Biodata of Prof. RS Sangwan (*Updated January 30, 2023*)

1. **Name** (*Block Letters*)**: RAJENDER SINGH SANGWAN**

2. **Father's Name:** *Late* Shri Karan Singh Sangwan

3. **Date & Place of Birth (DD/MM/YY): 24/08/1958**
Village Badal, Distt. Charkhi Dadri Haryana

3. Postal address:

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4. Nationality: Indian

5. Educational qualification (*from matriculation onward*)**:**

S.No.	Degree	Board/ University	Division	Year of Passing	Subject(s)
1.	**Matriculation (*10th Standard*)**	Board of School Education, Haryana, India	66.33 % ***[FIRST DIVISION***	1975	Hindi, English, General Science, Mathematics, Physics & Chemistry, History
2.	**B.Sc.**	Kurukshetra University Kurukshetra Haryana, India	61.90 % ***[FIRST DIVISION]***	1979	Chemistry, Botany and Zoology

3.	**M.Sc.** (*Biochemistry*)	Haryana Agricultural University, Hisar, Haryana, India	OGPA of 3.71/4.00 ***(Equivalent to 84.20%)***	1981	Biochemistry - ***Major*** Chemistry- ***Supporting*** Foods and Nutrition*:* ***Minor*** *(I)* Genetics: ***Minor*** *(II)*
4.	**Ph.D.** (*Biochemistry*)	Haryana Agricultural University, Hisar, Haryana, India	OGPA of 3.47/4.00 ***(Equivalent to 79.40%)***	1987	Biochemistry - ***Major*** Chemistry- ***Supporting*** Genetics*:* ***Minor***

6. Research/Academic Experience (*from latest to oldest*)**:**

S.No.	From	To	Name of Organization	Position Held	Scale/Level of Pay
1.	*Aug. 17, 2017*	August 16, 2022	Academy of Scientific & Innovative Research (AcSIR)- *An Institution of National Importance for Interdisciplinary Higher Education*	Director	Rs. 225000 (*Pay Matrix Level 17, 7th CPC*)- Scale of Secretary. Govt. of India
2.	*May 01, 2012*	Aug. 16, 2017	Centre of Innovative & Applied Bioprocessing (CIAB)- *An Autonomous National Research Institute under DBT (Govt. of India)*	**Chief Executive Officer** (CEO)	Rs. 225000 (*Pay Matrix Level 17*) from January 2016 onwards; Previously-6th CPC Apex/Secretary Scale (Rs. 80000)- Scale of Secretary. Govt. of India
3.	*June 01, 2016*	Jan. 09 2017	National Agri-Food Biotechnology Institute (NABI)- - *An Autonomous National Research Institute under DBT (Govt. of India)*	**Executive Director** (*Additional Charge*)	Rs. 225000 (*Pay Matrix Level 17*)

4.	*May 13, 2005*	April 30, 2012	CSIR-Central Institute of Medicinal and Aromatic Plants, Lucknow	**Senior Principal Scientist**	37400-67000, GP 8900
5.	*May 13, 2000*	May 12, 2005	CSIR-Central Institute of Medicinal and Aromatic Plants, Lucknow	**Principal Scientist**	14300-400-18300
6.	*May 13, 1995*	May 12, 2000	CSIR-Central Institute of Medicinal and Aromatic Plants, Lucknow	**Scientist E-I**	Rs. 12000-375-16500
7.	*May 13, 1990*	May 12, 1995	CSIR-Central Institute of Medicinal and Aromatic Plants, Lucknow	**Scientist C**	Rs. 3000-100-4500
8.	*May 13, 1986*	May 12, 1990	CSIR-Central Institute of Medicinal and Aromatic Plants, Lucknow	**Scientist B**	Rs. 2200-75-2800-100-4000

12. Professional training undergone,

- Post Doctoral Research at Queens' University Kingston, Canada (1990-1991)
- Diploma in Bioinformatics (online) with Distinction- University of Singapore, Singapore (2005)
- CSIR- Leadership Development Program (2008)- With Certificate of Merit, CSIR
- Certificate in Yoga (2004), University of Lucknow, Lucknow

13. Honours / Awards / Fellowship received:

(a) Fellowships of the National Academies:

- ***Fellow,*** *Indian National Science Academy,* ***F.N.A.***
- ***Fellow,*** *National Academy of Sciences (NASI),* ***F.N.A.Sc****.*
- ***Fellow,*** *National Academy of Agricultural Sciences,* ***F.N.A.A.S.***

(a) Major R&D Awards & Research Fellowships:

- ***CSIR-Technology Award*** *in Life Science-2015*
- ***Banaras Hindu University Centennial Award*** *of BRSI- 2015*
- ***Prof. Uma Kant Sinha Memorial Award*** *(Indian Science Congress Association)-****1997***
- ***CSIR Young Scientist Award*** **(**Biological Sciences**)-*****1993***
- ***Young Biochemist (Travel) Award*** *of International Union of Biochemistry and Molecular Biology (IUBMB)-****1992***

- ***Post-Doctoral Research Fellowship,*** *NSERC Project at Department of Biology,* ***Queens University, Canada****, 1990-91*
- ***CSIR Senior Research Fellowship****, 1985*
- ***Department of Atomic Energy, Junior Research Fellowship (B)****, 1984*
- ***Department of Atomic Energy, Junior Research Fellowship (A)****, 1982*

(a) Membership of Editorial Boards of Journals of Scientific Research:

- ***Associate Editor****, Journal of Genetics, Indian Academy of Sciences (served)*
- ***Subject Editor,*** *Proceedings of National Academy of Sciences, India****,*** **Section B. Biological Sciences**
- ***Associate Editor,*** *Journal of Plant Biochemistry and Biotechnology, Springer*
- ***Member****, Editorial Board, Journal of Agricultural Biochemistry*

(c) Membership of Academic Bodies of Universities/Educational Institutions:

- ***Chairman, Senate,*** *Academy of Scientific & Innovative Research (AcSIR)- ex-Officio as Director, AcSIR (Served)*
- ***Member***, Academic Council, Maharshi Dayanand University, Rohtak
- ***Member, Board of Studies,*** *Department of Food Technology, Guru Jambheshwar University, Hisar (Served)*
- ***Member, Board of Studies,*** *University Institute of Engineering & Technology, Kurukshetra University, Kurukshetra*
- ***Member, Academic Plan Draft Committee, New Institute of Public Health*** *(Maharshi Dayanand University, Rohtak) (Served)*
- ***Member,*** *Academic Planning Board, CDL University, Sirsa*

(d) Membership of Scientific/Research Advisory Bodies of R&D Agencies/ Institutions:

- ***Member,*** *Steering cum Project Monitoring Committee,* ***National Biotechnology Park Program, DBT (Govt. of India)***
- ***Member, Scientific Advisory Committee,*** *DBT Institute- National Institute of Animal Biotechnology (NIAB), Hyderabad*
- ***Member, Scientific Advisory Committee,*** *DBT Institute- National Institute of Plant Genome Research (NIPGR), Delhi (Served)*
- ***Member, Scientific Advisory Committee,*** *DBT Institute- National Agri-Food Biotechnology (NABI), Mohali (Served)*
- ***Member- Convener*** *(ex-officio)****, Scientific Advisory Committee,*** *DBT Institute- Center of Innovative and Applied Bioprocessing (CIAB), Mohali (Served)*

(e) Membership, Board of Governors/Governing Bodies of R&D Institutions:

