

## Brief Resume

Name	Dr. Swarup Kumar Chakrabarti
Date of birth	05.03.1958
Field of specialization	Plant Biotechnology, Plant Pathology
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### Educational qualification:

Degree	Institute/ University	Year
B. Sc. (Ag.) Hons.	BCKV, Kalyani, West Bengal	1980
M. Sc.	Indian Agricultural Research Institute, New Delhi	1983
Ph. D.	Indian Agricultural Research Institute, New Delhi	1987
Post Doc.	Waksman Inst., Rutgers, New Jersey, USA	2002-03
Post Doc.	CIRAD-AMIS, IGEPAM, Montpellier, France	1999

**Research experience:** I was the country leader of the Potato Genome Sequencing Consortium (PGSC) that sequenced the potato genome and published in Nature in the year 2011. It was the first genome of a plant belonging to Asterid clade of eudicot that represented 25% of flowering plant species. A total of 39,031 protein-coding genes were predicted in the sequence. I also led a team of scientists that sequenced the genomes of *Fusarium sambucinum* Fckl. F-4., *Rhizoctonia solani* Anastomosis Group 3, phylotype I, II, IV of *Ralstonia solanacearum*, mitogenome of *Phytophthora infestans* A2 mating type, potato leaf roll virus, Tomato leaf curl New Delhi virus-[potato]. Besides, genomes of wild potato species *Solanum pinnatisectum*, dihaploid of *Solanum tuberosum*, Indian strain of *Phytophthora infestans*, aphid species *Aulacorthum solani*, Indian strain of cyst nematode *Globodera rostochiensis* have been sequenced. Whole genome bisulfite sequencing of potato cv. Kufri Bahar was done to analyze extent of DNA methylation for tuber shape variation (Bioproject PRJNA476419, and Biosample SAMN09433514).

High throughput transcriptome analysis of the late blight resistant Indian potato cultivar Kufri Girdhari revealed up-regulation of 2,344 genes post-inoculation compared to pre-inoculation stage. Role of four host genes, viz. SGT1 (Suppressor of G2 allele of SKP1), Steroid Binding Proteins (SBP), Proline rich proteins and a gene of unknown function in determining late blight resistance have been validated by QRT-PCR as well as Virus Induced Gene Silencing (VIGS) experiments. Similarly, two effector genes of *Phytophthora infestans* viz., eukaryotic elongation factor 1-alpha (*eef1a*) and sorbitol dehydrogenase (*sdh*) played important role in pathogenesis. These two genes are also being used for transgenic development through RNAi strategy. Moreover, the role of miR160 has been demonstrated in local and systemic acquired resistance (SAR) responses to *P. infestans* infection in potato. My group also developed a concept for improving nitrogen use efficiency (NUE) through integrated genomics, physiology and breeding concepts in potato. Potato is an N-fertilizer responsive crop to produce high tuber yield. The excessive use of N can result in environmental damage and high cost of production, hence improving NUE of potato plant is one of the sustainable options to address these issues and increase yield. Further, identified homologues and CAPS marker for nitrate reductase gene involved in N metabolism of potato. Besides, genes and regulatory elements (micro RNA) were also identified for improving NUE in potato by RNA sequencing. Under N starvation condition, 233 genes were up-regulated, whereas 1,188 genes were down-regulated in leaf tissues, whereas in roots, 645 genes were down-regulated and 250 genes were up-regulated under N starvation than N sufficient conditions in cv. Kufri Jyoti.

I have also worked extensively on development and application of molecular markers like AFLP markers for QTL mapping, MAS using SCAR markers, and SSR markers for DNA fingerprinting of potato varieties. Besides, I took lead role in development of transgenic potatoes with late blight resistance, improved protein quality, tuber moth resistance, virus resistance, and bacterial wilt resistance. I have also worked extensively on serological and molecular diagnostics of potato viruses, bacterial and fungal pathogens.

**Experience in research management:** I served as Director of two research institutes of ICAR. I was selected as the Director of ICAR-Central Tuber Crops Research Institute, Thiruvananthapuram, Kerala in the year 2012. As Director of that Institute, I led a team of 170 staff including 48 scientists with an annual budget of about ₹ 22 crores for research and development of tropical tuber crops like tapioca, sweet potato, yams, taro, etc. I was again selected as the Director of ICAR-Central Potato Research Institute, Shimla in the year 2016 by ASRB. As Director, I led a team of about 380 regular staff including 76 scientists with an annual budget of about ₹ 80 crores for carrying out potato research and development. A conducive and satisfying working environment was created in both the institutes for unleashing and realizing the positive power of all the employees. I also acted as Project Coordinator of All India Coordinated Research Project on Potato that operates in 25 different centres including 17 State Agricultural Universities spread all across India. Data generation, tabulation, analysis, and reporting for technology evaluation was done under my supervision.

**Experience in research project management:** I was the Country Leader of the Potato Genome Sequencing Consortium consisting of 26 laboratories from 14 countries. Besides, I was the Principal Investigator of two foreign funded projects, i.e. USAID project “Engineering late blight resistance in susceptible commercial potato cultivars” and the Indo-European networking project “PotBio: generating biomarkers for breeding healthy potatoes” and three externally funded projects, i.e. “Molecular characterization, detection and management of potato pathogens”, “Molecular tagging of extreme resistance to potato Y potyvirus (PVY) and horizontal resistance to late blight in potato”, and “Development of transgenic potato with resistance to major viruses” under the “ICAR network project on transgenics in crops”.

**National/International linkages established:** Established research linkages with large number of national (NIPGR, New Delhi; NRCPB, New Delhi; IISER, Pune, CSIR-IHBT) and international (Cornell University, Ithaca, USA, University of Wisconsin, USA; Waksman Institute, Rutgers, USA; Wageningen University, The Netherlands; FAU, Erlangen/Germany; CSIC, Madrid/Spain; SCRI, Dundee/Scotland) organizations. Also established linkages with large number of private companies (M/S Pepsico India Holdings India Ltd., Gurgaon, Technico Agri Science Limited, Chandigarh, McCains Foods India Pvt. Ltd, New Delhi, Merino Industries, Ghaziabad, UP etc).

**Publication:**

Research papers in international journals	70	Research papers in national journals	69
Books authored	6	Book chapters	36
Popular articles	50	Monograph:	11
Training modules	8	Papers in Conf. Proc. (international)	78
Papers in Conf. Proc. (national)	42	Any other publications	38
Total publication	408	Total citations (Google Scholar)	3,327
h-index	21	i10-index	50