-HPLC. I also participated in other projects and did measurements on tobacco using PAM-fluorimetry.

During the course of M. Phil-PhD studies, I worked as Junior and Senior Research Fellow at Jawaharlal Nehru University, New Delhi, India (Aug, 2002 – April, 2010).

Attempts were made to understand the regulation of chlorophyll biosynthesis and photosynthesis under salt stress in two rice cultivars Pusa Basmati-1 (salt sensitive) and CSR-10 (salt tolerant).

To explore the mechanism of resistance to NaCl stress, Na, K, Ca ions contents were determined by inductively coupled plasma atomic emission spectrometry (ICP-AES) in shoots and roots. Photosynthetic parameters, Electron transport rate (etr), quantum yield of PSII, photochemical quenching (qP), non-photochemical quenching (qN), Minimum and variable fluorescence (F_0 and Fv) and Maximum efficiency of photosystem II (Fv/Fm) were measured as a function of chlorophyll a fluorescence using pulse modulated fluorimeter (PAM). Photosynthetic electron transport reactions for whole chain, Photosystem II (PSII) and Photosystem I (PSI) were studied by Oxy-Lab (Hansatech) by measuring oxygen uptake or evolution. To understand the modulation of Chl biosynthesis; Chl, carotenoids and Chl biosynthetic intermediates *viz.* ALA, Proto IX, Mg-Proto, Pchlide and Childe were measured by spectrophotometry and spectrofluorometry. Enzymatic activities of major regulatory steps of chlorophyll biosynthesis were also estimated. Gene expressions of chlorophyll biosynthetic enzymes were studied by RT-PCR/Real-time PCR or Northern blotting. Protein expressions of major enzymes and photosynthetic proteins were studied with western blotting. Oxidative damage due to salt stress was estimated by in-gel assays, enzymatic activities of antioxidative enzymes and lipid peroxidation status of membranes. To study differential expression of proteins due to salt stress, 2-dimensional gel electrophoresis was performed and proteins were identified by MALDI TOF/ TOF. Tocopherols content were studied in two cultivars by HPLC. PB1 was affected by larger extent by salt as compared to CSR10.

Laboratory Skills:

Molecular Biology Techniques

RNA isolation, cDNA preparation, RT-PCR, Real time PCR, Northern blotting, Plasmid isolation, Gene cloning, Microbiological practices related to Molecular biology, *E.coli* and *Agrobacterium* transformation, Rice tissue culture and transformation, Guayule tissue culture and transformation.

Biochemical Techniques

Chloroplast envelope thylakoid and stroma isolation, Cytoplasmic and chloroplast protein isolation, protein estimation, SDS and Native-PAGE analysis, Western Blotting, In-gel assay of anti-oxidative enzymes, spectrofluorimetry, spectrophotometry, Vaccum dry evaporator, TLC, HPLC (quantitative estimation of tocopherols), Radio-labeling and Radio-HPLC, 2-dimensional gel electrophoresis, mass spectrometry (MALDI-TOF), proton transfer reaction-mass spectrometry (PTR-MS), Gas chromatography-mass spectrometry (GC-MS).

Physiological Techniques

Chl and Carotenoid estimation, Chl a fluoroscence based parameters measurement (PAM-FLORIMETER).

Computer Knowledge

MS office, Photoshop, Primer Express etc, and databases including NCBI, Bioedit, Gene Runner, basic knowledge of Wolfram Mathematica.

Publications:

Published:

Satpal Turan, Kaia Kask, Arooran Kanagendran, Shuai Li, Rinaldo Anni, Eero Talts, Bahtijor Rasulov, Astrid Kännaste, and Ülo Niinemets (2019) Lethal heat stress-dependent volatile emissions from tobacco leaves: what happens beyond the thermal edge? Journal of Experimental Botany. 70 (18): 5017-5030. ((IF=6.9)

Satpal Turan (2018) Single-gene versus multigene transfer approaches for crop salt tolerance. In V. Kumar, S. Wani, P. Suprasanna, & L. S. Tran (Eds.), *Salinity responses and tolerance in plants* (Vol. 1, pp. 213–234). Cham: Springer.

Satpal and Baishnab C. Tripathy (2015) Salt-stress induced modulation of chlorophyll biosynthesis during de-etiolation of rice seedlings. Physiologia plantarum. 153: 477-91. (IF=4.5)

Satpal Turan, Katrina Cornish and Shashi Kumar (2014) Highly efficient callus-mediated genetic transformation of Parthenium argentatum Gray, an alternate source of latex and rubber. Industrial Crops and Products. 62: 212-218 (IF=5.6)

Satpal Turan, Katrina Cornish and Shashi Kumar (2014) Photosynthetic response of *in vitro* guayule plants in low and high lights and the role of non-photochemical quenching in plant acclimation. Industrial crops and products. 54, 266–271. (IF=5.6)

Satpal Turan and Baishnab C. Tripathy (2013) Salt and genotype impact on antioxidative enzymes and lipid peroxidation in two rice cultivars during de-etiolation. Protoplasma. 250, 209-22. (IF=3.3)

Satpal Turan, Katrina Cornish and Shashi Kumar (2012) Salinity tolerance in plants: Breeding and genetic engineering. Australian Journal of Crop Science. 6, 1337-1348. (IF=0.3)

Satpal Turan (2012) Light acclimation in plants: Photoinhibition and Photoprotection. Advances in Bioresearch. 3, 90-94.

Manuscript under preparation:

Satpal and Baishnab C. Tripathy. Photosynthetic responses of two rice cultivar to salt stress during de-etiolation. (Manuscript under preparation).

International Seminars/Symposia/Conferences attended

Environmental Adaptation: from Molecules to the Planet, The Estonian Centre of Excellence in Environmental Adaptation ENVIRON-final conference, Tartu, October 1-3, 2015.

The Indian Proteomics Conference and Workshop, 2011, Organized by The Proteomics Society (India) & Jawaharlal Nehru University, New Delhi, April 3-5, 2011.

2nd International Conference on Trends in Cellular and Molecular Biology, School of Life Sciences, Jawaharlal Nehru University New Delhi, January 5-7, 2008.

International Symposium on Light and Life, University of Hyderabad and Indian Physiology Society, August 29-31, 2007.

75th Annual Meeting of Society of Biological Chemists (India) Jawaharlal Nehru University, New Delhi, December 8-11, 2006.

International Meeting on Biotic and Abiotic Stress Response in Plants, International Centre for Genetic Engineering and Biotechnology, New Delhi, India, December 11-13, 2006.

Wolfram Mathematica: Modern scientific computing course organised by Estonian University of Life Sciences, Tartu, Estonia, Novemver 23-25, 2015.

Training qPCR School Workshop organized by Estonian University of Life Sciences, December 13-26, 2015.

National Conference on Impact of Climate Change on Indian Agriculture and Productivity organized by Jawaharlal Nehru University in collaboration with the society for Science of climate change and sustainable development, Dec 23-24, 2018.

Personal information:

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Date of Birth : 04 May, 1978
Nationality : India
Marital status : Married
SEX : Male

References:

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(CANDIDATE SIGNATURE)