- ***Member, Governing Body,*** *DBT Institute- National Institute of Animal Biotechnology (NIAB), Hyderabad*
- ***Member*** *(ex-officio)****, Board of Governors,*** *-Academy of Scientific and Innovative Research- Institute of National Importance for Inter-disciplinary Higher Education in Science and Engineering (Served)*
- ***Member, Governing Body****, Biotech Park, Lucknow*
- ***Member-Convener*** *(ex-officio)****, Governing Body,*** *DBT Institute- Centre of Innovative and Applied Bioprocessing* (Served)
- ***Member (****ex-officio****), Governing Body,*** *DBT Institute- National Agri-food Biotechnology Institute* (Served)
- ***Member*** *(ex-officio)****, Board of Governors,*** *Mohali Biotech Park,* (Served)
- ***Executive Member,*** *Governing Body,* ***Chandigarh Region Innovation and Knowledge Cluster (CRIKC)***

(f) Expert Member of Panels/Committees on Govt. of India Departments & Organizations' R&D Projects, Initiatives, Missions as well as Program Development /Monitoring and Evaluation

- *Member, Himalayan Bioresource Mission, Department of Biotechnology (Govt. of India) (Served)*
- *Member, Committee on Evaluation of Soybean Mission Proposals submitted to the Department of Biotechnology (Govt. of India)(Served)*
- *Member, Empowered Committee of CSIR on Development of a Conceptual Framework for Strengthening CSIR's linkage with University Research system by establishment of CSIR Associated Laboratory (CAL) at Universities. (Served)*
- *Chairman, Selection Committee for Research Associates and Senior Research Fellows (in the area of "Agro-Bio, Physico, Chemico, Food, Leather & Textile Technology)(Served)*
- *Co-Chair, Department of Biotechnology (Govt. of India) Expert Committee for Review and Selection of Proposals under Newton-Bhabha Researcher Link Workshops.(Served)*
- *Member, Inter-Ministerial Expert Committee on Nano based Agri and Food Products Guidelines of Govt. of India (Served)*
- *Member, Department of Biotechnology (Govt. of India) Technical Expert Committee (TEC) in the area of Medicinal and Aromatic Plants, Bioresource and Secondary Agriculture and Silk Biotechnology for North Eastern Region. (Served)*
- *Expert Member, Project Monitoring Committee (PMC) of Biotechnology Industry Research Assistance Council (BIRAC) on Academic Innovation*

Research (AIR) and Contract Research Scheme under the program of PACE (Promoting Academic Research Conversion to Enterprise)

- *Member, Area Review Panel on Energy, Environment and Secondary Agriculture for BIPP, SBIRI & PACE schemes of BIRAC.*
- *Member, Project Monitoring Committee (PMC) of the Department of Biotechnology (Govt. of India) for Establishment of Centre for Bioresources and Sustainable Development in Arunachal Pradesh as Centre of Excellence*
- *Member, Department of Biotechnology (Govt. of India), Technical Expert Committee on Bioresources and Secondary Agriculture (Served)*
- *Member, Expert Committee for DBT-BIRAC Programme on Secondary Agriculture/Food Processing Entrepreneurial Network (SAEN) in Punjab (Served)*
- *Member, Department of Biotechnology (Govt. of India) Thematic Working Group for North Eastern Region of India (Served)*
- *Member, Technical Expert Committee on SPARSH (Social Innovation Programme for Products Affordable & Relevant to Societal Health)- A social innovation scheme initiated by BIRAC.*
- *Member, Sub-Committee on Industrial Biotechnology & Secondary Agriculture" under 124th TEC of BIRAC under Department of Biotechnology (Govt. of India) (Served)*
- *Member, Thematic Working Group of the Department of Biotechnology (Govt. of India) for Review and Evaluate the Programmes Implemented during 14th Finance Commission. (Served)*
- *Member, Bio-CARe Committee of the Department of Biotechnology (Govt. of India) (Served)*
- *Member, Sectorial Project Review Committee of CSIR for Food Nutrition and Agriculture Projects of 12th Five Year Plan and their translational perspectives in future (Served).(Served)*
- *Member, Department of Biotechnology Committee on Evaluation of Project Proposal on Efficacy of Iron Fortified Rice (served)*
- *Member, Department of Biotechnology (Govt. of India) North East Region specific Scientific and Technical Appraisal and Advisory Group (STAG) in the area of Energy, Environment and Bioresource Applications (Served)*
- *Member, Expert Group on Proposal for Establishment of National Biotechnology Translational Research Institute at Kanpur/Lucknow under the aegis of DBT (Served)*
- *Member, DBT (Govt. of India) Task Force on 'Public Health including Nutritional Interventions' (Served)*
- *Member (Co-opted), Project Advisory Committee (PAC) of SERB (Department of Science & Technology, Govt. of India) on Plants (Served)*

- *Member, Department of Biotechnology (Govt. of India) Task Force on 'Value Added Biomass and Products from Natural Resources' (Served)*
- *Member, Project Monitoring Committee (PMC) on Metabolomics under Department of Biotechnology (Govt. of India) (Served)*
- *Member, Advisory Committee for Recommending CSIR Young Scientist Awardee in Biological Sciences (served)*

14. Total Research / Academic experience (Years / Months): >36 Years

15. Details of research work: Consistent profile of carrying out globally competitive R&D work for more than 30 years in the major areas/domains of:

- **Biochemistry, Molecular Biology and Genomics** of Secondary Metabolism in Plants

- **Biotechnology- Bioprocesses & Technologies** for Secondary Stream of Food, Agriculture and Health/Nutraceutical Bioproducts

The R&D work has consistent trail of high-quality publications, patents, product development components as well as translational profile for societal good through technology transfer/patent licencing to industry and other stakeholders.

16. Details of publications with impact factors (*a list of publications may be provided***) with H Index (***List of publications appended herewith as* ***Annexure-I*****):**

- *Total Publications in SCI[Thomson Reuters] Journals:* **154**
- **Books Edited:** **02**
- **Chapters in Books:** **15**
  - ***H-Index*** **(**Source***: Google Scholar*****):** **53**
  - ***i-10 index*** **(**Source***: Google Scholar*****):** **142**
  - ***Citations*** **(**Source***: Google Scholar*****):** **>9200**

List of Publications

[*Including* (A) Research Papers, (B) Books/Monographs, and (C) Book Chapters

(A). National & International Referred Journals: 154 Publications:

1. Kaushal N, Singh M and Sangwan RS (2022) Flavonoids: Food associations, therapeutic mechanisms, metabolism and nanoformulations. **Food Research International** (*In Press*) **[Impact Factor 7.425]**

2. Narnoliya LK, Sangwan NS, Jadaun JS, Bansal S and **Sangwan RS** (2021) Defining the role of a caffeic acid 3-O- methyltransferase from *Azadirachta indica* fruits in the biosynthesis of ferulic acid through heterologous over-expression in *Ocimum* sp and *Withania somnifera*. **Planta** 253: 1-13. **[Impact Factor 4.54]**

3. Pandey N, Singh M, Dwivedi P, Ahluwalia V, **Sangwan RS** and Mishra BB (2021) Synthesis of food-grade 6-O-ascorbyl fatty esters and their semi-synthesis from low-value oils as resources. **Biomass Conversion and Biorefinery** 2021/7/2, https://doi.org/10.1007/s13399-021-01682-9 **[Impact Factor 4.05]**

4. Sharma M, **Sangwan RS**, Khatkar BS and Singh SP (2021) Development of a prebiotic oligosaccharide rich functional beverage from sweet sorghum stalk biomass. **Waste and Biomass Valorization** 12: 2001-2012. **[Impact Factor 3.449]**

