

Brief profile of Dr. S. N. Saxena

Discipline: Plant Physiology

Designation: Head, IIMR-Regional Research Station of Pearl Millet, Gudamalani, Barmer

At IIMR Since, December 2023

Email- shailendra.saxena@icar.gov.in, saxena@millets.res.in shail.nrcss@gmail.com

Mobile: 9414429765, 7878905992 (M)

Academic Qualifications:

Examination	Board/University	Year	Subject
B.Sc. (Ag.)	MDS University, Ajmer	1988	Agriculture
M.Sc. (Ag.)*	SKRAU, Bikaner	1991	Plant Physiology
NET	ASRB, New Delhi	1995	Plant Physiology
Ph.D.**	SKRAU, Bikaner	2004	Plant Physiology

Employment Record & Experience (Starting from the present position)

Designation	Organization	Institute	Period	
			From	To
Head	ICAR, New Delhi	ICAR-IIMR, Hyderabad	1/12/2023	Continue
Principal Scientist	ICAR, New Delhi	ICAR-NRCSS, Ajmer	12/02/2023	30/12/23
Director (Act.)	ICAR, New Delhi	ICAR-NRCSS, Ajmer	10/03/2021	12/2/2023
Principal Scientist	ICAR, New Delhi	ICAR-NRCSS, Ajmer	8/5/2011	Continue
Senior Scientist	ICAR, New Delhi	ICAR-NRCSS, Ajmer	30/7/2007	8/5/2011
Asstt Professor	SKRAU, Bikaner	SKRAU, Bikaner	8/5/1996	30/7/2007

Research Experience: More than 29 years' experience in research, teaching, extension and research infrastructure development

Current responsibility:

1. **Infrastructure Development:** Spearheaded the establishment of basic research infrastructure at the IIMR-Regional Research Station (RRS) on Pearl Millet, Gudamalani, Barmer, Rajasthan.
2. **Project Supervision:** Monitored and expedited the construction of the laboratory-cum-administrative building, ensuring adherence to timelines and quality standards.
3. **Farm Development:** Led the transformation of raw land into cultivable farm plots, including planning and implementation of irrigation systems and other essential farm utilities.
4. **Research Coordination:** Designed, coordinated, and supervised various experimental trials related to pearl millet research to support the scientific objectives of the RRS.
5. **Operational Readiness:** Ensured timely development of all critical infrastructure and operational systems to make the Regional Research Station fully functional at the earliest.

Externally funded projects handled:

Title of the Project	Level of Association	Value (in lakhs)	Sponsoring Agency
Exploitation of seed spices as a potential source of natural antioxidants, essential oil and oleoresins of enhancing export of value-added products	Principal Investigator (2014-17)	40.30	NMPB, Ministry of AYUSH, GOI, New Delhi (Z.18017/187/CSS/R&D/Raj- 01/2013-14-NMPB dated 13.01.2014)
Improvement of moth-bean using radiations and biotechnological approaches.	PI: (2006-2007)	13.00	Board of Research in Nuclear Sciences, Mumbai (No.2005/35/32/BRNS/2812 dated 31.03.2006)
Network project on high value compounds	Co-PI (2015-16), PI: 2016-17	22.20	ICAR, New Delhi (XII EFC, IISR Calicut)
Studies on cryogenic grinding for retention of flavour and medicinal properties of some important Indian spices. ICAR, New Delhi under NAIP	PI: (2009-2014)	97.00	NAIP, ICAR, New Delhi (NAIP/component-4/4185 dated 7/1/2009)
Creation of seed infrastructure facilities (seed processing & seed storage) at ICAR-NRCSS, Ajmer	Co-PI (2022-2023)	127.00	Department of Agriculture Co-operation, Ministry of Agriculture & Farmer's Welfare Govt. of India of National Mission on Agricultural Extension and Technology
Entrepreneurship development in seed spices: demonstration cum training programs to improve socio economic status of farmers in Koraput, Odisha	PI (2022-2023)	68.0	District administration Koraput, Odisha
Intellectual property management and transfer/commercialization of agricultural technology scheme	In charge (2013-2016)	Annual grant basis	XIth and XII th plan EFC of IP and TM unit, ICAR, New Delhi
Development of resistant variety / line in cumin against wilt (<i>F. oxysporum</i>) using <i>in vitro</i> techniques.	Co-PI (2000-2002)	12.00	ICAR, New Delhi (Sanction No. F.No.15(1)/97-Hort.I/1998)
Characterization of underutilized plant species of Thar Desert.	Co. PI (2005-2006)	12.00	DBT, New Delhi (DBT Ref. BT/PR4349/NDB/51/028/3)
Biotechnology for improvement of arid zone crops	Associated Scientist (1996-2001)	165.00	DBT, New Delhi, GOI, India
Value chain in Major Seed Spices for Domestic and Export Promotion	Associated Scientist (2009-2014)	110.0	ICAR-New Delhi
GAP in selected seed spices for Western Dryland Region under Biotech Kisan Programme	Co-PI (2021-2023)	87.0	DBT, New Delhi, GOI, India
Promotion of Beekeeping in Rajasthan for Farmers livelihood and biodiversity conservation, Rajasthan	Co-PI (2022-2023)	29.32	NHBB Letter No. 6-81/2021- NBB dated 15.03.2022
Network Project on Organic farming	Co-PI (2021-2023)	56.0	ICAR-New Delhi