5. Kumar V, Sharma DK, Sandhu PP, Jadaun J, **Sangwan RS** and Yadav SK (2021) Sustainable process for the production of cellulose by an *Acetobacter* pasteurianus RSV-4 (MTCC 25117) on whey medium. **Cellulose** 28: 103-116. **[Impact Factor 6.123]**

6. Singla G, Panesar PS, **Sangwan RS** and Krishania M (2021) Enzymatic processing of *Citrus reticulata* (Kinnow) pomace using naringinase and its valorization through preparation of nutritionally enriched pasta. **Journal of Food Science and Technology** 58: 3853-3860. **[Impact Factor 2.701]**

7. Singla G, Panesar PS, **Sangwan RS** and Krishnia M (2021) Effect of packaging materials on the shelf-life of vermicelli supplemented with enzyme processed kinnow pulp residue. **Journal of Food Process Engineering** e13862. **[Impact Factor 2.889]**

8. Singla G, Panesar PS, **Sangwan RS** and Krishania M (2021) Enzymatic debittering of *Citrus reticulata* (Kinnow) pulp residue and its utilization for the preparation of vermicelli. **Journal of Food Processing and Preservation** 45: e15135. **[Impact Factor 2.609]**

9. Sangwan NS, Kumar A and **Sangwan RS** (2021) Identification of partial BAHD acyltransferases gene (CAAT) and its expression with the use of semi-quantitative and real time PCR in the tissues of citronella (*Cymbopogon winterianus*). **European Journal of Molecular & Clinical Medicine** 7: 4505-4522. **[Impact Factor 0.333]**

10. Narnoliya LK, Sangwan NS, Misra L and **Sangwan RS** (2021) Processes of high-yield isolation and flash chromatographic purification of azadiradione from Neem fruits. **Proceedings of the National Academy of Sciences, India: Biological Sciences** 91: 847-853. **[Impact Factor 0.946]**

11. Jadaun JS, Kushwaha AK, Sangwan NS, Narnoliya LK, Mishra S and **Sangwan RS** (2020) WRKY1-mediated regulation of tryptophan decarboxylase in tryptamine generation for withanamide production in

*Withania somnife*ra (Ashwagandha). **Plant Cell Reports** 39: 1443-1465. **[Impact Factor 4.964]**

12. Singla G, Singh U, **Sangwan RS**, Panesar PS and Krishania M (2020) Comparative study of various processes used for removal of bitterness from kinnow pomace and kinnow pulp residue. **Food Chemistry** 335: 127643. **[Impact Factor 9.231]**

13. Tripathi S, Srivastava Y, **Sangwan RS** and Sangwan NS (2020) *In silico* mining and functional analysis of AP2/ERF gene in *Withania somnifera*. **Scientific Reports** 10: 1-12. **[Impact Factor 4.996]**

14. Tripathi S, **Sangwan RS**, Mishra B, Jadaun JS and Sangwan NS (2020) Berry transcriptome: insights into a novel resource to understand development dependent secondary metabolism in *Withania somnifera* (Ashwagandha). **Physiologia Plantarum** 168: 148-173. **[Impact Factor 5.081]**

15. Sharma M, **Sangwan RS**, Khatkar BS and Singh SP (2019) Alginate–pectin co-encapsulation of dextransucrase and dextranase for oligosaccharide production from sucrose feedstocks. **Bioprocess and Biosystems Engineering** 42: 1681-1693. **[Impact Factor 3.434]**

16. Maurya S, Chandra M, Yadav RK, Narnoliya LK, **Sangwan RS**, Bansal S, Sandhu P, Singh U, Kumar D and Sangwan NS (2019) Interspecies comparative features of trichomes in *Ocimum* reveal insights for biosynthesis of specialized essential oil metabolites. **Protoplasma** 4: 893-907. **[Impact Factor 3.186]**

17. Sandhu PP, Bains K, Singla G and **Sangwan RS** (2019) Nutritional and functional properties of defatted, debittered and off-flavour free high protein guar (*Cyamopsis tetragonoloba*) meal flour. **Proceedings of the National Academy of Sciences**, India **Biological Sciences** 2: 695-701. **[Impact Factor 0.946]**

18. Chownk M, **Sangwan RS** and Yadav SK (2019) A novel approach to produce glucose from the supernatant obtained upon the dilute acid pre-treatment of rice straw and synergistic action of hydrolytic enzymes producing microbes. **Brazilian Journal of Microbiology** 50: 395-404. **[Impact Factor 2.214]**

19. Singla G, Krishania M, Sandhu PP, **Sangwan RS** and Panesar PS (2019) Value addition of kinnow industry byproducts for the preparation of fiber enriched extruded products. **Journal of Food Science and Technology** 56: 1575-1582. **[Impact Factor 2.701]**

20. Mehta D, Sharma N, Bansal V, **Sangwan RS** and Yadav SK (2019) Impact of ultrasonication, ultraviolet and atmospheric cold plasma processing on quality parameters of tomato-based beverage in comparison with thermal processing. **Innovative Food Science & Emerging Technologies** 52, 343-349. **[Impact Factor 7.104]**

21. Kumar V, Sharma DK, Bansal V, Mehta D, **Sangwan RS** and Yadav SK (2019) Efficient and economic process for the production of bacterial cellulose from isolated strain of *Acetobacter pasteurianus* of RSV-4 bacterium. **Bioresource Technology** 275, 430-433. **[Impact Factor 11.889]**

22. Singla G, Krishania M, Sandhu PP, **Sangwan RS** and Panesar PS (2019) Value addition of kinnow juice processing industry byproducts using green solvents. **Journal of Pharmacognosy and Phytochemistry** SP1: 19-22.

23. Choudhri P, Rani M, **Sangwan RS**, Kumar R, Kumar A and Chhokar V (2018) *De novo* sequencing, assembly and characterization of *Aloe vera* transcriptome and analysis of expression profiles of genes related to saponin and anthraquinone metabolism. **BMC Genomics** 19: 427. **[Impact Factor 4.547]**

24. Kaushal G, Kumar J, **Sangwan RS** and Singh SP (2018) Metagenomic analysis of geothermal water reservoir sites exploring carbohydrate-related thermozymes. **International Journal of Biological Macromolecules** 119: 882-895. **[Impact Factor 8.025]**

25. Narnoliya LK, **Sangwan RS** and Singh SP (2018) Transcriptome mining and in silico structural and functional analysis of ascorbic acid and tartaric acid biosynthesis pathway enzymes in rose-scanted geranium. **Molecular Biology Reports 45:** 315-326. **[Impact Factor 2.742]**

26. Patel SN, Sharma M, **Sangwan RS**, Singhal N and Singh SP (2018) Development of a thermo-stable and recyclable magnetic nanobiocatalyst for bioprocessing of fruit processing residues and D-allulose synthesis. **Bioresource Technology** 247: 633-639. **[Impact Factor 11.889]**

27. Rai SK, Narnoliya NK, **Sangwan RS**, and Yadav S (2018) Self-assembled hybrid nanoflowers of manganese phosphate and L-arabinose isomerase: A stable and recyclable nanobiocatalyst for equilibrium level conversion of D-galactose to D-tagatose. **ACS Sustainable Chemistry and Engineering** 6: 6296–6304. **[Impact Factor 9.224]**

28. Lata K, Sharma M, **Sangwan RS** and Singh SP (2018) An integrated bio-process for production of functional biomolecules utilizing raw and by-

products from dairy and sugarcane industries. **Bioprocess and Biosystems Engineering** 41: 1121-1131. **[Impact Factor 3.434]**

29. Kumar S, Ahluwalia V, Kundu P, **Sangwan RS**, Kansal SK, Runge TM and Elumalai S (2018) Improved levulinic acid production from agri-residue biomass in biphasic solvent system through synergistic catalytic effect of acid and products. **Bioresource Technology** 251: 143-150. **[Impact Factor 11.889]**

30. Dwivedi P, Singh M, Singh U, Jatav S, **Sangwan RS** and Mishra BB (2018) Iodosylbenzene (PhIO) mediated synthesis of rose oxide from β-citronellol and its application for in situ rose oxide enrichment led valorization of citronella essential oil. **Journal of Cleaner Production** 172: 1765-1771. **[Impact Factor 11.072]**

31. Li H, Riisager A, Saravanamurugan S, Pandey A, **Sangwan RS**, Yang S and Lugue R (2018) Carbon-increasing catalytic strategies for upgrading biomass into energy-intensive fuels and chemicals. **ACS Catalysis** 8: 148–187. **[Impact Factor 13.70]**

32. Kumar V, Krishania M, Sandhu PP, Ahluwalia V, Gnansounou E and **Sangwan RS** (2018) Efficient detoxification of corn cob hydrolysate with ion-exchange resins for enhanced xylitol production by *Candida tropicalis* MTCC 6192. **Bioresource Technology** 251: 416-419. **[Impact Factor 11.889]**

33. Agarwal B, Kailasam K, **Sangwan RS** and Elumalai S (2018) Traversing the history of solid catalysts for heterogeneous synthesis of 5-hydroxymethylfurfural from carbohydrate sugars: A review. **Renewable and Sustainable Energy Reviews** 82: 2408-2425. **[Impact Factor 16.799]**

34. macroMehta D, Prasad P, **Sangwan RS** and Yadav SK (2018) Tomato processing byproduct valorization in bread and muffin: improvement in physicochemical properties and shelf life stability. **Journal of Food Science and Technology** 55:2560-2568. **[Impact Factor 2.701]**

35. Dwivedi P, Singh M, Sehra N, Pandey N, **Sangwan RS** and Mishra BB (2018) Processing of wet Kinnow mandarin (*Citrus reticulata*) fruit waste into novel Brønsted acidic ionic liquids and their application in hydrolysis of sucrose. **Bioresource Technology** 250: 621-624. **[Impact Factor 11.889]**

36. Ahluwalia V, Elumalai S, Kumar V, Kumar S and **Sangwan RS** (2018) Nano silver particle synthesis using *Swertia paniculata* herbal extract and its antimicrobial activity. **Microbial Pathogenesis** 114: 402-408. **[Impact Factor 3.848]**

37. Tripathi S, **Sangwan RS**, Narnoliya LK, Srivastava Y, Mishra B and Sangwan NS (2017) Transcription factor repertoire in Ashwagandha (*Withania somnifera*) through analytics of transcriptomic resources: Insights into regulation of development and withanolide metabolism. **Scientific Reports** 7: article # 16649, DOI:10.1038/s41598-017-14657-6. **[Impact Factor 4.996]**

38. Narnoliya LK, Kaushal G, Singh SP and **Sangwan RS** (2017) *De novo* transcriptome analysis of rose-scented geranium provides insights into the metabolic specificity of terpene and tartaric acid biosynthesis. **BMC Genomics** 18:74. **[Impact Factor 4.547]**

39. Yadav R, **Sangwan RS**, Srivastava AK and Sangwan NS (2017) Prolonged exposure to salt stress affects specialized metabolites-artemisinin and essential oil accumulation in *Artemisia annua* L.: metabolic acclimation and reprogramming in preferential favour of enhanced terpenoid accumulation accompanying vegetative to reproductive phase transition. **Protoplasma** 254: 505-522. **[Impact Factor 3.186]**

40. Jadaun JS, Sangwan NS, Narnoliya LK, Singh N, Bansal S, Mishra B and **Sangwan RS** (2017) Over-expression of DXS gene enhances terpenoidal secondary metabolite accumulation in geranium and *Withania somnifera*: Active involvement of plastid isoprenogenic pathway in their biosynthesis. **Physiologia Plantarum** 159: 381-400. **[Impact Factor 5.081]**

41. Jadaun JS, Sangwan NS, Narnoliya LK, Tripathi S and **Sangwan RS** (2017) *Withania coagulans* tryptophan decarboxylase gene cloning, heterologous expression, and catalytic characteristics of the recombinant enzyme. **Protoplasma** 254: 1818-192. **[Impact Factor 3.186]**

42. Purohit A, Rai SK, Chownk M, **Sangwan RS** and Yadav SK (2017) Xylanase from *Acinetobacter pittii* MASK 25 and developed magnetic cross-linked xylanase aggregate produce predominantly xylopentose and xylohexose from agro biomass. **Bioresource Technology** 244: 793-799. **[Impact Factor 11.889]**

43. Sharma M, Patel SN, **Sangwan RS** and Singh SP (2017) Biotransformation of banana pseudostem extract into a functional juice containing value added biomolecules of potential health benefits. **Indian Journal of Experimental Biology** 55, 453-462. **[Impact Factor 0.944]**

44. Singh U, Dwivedi P, **Sangwan RS** and Mishra BB (2017) *In situ* rose oxide enrichment led valorization of citronella (*Cymbopogon winterianus*) essential oil. **Industrial Crops and Products** 97: 567-573. **[Impact Factor 6.449]**

45. Sharma A, Giri SK, Kartha KPR and **Sangwan RS** (2017) Value-additive utilization of agro-biomass: Preparation of cellulose triacetate directly from rice straw as well as other cellulosic materials. **Royal Society of Chemistry Advances** 7, 12745–12752. **[Impact Factor 4.036]**

46. Prasad P, Mehta D, Bansal V and **Sangwan RS** (2017) Effect of atmospheric cold plasma (ACP) with its extended storage on the inactivation of *Escherichia coli* inoculated on tomato. **Food Research International** 102: 402-408. **[Impact Factor 7.425]**

47. Tripathi CDP, Kushwaha PK, **Sangwan RS**, Mandal C, Misra-Bhattacharya S and Dube A (2017) *Withania somnifera* chemotype NMITLI 101R significantly increases the efficacy of anti-leishmanial drugs by generating strong IFN-□ and IL-12 mediated immune responses in *Leishmania donovani* infected hamsters. **Phytomedicine** 24: 87-95. **[Impact Factor 6.656]**

48. Tiwari P, **Sangwan RS** and Sangwan NS (2016) Plant secondary metabolism linked glycosyltransferases: An update on expanding knowledge and scopes. **Biotechnology Advances** 34: 714-739. **[Impact Factor 17.681]**

49. Mishra S, Bansal S, Mishra B, **Sangwan RS**, Asha, Jadaun JS and Sangwan NS (2016) RNAi and homologous over-expression based functional approaches reveal triterpenoid synthase gene-cycloartenol synthase is involved in downstream withanolide biosynthesis in *Withania somnifera*. **PLoS ONE** 11(2): e0149691. doi:10.1371/journal.pone.0149691. **[Impact Factor 3.752]**

50. Mishra S, Bansal S, **Sangwan RS** and Sangwan NS (2016) Genotype independent and efficient *Agrobacterium*-mediated genetic transformation of the medicinal plant *Withania somnifera* Dunal **Journal of Plant Biochemistry Biotechnology** 25: 1919-198. **[Impact Factor 1.175]**

51. Patel SN, Sharma M, Lata K, Singh U, Kumar V, **Sangwan RS** and Singh SP (2016) Improved operational stability of D-psicose 3-epimerase by a novel protein engineering strategy, and D-psicose production from fruit and vegetable residues. **Bioresource Technology** 216: 121-127. **[Impact Factor 11.889]**

52. Li H, Yang S, Riisager A, Pandey A, **Sangwan RS**, Saravanamurugan S and Luque R (2016) Zeolite and zeotype-catalysed transformations of biofuranic compounds. **Green Chemistry** 18: 5701-5735. **[Impact Factor 11.034]**

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161. Krishania M, Sindhu R, Binod P, Ahluwalia V, Kumar V, **Sangwan RS** and Pandey A (2018) Design of bioreactors in solid-state fermentation. *In:* ***Current Developments in Biotechnology and Bioengineering*** (A Pandey, C Larroche and C Soccol, *eds.*), pp. 83-96, Elsevier.