Institutional Research Projects

As PI: 09

As Co-PI: 30

Salient Research Achievements:

Development of Crop Variety (As Developer/Co-operator)

- **Ajmer Fenugreek-3 (AFg-3):** Fenugreek variety with higher yield, better diosgenin and 4-hydroxy-iso-leucine content. Area under fenugreek increased from 85000 ha in 2013 to 225000 ha in 2019 (10-12% area coverage under AFg-3). Covered 26000 hac. Area as per seed sale record of NRCSS, Ajmer. Identified for national release during XXIII workshop on spices held at IISR, Calicut on 29 Sep 2012-1 Oct 2012. **Gazette notification S. O. 3666 (E) 06.12.2016**
- **Ajmer Fenugreek-4 (AFg-4):** This variety was developed through pure line selection method and released at state level in 2015. Average seed yield is 19.25q/ha. The seeds contain 0.94 % 4-hydroxyisoleucine and 1.74 % diosgenin. Seeds are rich in crude fibre (21.7 %). It has excellent anti diabetic properties. **Gazette notification S.O.3666(E) 06.12.2016**
- **Ajmer Coriander-1 (ACr-1):** This variety was developed through mass selection suitable for leaves as well as seed production with an average yield 12 to 12.5 q seeds per ha. The plants are resistant to *stem gall* and have tolerance to *powdery mildew*. ACr-1: Yield enhancement from 2-6 q/ha, Covers about 1.5 lakh hectare of coriander cultivation area as per seed sale record of NRCSS. **Gazette notification S.O.3666(E) 06.12.2016**
- **Ajmer Fennel-2 (AF-2):** developed through recurrent selection and released for national level in 2017. The plants are erect and tall, bearing large size umbels. Produces average yield of 17.9q/ha. Its seed contain 1.9 % essential oil and 57.5% anethole+estragol. This variety has tolerance to *Ramularia* and *Alternaria blight*. **Gazette notification S.O/261(E) 16.01.2018**
- **Ajmer Fennel-3 (AF-3):** The variety gives 21.43q/ha average seed yield, which is 12.6% and 9.95% higher as compared to national check RF-205 and RF-101, respectively. The variety is moderately resistant to *Ramularia* blight disease. This variety has superior quality characters as its seeds contain 1.9 % essential oil. Major constituent of essential oil i.e. anethol is found 45%. Identified for release during 27th meeting of Central Sub Committee on Crop Standards, Notification and Release of Varieties for Horticultural Crops held on 2nd September, 2019
- **Ajmer Fenugreek-5 (AFg-5):** This variety developed through pure line selection and identified for national release in 2017. The seed are bold and large. The crop takes 106-141 days to mature gives average seed yield of 17.21q/ha. Moderate resistant to powdery mildew and Alternation blight.
- **Ajmer Nigella-1(AN-1):** This variety has been identified for released by the Varietal Release Committee of AICRP on Spices for National Release on dated 29-30 September 2020 held at IISR Calicut and considered and approved in 28th meeting of Central Sub Committee on Crop Standards, Notification and Release of Varieties for Horticultural Crops held on 28th October, 2020 in Krishi Bhawan, New Delhi for release in the states of Rajasthan, UP, MP, Uttarakhand, Haryana, West Bengal and Chhattisgarh.
- Ninety-one (91) fennel germplasm line and one hundred forty-one (141) coriander germplasm lines have been characterized and grouped on the basis of major essential oil constituents (anethole in fennel and linalool in coriander)
- Three hundred forty (340) fenugreek germplasm lines have been characterized as per oil yield and regrouped based on major fatty acids present in fenugreek seed oil (Linoleic acid (18:2; n-6) and α -Linolenic acid (18:3; n-3) acids). Nineteen selected lines evaluated to establish the suitability of fenugreek seed oil for human consumption.
- Cumin germplasm collected from major cumin growing AESRs on India have been characterized as per essential oil constituents (Cuminaldehyde)