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167. **Sangwan RS** and Sangwan NS (2003) Medicinal plant trade: techno-benefaction of grower level participants. ***NIM- Medicinal and Aromatic Plants*** pp. 464-467.

168. Farooqi AHA, Bansal RP, Luthra R, Sangwan NS and **Sangwan RS** (2000) Physiological, biochemical and environmental aspects of essential oil synthesis in aromatic grasses (*Cymbopogon spp.*)- *In*: ***Aromatic Grass Monograph***, Sushil Kumar *et al.* (eds) CSIR-CIMAP, Lucknow, pp 199-222.

169. **Sangwan RS** and Sangwan NS (2000) Metabolic and molecular analysis of chemotypic diversity in aromatic grasses (*Cymbopogon spp.*)- *In*: ***Aromatic Grass Monograph***, (Sushil Kumar *et al.* (eds) CIMAP, Lucknow, pp 223-247.

170. Farooqi, AHA, Luthra R and **Sangwan RS** (1993) Biotechnology of skin care. *In*: **Medicinal Plants in Skin Care** (Kumar et al. eds.), pp. 37-42, CSIR, New Delhi, India.

171. Plaxton WC, **Sangwan RS**, Singh N, Gauthier DA and Turpin DH (1992) Phosphoenol pyruvate metabolism of developing oil seeds. In: ***Seed oils for the Future*** (S.C. Mackenzie & D.C. Taylor eds.), American oil Chemists Society (AOCS) Press, Champaign, Illinois, USA, pp 35-43.

17. Details of patents granted:

- ***Patents (Granted/Filed):*** ***40***
- *Patents Licensed'Transferred to Industry (fully or partially):* ***06***

List of Patents *(Filed/Granted)*

01. **2020:** Pharmaceutical composition for the treatment of diminution of bone tissue. (**US Patent Number 10596115**). *Inventors:* R Trivedi, PR Mishra, D Singh, V Khedgikar, P Kushwaha, S Adhikary, D Choudhary, J Gautam, A Kumar, A Karvande, A Verma, S Sharma, P Trivedi, NS Sangwan and **RS Sangwan**

02. **2018:** Cornvita as a product from corn fiber and dairy whey in any form or its derivatives process of its production and uses thereof. (**Indian Patent Appl. No. 201811000749**). *Inventors:* M Krishania, **RS Sangwan**, D Kaur and Gisha.

03. **2018:** An improved process for production of food grade 6-o-ascorbyl esters by chemical esterification of l-ascorbic acid with various fatty acids and their simple purification. (**Indian Patent Appl. No. 201811028298**). *Inventors:* BB Misha, P Dwivedi, N Pandey, M Singh, V Ahluwalia and **RS Sangwan**

04. **2018:** An improved process for isolation of "1,5-dihydroxy-3,8-dimethoxyxanthone" from *Swertia paniculata* (**Indian Patent Appl. No. 201811000397**). *Inventors:* V Ahluwalia, BB Mishra and **RS Sangwan**

05. **2018:** An improvised, sustainable and economical process for the synthesis of biomass derived lignin coated metal nanocomplexes and development of nanotherapeutic and nano-diagnostic conjugates thereof. (**Indian Patent Appl. No. 201711047253**). *Inventors*: J Bhaumik, S Chandna and **RS Sangwan**

06. **2018:** Utilization of tomato and tomato processing by-products for the development of fiber, minerals and antioxidant rich novel nutritional bakery products. (**Indian Patent Appl. No. 201711039578**). *Inventors*: SK Yadav, **RS Sangwan, D Mehta** and P Dwivedi

07. **2017:** Development of nutritional whey-based sweet lime beverage (whey-lime) using high pressure processing. (**Indian Patent Appl. No. 201711039578**). *Inventors*: V Bansal, SK Yadav and **RS Sangwan**

08. **2017:** A special beverage based on tomato fruit juice, coconut water and other additives. whey (**Indian Patent Appl. No. 201711028768**). *Inventors*: **RS Sangwan**, SK Yadav, D Mehta and P Dwivedi **(*Patent licensed to Industry)***

09. **2017:** Integrated as well as module(s) selective process for production of whey proteins, bacterial cellulose, calcium citrate and D-tagatose from liquid whey (**Indian Patent Appl. No. 201711024828**). *Inventors*: SK Yadav, **RS Sangwan**, V Kumar, PP Sandhu, SK Rai, LK Narnolia and JS Jadaun

10. **2017:** An efficient process of production of bacterial cellulose from tomato juice using *Acetobacter pasteurians* strain RSV-4 (**MTCC 25117**). **(Indian Patent Appl. No. 201711024694**). *Inventors:* V Kumar, **RS Sangwan**, JS Jadaun, DK Sharma, P Prasad and D Mehta

11. **2017:** Iron fortified or iron added turmeric as a value-added product for improving iron nutrition and for alleviating or lessening iron deficiency anemia and for such other healthful uses and process of its preparation (**Indian Patent Appl. No. 201711023123**) *Inventors*: PP Sandhu, **RS Sangwan** and U Singh. **(*Patent licensed to industry*)**

12. **2017:** A novel process of production of special and premium pectin preparation, named as neopectin, from diversified bioresources through steps free from chemical treatments and uses thereof (**Indian Patent Appl. No. 201711021690**). *Inventors*: **RS Sangwan**, M Sharma, SN Patel, U Singh, SP Singh, SK Yadav and PP Sandhu

13. **2017:** Xylanase and magnetic-xylanase-CLEA based process for xylooligosaccharides (XOS) production from physically treated agrobiomass and uses thereof (**Indian Patent Appl. No. 201711020622**). *Inventors*: SK Yadav, A Purohit, SK Rai, Manisha and **RS Sangwan**

14. **2017:** Process method for production of levulinic acid from agri-residue waste in single-pot reactor setup (**Indian Patent Appl. No. 201711010199**). *Inventors*: S Elumalai, S Kumar, V Ahluwalia, P Kundu and RS Sangwan

15. **2017:** A process for biotransformation of banana pseudo-stem extract into a functional juice containing non-digestible and prebiotic oligosaccharides, and nearly calorie free functional monosaccharide, and uses thereof. (**Indian Patent Appl. No. 201711009819**): *Inventors*: SP Singh, M Sharma, SN Patel and **RS Sangwan**

16. **2017:** Process for enriched xylooligosaccharides production from secondary agri-residues through alkaline treatment (**Indian Patent Appl. No. 201711007495**). *Inventors*: S Elumalai, **RS Sangwan**, P Kundu, S Kumar, V Ahluwalia and SK Yadav

17. **2017:** A process for the production of prebiotic and health functional biomolecules from fully or partially processed products or by-products of sugar and dairy industries, and uses of the same. (**Indian Patent Appl. No. 201711006155**). *Inventors*: SP Singh, K Lata, M Sharma, SN Patel and **RS Sangwan (*Patent licensed to Industry*)**

18. **2017:** Hydrolytic enzyme producing microbes based process for the production of glucose from the supernatant obtained upon the dilute acid pretreatment of agro-biomass and uses thereof (**Indian Patent Appl. No. 201711006024**); *Inventors*: SK Yadav, Manisha and **RS Sangwan**

19. **2017:** A liquid whey beverage product named CIAB-NAVITA containing a fiber rich preparation produced from fruit processing by-products wastes and uses of the product (**Indian Patent Appl. No. 201711008368**). *Inventors*: **RS Sangwan**, M Krishania, PP Sandhu, P Dwivedi and D Mehta. **(*Patent licensed to Industry*)**

20. **2017:** A novel process of producing debittered edible fibre powder from the composite kinnow juice processing industry residues (exocarp, mesocarp, endocarp, juice sacs and seeds) and pulp residue after juice clarification (**Indian Patent Appl No. 201711007926**). *Inventors*: RS Sangwan, PP Sandhu and M Krishania **(*Patent partially licensed to Industry*)**

21. **2016:** A process for magnetic particle immobilization of Smt3-d-psicose 3-epimerase enzyme and post-reaction recovery and recycled use of the immobilized enzyme for production of D-psicose from biomass or bioresource or agro-industrial products or residues, and uses of the same. (**Indian Patent File No. 201611044752**): *Inventors*: SP Singh, **RS Sangwan**, SN Patel and N Singhal. ***(Patent licensed to Industry)***

22. **2016:** A Process for producing edible off-flavour free and high protein flour from guar meal (**Indian Patent Appl. # 201611024281**); *Inventors*: RS **Sangwan**, K Bains K, PP Sandhu and Gisha

23. **2016:** A process for fragrance improvement of citronella essential oil by its enrichment with rose oxide using hypervalent iodine reagents and uses thereof (**Indian Patent Appl. No. 201611024112**). *Inventors*: BB Mishra, P Dwivedi, U Singh and **RS Sangwan**

24. **2016:** A process for the production of prebiotic oligosaccharides, and uses of the same (**Indian Patent Appl. # 201611016793**); *Inventors*: SP Singh, **RS Sangwan**, M Sharma, SN Patel, M Krishania, U Singh and K Lata.

25. **2016:** A Process of fragrance improvement of citronella essential oil by its enrichment with rose oxide and a process of production of rose oxide and uses thereof. (**Indian Patent Appl. No. 201611009275**). *Inventors*: BB Mishra, **RS Sangwan** and U Singh ***(Patent licensed to Industry)***

26. **2016:** A process for the production of nearly zero calorie sweet sugar from fruit or vegetable plants, plant parts and their extracts and residues, and uses of the same (**Indian Patent Appl. # 201611003411)**; *Inventors*: SP Singh**, RS Sangwan**, SN Patel, M Sharma, U Singh and V Kumar

27. **2015:** A process for production of natural and scented tartaric acid from geranium (*Pelargonium graveolens*) and geranium biomass hydro-distillation residual water. (**Patent Application No: 1487/DEL/2015**), *Inventors*: **RS Sangwan** and U Singh.

28. **2015:** A Process of *Withania somnifera* (Ashwangandha) biomass-based production of solanesol and uses thereof. (**Indian Patent Appl. # 3201/DEL/2015)**; *Inventors*: **RS Sangwan** and U Singh.

29. **2015:** A green process of non-inflammable volatile biogenic solvents based extraction and isolation of lycopene and other carotenoids from bioresources and other materials and uses thereof. (**Indian Patent Appl. # 3197/DEL/2015**); *Inventors*: **RS Sangwan**, and M Sharma.

30. **2015:** A process of volatile biogenic solvent(s) aided enhancement of colour and stability of lycopene and other carotenoids in presence or absence of light and uses thereof (**Indian Patent Appl. # 3228/DEL/2015**); *Inventors*: **RS Sangwan** and U Singh.

31. **2014:** Non-alcoholic and biogenic solvent based process for production of lactose and whey proteins from liquid whey (**Indian Patent Appl. # 2291/DEL/2014**); *Inventors*: **RS Sangwan**, PP Sandhu and JP Gupta.

32. **2014:** A formulation useful for delivery of neuroprotecting agent (**Indian Patent Appl. # 2773DEL2014**)*; Inventors*: AK Dwivedi, H Ahmad, K Kumar, Khandelwal, NS Sangwan, **RS Sangwan** , JR Gayen, S. Bhadauria, SK Rath, S Sharma, R Shukla, SPS Gaur, VV Bhosale and Sarika.

33. **2013:** Proteasomal inhibitors useful for osteogenic activity and pharmaceutical composition thereof [osteoheal] (**Indian Patent Appl. # 2145DEL2013**) and **PCT Patent Appl'. # PCT/IN2014/000475); *Inventors***: R Trivedi R, PR Mishra, NS Sangwan, PK Trivedi, D Singh, **RS Sangwan**, P Kushwaha, V Khedgikar, S Adhikari, D Chaudhary, J Swarup, A Kumar, A Karvande, A Verma and A Sharma.

34. **2007:** A pharmaceutical composition as an immune-modulating agent and a process for the preparation thereof (**PCT Patent Appl. # WO/2007/113646; CN 101415432 A**); *Inventors*: **RS Sangwan**, ND Chaurasiya, LN Misra, P Lal, GC Uniyal, NS Sangwan, AK Srivastava, KA Suri, GN Qazi and R Tuli.

35. **2005:** An improved process for isolation of withaferin-A from plant materials and products therefrom (**US Patent 7,108, 870)**; *Inventors*: **RS Sangwan**, ND Chaurasiya, LN Misra, P Lal, GC Uniyal, NS Sangwan, AK Srivastava, KA Suri, GN Qazi and R Tuli.

36. **2005:** Protein profiling of hyper acidic plants and high protein extraction compositions thereof. **US Patent 6,893,667;** *Inventors*: **RS Sangwan RS**, BR Tyagi BR and NS Sangwan.

37. **2003:** Process for the induction of normal roots on nodes and internodes of stem segments without using hormones and/or chemical treatments in Mentha species. ***US Patent # 6,586,248***; *Inventors*: **RS Sangwan,** NS Sangwan and S Kumar.

38. **2002:** Ecological method of phyto-remediation of alkaline and chemically degraded soils using scented geranium (*Pelargonium species*). **US Patent # 6,398,841**; *Inventors*: **RS Sangwan**, BR Tyagi, NS Sangwan and AK Srivastava.

39. **2002:** Anthocyanin producing callus line in cultures of Panax sikkimensis and a method of producing *Panax sikkimensis* line capable of producing anthocyanin. **US Patent # 6,368,860**; *Inventors*: A Mathur, A Gangwar, AK Mathur, **RS Sangwan RS** and DC Jain.

40. **2001**: Stable high ginsenoside-yielding callus line of *Panax quinquefolium* (American ginseng) and a method for developing such stable ginsenoside-yielding line. ***US Patent # 6,326,202***; *Inventors*: A Mathur, AK Mathur, GC Uniyal, M Pal and **RS Sangwan.**

19. International academic Exposure

S. No.	Post / Assignment	Organization / University	Area of Assignment	Duration		
				From	To	In Years & Months
1.	Project-Post Doctoral Fellow	**Queens University, Kingston, Canada**	PBiochemistry & Molecular Biology	April 15, 1990	October 11, 1990	**1 Year & 6 Months**
Other Short-term Academic/Scientific/Delegation Visits abroad: **USA, UK, South Korea, Hong Kong, Taiwan, Japan, The Netherlands, France, Australia, South Africa**						

20. National Institutional Network/External Cash Flow Research Projects:

S. No.	Client/ Organization's name	Nature of Project	Duration of Project	Amount of Grant (Rupees)
1	New Millenium Indian Technology Leadership Initiative (NMITLI) Program (Govt. of India)	Multi-Phase NMITLI Project on Ashwagandha (**Rs. 1.202 Crores**): • As part of program on Genomics of Ashwagandha, mentha, tea and Ac-Ds elements • Pharmacological and genomic investigations on Ashwagandha (*Withania somnifera*)_- An Indian Medicinal Plant Leads based drug development and genetic improvement of Ashwagandha (*Withania somnifera*)	14 Years (2001 to 2015)	**1.202 Crores**
2.	CSIR- Inter-Institutional Network 10th FYP Project	Inter CSIR Institutional R&D Collaboration Program: CMM0004: Designing animals and plants as bioreactor for for production of proteins and other products	5 Years (2002 to 2007)	**Rs. 19.87 Crores**
3.	CSIR- Inter-Institutional Network 11th FYP Project	• Inter-Institutional R&D Project: Biological and chemical transformation of plant compounds for production of value-added products of therapeutic and aroma value	5 Years (2002 to 2007)	**Rs. 20.00 Crores**
4.	DBT (Govt. of India)	R&D Project: Phenotypic, chemotypic and genotypic characterization of some medicinal plants (*Rauwolfia serpentina, Glycyrrhiza glabra and*	3 Years (2014 to 2017)	**Rs. 0.247 Crore**

		Andographis paniculata)		
5.	DBT (Govt. of India)	R&D Project: Innovation and demonstration of technologies for improved production and enhanced shelf life of tomato and onion	3 Years (2014 to 2017)	**Rs. 0.66 Crore**

21. Leadership Roles & Experience in Large R&D Missions & Inter-Institutional Network Programs:

- **Coordinator (***as Head of NABI***), Indo-Australian Multi-Institute Translational Project** on Pro-Vitamin A and Iron Bio-fortification of Indian Banana
- ***One of the Institutional PI in Newton Fund India-UK Research and Innovation Bridge Competition*** *Project on Rice Valorization involving 3 Indian Institutes, 1 UK university, 3 Indian industries and 6 UK Industries*
- ***Principal Investigator*** (CSIR-CIMAP): **New Millennium Indian Technology Leadership Initiative (NMITLI) sponsored Inter-Institutional program on Ashwagandha** (from 2001 to 2015*, in Three Phases of the Project since inception*)
- ***Nodal Officer***, CSIR Inter-Institutional 11th Five Year Plan Network Research project (NWP-09) "**Biological and chemical transformation of plant compounds for production of value added products of therapeutic/ aroma value**" during 2007 to 2012.
- ***Nodal Officer***, CSIR Inter-Institutional 10th Five Year Plan Network Research project (CMM-004) "**Designing Plants and Animals as Bioreactors for Proteins and Other Products"** during 2002 to 2007.

22. Other Special Mention Achievements- *Research/Academic Institution Building/Leadership/Development & Establishment of Collaboration* etc. **(ANNEXURE-I)**

ANNEXURE-I

Other Special Mention Achievements-

(Research/Academic Institution Building/Leadership/Development & Establishment of Collaboration etc.)

A. Experience of Establishment, Development and Leadership of National Level R&D and Academic Institution: More than 10 Years (May 01, 2012 to August 2022) as Detailed below:

S. No.	Post held	Organization	Natures of Duties	Experience (in Years and Months)
1	*Founder* Chief Executive Officer	Center of Innovative and Applied Bioprocessing, Mohali- *A National Institute under DBT (Govt. of India) for R&D on Agri-Food Biomass and Bioresources Value Addition*	Head of National R&D Institute in the area of plant bioprocessing and plant biotechnology; Administration and management; developing institute research mandate d R&D Program and Project Planning, Human Resource development	**5 Years and 3 Months**
2	Executive Director, *Additional Charge to above*	National Agri-Food Biotechnology Institute, Mohali - *A National Institute under DBT (Govt. of India) for R&D on Agri-Food Biotechnology*	Head of National R&D Institute in the area of plant bioprocessing and plant biotechnology; Administration and management; institute R&D Program and Project Planning, Human Resource Development	Period overlapping to above (1)
3	*First* Director	Academy of Scientific and Innovative Research- *An Institution of National Importance for Interdisciplinary Higher Education in*	Head of the Higher Education Institute as Executive Head, Academic Program Development, Control and management of admissions, examinations, degree awards, MoUs, Joint Ph.D. programs with universities in India and abroad, financial resource	**5 Years**

		Science and Engineering	development and deployment for sustainability etc.	

B. Leadership to achievements (as Head of Institution) of Research and Academic Institutions

S. No.	Name of Institution	Position held	Period	Detail of special of Special Achievement
1.	**DBT- Center of Innovative and Applied Bioprocessing**, Mohali	**Chief Executive Officer**	2012 to 2017	• **Developed, Patented and Transferred to Industry** several **Technologie**s on bioprocessing of Agri-Farm and ***waste for value added commercial and health products***
2,	**DBT-National Agri-Food Biotechnology Institute**, Mohali	**Executive Director**	2016 to 2017	• *As Head of the Institution*, catalyzed **commercialization of** Anthocyanin Rich **Coloured (***Black, Brown etc***.) Wheat**
3.	**Academy of Scientific and Innovative Research** (AcSIR): *An Institution of National Importance for Interdisciplinary of Higher Education in STEM*	**Director**	2017 to 2022	a. **Nurtured and Evolved the Model of AcSIR as a 100% Self Sustainable** *with affordability of the education by the poorest* b. **Incorporated a mandatory 'My Thesis for My Country" for AcSIR Ph.D. Students** at thesis oral exam to submit a short audio-video (*in his/her own voice*) about importance of the thesis research work in English and Hindi or Regional Language for understanding of common people and available at AcSIR website. c. **Started the new academic programmes of Masters in Public Health** through partnerships with Public Health Foundation of India as well as Max Healthcare institution , Max Institute of Medical Excellence. d. **Started the new academic programmes of Masters in Wildlife and Heritage Conservation** through partnerships with Wildlife Institute of India. e. **Created a Faculty of Agricultural Sciences at AcSIR** for promotion of Agri-Business and farmer empowerment through cash and commercial crops and crop products. f. **Launched a Portal named** *Indian Research Scholars' Science*) reflecting research endeavors

				of young research for Science and Technology in the service of the society and the nation g. **AcSIR initiated a Joint Ph.D. program with National Institute of Ayurveda, Jaipur and Institute of Teaching and Research** in India to promote health science and technology at the interface of holistic medicines (Ayurveda) and Molecular Medicines (*the so called Modern Medicines*) h. **AcSIR initiated and operated joint Ph.D. Program with several leading universities abroad** with close to 100 Ph.D. students on rolls today i. **AcSIR achieved a Rank of 11th in Nature Index** (*a quality parameter*) among academic institutions in India. j. **AcSIR achieved a Scimago Rank of 2nd** (*i.e. next to Insdian Institute of Science, Bangalore*) among academic institutions in 2018 and maintained it till date k. **AcSIR**, *despite being a new institution*, **achieved NIRF Rank of 22nd in 2021 and 18th in 2022** under Research Category l. **AcSIR Umbrella of Academic Centres expanded to about 55 R&D institutions** covering more than 30 cities across the country m. **AcSIR became the largest institution of higher education** w.r.t. Ph.D. students on rolls in Science and Engineering in India **(~ 6000 Ph.D. students on rolls**)

C. Niche/ Inter-disciplinary Academic Program Development in Science and Engineering domains:

S. No.	Nomenclature of Innovative Academic Programmes formulated	Date of Approval by Academic Council (AcSIR Senate)	Year of Introd-uction
1.	M.Tech and Integrated Flexible Dual (M.Tech-Ph.D.) Degree Program in Engineering Sciences and/or Stand alone M.Tech at 14 Campuses of AcSIR (CSIR National Institutes with R&D in Engineering Sciences	January 25, 2018	2018
2.	Ph.D. in Science Communication & Information Sciences	August 13, 2018	2018
3.	M.Sc. in Science Communication & Information Sciences	August 13, 2018	2018
4.	Re-structuring of Course Work in Ph.D. Program	September 10, 2020	2020

\5.	Masters in Public Health @ AcSIR Academic Centre IIPH	July 09, 2021	2021
6.	PG Diploma (Metrology) @ AcSIR Academic Centre CSIR-NPL	July 09, 2021	2021
7.	Ayurveda- Molecular Medicine Interdisciplinary cotutelle joint (*between AcSIR & Institute of Training & Research in Ayurveda, Jamnagar*) Ph.D. Program	May 11, 2022	2022
8.	Ayurveda- Molecular Medicine Interdisciplinary cotutelle joint (*between AcSIR & National Institute of Ayurveda, Jaipur*) Ph.D. Program	May 11, 2022	2022
9.	Masters in Wildlife	May 11, 2022	2022
10.	Masters in Heritage Conservation & Management	May 11, 2022	2022
11.	Masters in Public Health at AcSIR Academic Centre- Max Institute of Medical Excellence, Delhi	July 08, 2022	2022
12.	Created Faculty of Agricultural Science in AcSIR for Focus on cash crops & their value-added products	May 11, 2022	2022

D. Important MoUs formulated and signed as *(Head of the Institutions)* for establishment of R&D Institute- Academic Institution as well as Academic Institution-Academic Institution collaborations:

S.No	MoUs formulated	Name of Agencies/ Departments involved	Date/**Year** of MoU
National: ***Academic-cum- R&D Cooperation*** *between* ***R&D Institute*** *(as* ***CEO*** *of Center of Innovative and Applied Bioprocessing,* ***CIAB****) and* ***Universities***			
1.	Research & Academics Cooperation	Between DBT-Center of Innovative and Applied Bioprocessing (Mohali) & **Central University of Punjab**, Bhatinda	January 14, **2014**
2.	Research and Academic Cooperation	Between DBT-Center of Innovative and Applied Bioprocessing (Mohali) & **Guru Jambheshwar University of Science and Technology,** Hisar	February 10, **2014**
3.	Research & Academic Cooperation (amendment)	Between DBT-Center of Innovative and Applied Bioprocessing (Mohali) & **Guru Jambheshwar University of Science and Technology,** Hisar	June 17, **2016**
4.	Research & Academics Cooperation	DBT-Center of Innovative and Applied Bioprocessing (Mohali) & **Central University of Haryana**	July 16, **2016**
National: ***Admittance of the R&D institutes*** *of repute as* ***Associate Academic Centres*** *to Academy of Scientific and Innovative Research (***AcSIR***)*			
5.	Academic collaboration for Ph.D. program	Between **AcSIR** and DST-**Birbal Sahni Institute of Palaeosciences**, Lucknow	January 13, **2020**
6.	Academic collaboration for Ph.D. program	Between **AcSIR** and DST-**Institute of Advanced Studies in Science and Technology**, Gauhati, Assam	February 25, **2020**
7.	Academic collaboration for Ph.D. program	ICMR-**National Institute of Malaria Research**, New Delhi	March 04, **2020**
8.	Academic collaboration for Ph.D. Program	Between **AcSIR** and DST-**Institute of Nanoscience and Technology**, Mohali	July 14, **2020**
9.	Academic collaboration for Ph.D. Program	Between **AcSIR** and DST-**Wadia Institute of Himalayan Geology**, Dehradun	October 23, **2020**
10.	Academic Collaboration	Between **AcSIR** and **Public Health Foundation of**	June 30,

	for Masters in Public Health	**India**, Delhi	**2021**
11.	Academic collaboration for Ph.D. program	Between **AcSIR** and ICMR-**Vector Control Research Centre**, Puducherry	August 30, **2021**
12.	Academic collaboration for Ph.D. Program	Between **AcSIR** and ICMR-**Regional Medical Research Centre**, Dibrugarh	September 01, **2021**
13.	Academic collaboration for Ph.D. Program	Between **AcSIR** and **Centre for Biomedical Research**, Lucknow	September 02, **2021**
14.	Academic collaboration for Ph.D. Program	Between **AcSIR** and ***Ministry of Health & Family Welfare*-National Institute of Biologicals**, Noida	February 28, **2022**
15.	Academic collaboration for Ph.D. Program	Between **AcSIR** and ***Ministry of Environment and Forests*-Wildlife Institute of India**, Dehradun	March 07 07, **2022**
16.	Academic collaboration for Ph.D. Program	Between **AcSIR** and **Tata Institute of Genetics and Society**, Bangalore	May 23, **2022**
17.	Academic Collaboration for Masters in Public Health at Max Institute of Medical Excellence, Delhi	Between **AcSIR** and **Max Healthcare Ltd**., Delhi	July 08, 2022
*National: **Ayurveda & Molecular Medicine Interdisciplinary Research & Training Platform** for Ph.D. students' Education & Research through Joint Ph.D. Program*			
18.	Dual Testamur (Cotutelle) Joint Ph.D. Program	Between **AcSIR** and AYUSH-**National Institute of Ayurveda**, Jaipur	April 21, **2022**
19.	Dual Testamur (Cotutelle) Joint Ph.D. Program	Between **AcSIR** and AYUSH-**National Institute of Teaching and Research in Ayurveda**, Jamnagar	April 21, **2022**
*International: **Dual Testamur (Cotutelle) Joint Ph.D. Program** in Science and Engineering between **AcSIR** and reputed **Universities abroad (**A bi-directional student mobility**)***			
20.	Dual *Testamur* Joint Ph.D. Program	Between **AcSIR** and **Royal Melbourne Institute of Technology University,** Melbourne, **Australia** (*DoV: Double Badged to Cotutelle*)	August 04, **2020**
21.	Dual *Testamur* (Cotutelle) Joint Ph.D. Program	Between **AcSIR** and **University of Western Australia, Perth**, **Australia**	March 29, **2022**
22.	Dual *Testamur* Joint Ph.D. Program	Between **AcSIR** and **Royal Melbourne Institute of Technology University,** Melbourne, **Australia** (*Renewal/Extension with reciprocal student mobility*)	June 21, **2021**
23.	Dual *Testamur* Joint Ph.D. Program	Between **AcSIR** and **Deakin University,** Australia	June 22, **2020**