New Trait Identified

- **AFgM-1:** This fenugreek mutant with changed morphology have been identified and purified up to M₄ generation. *Int. J. of Seed Spices* 2(1) 66-68.
- **AFgM-2:** This fenugreek mutant with changed morphology have been identified and purified up to M₄ generation. Apical tip converts in the bunch of leaves gave good green leaf yield with multiple cutting, suitable for consumption as leaf vegetable. *Int. J. of Seed Spices* 2(1) 66-68.

Development of Technologies/ Product:

- ICAR-HS-NRCSS-Process-2024-057: Cryogenic grinding technology for seed spices for better retention of flavour and medicinal properties. Developer: Dr. S. N. Saxena: Co-developer(s): Dr. P. Barnwal and Dr. K. K. Singh
- ICAR-HS-NRCSS-Process-2024-058: Millet –Seed spices cumin cookies. Developer: Dr. Shiv Lal
- Co-developer(s): Dr. S.N. Saxena, Dr. O.P. Aishwath, and Dr. B.K. Mishra
- ICAR-HS-NRCSS-Process-2024-059: Process for making celery seed salt. Developer: Dr. Shiv Lal, Co-developer(s): Dr. S.N. Saxena, Dr. O.P. Aishwath, and Dr. B.K. Mishra
- Essential oil extraction technology from seed spice crop residues (From waste to wealth), Technical bulletin No. NRCSS/2018/01
- Seed priming technology for hastening germination in cumin. *International J. of Seed Spices* 5(1):24-28
- Seed pelleting technology for cumin (Farmers friendly, simple technology involving no extra cost and chemicals), Saxena S. N. (2016). Seed priming and pelleting in cumin for hastening germination. *Seed Spices E-Newsletter Vol. 8 (2). 5*
- A highly efficient, cost-effective technology for essential oil extraction from seed spices, 87-88, Innovative technologies for Agri Business published from ZTM & BPD Unit, IARI, New Delhi. Pp 69-70
- Isolation of soluble fibre galactomannan from fenugreek seeds. 89, Seed Spices E-Newsletter Vol. 7 (3)
- Cryo ground coriander and garam masala (Value added product)

Development of Concept, Theory, Process and Package of Practices

- Developing protocol for regulation of *in vitro* flowering in *vigna aconitifolia* and other crops (Process/protocol). Saxena et. Al., (2008). *Biologia Plantarum* 52 (1) 181-183; Saxena et. al., (2005). *J. Arid Legumes* 2 (2):210-214.
- Advance production technology of fenugreek (Package of Practices)
- Crop production technology of Dill (Sowa) (Package of Practices)
- Advance production technology of ajwain (Package of Practices)
- Advance production technology of caraway (Package of Practices)
- Microproagation technology of date-palm (Bhargava, S., **Saxena, S.N.** and Sharma, R. (2003). *J. Plant Biochem. and Biotech.*, vol. 12: 43-47)
- Protocol for *In vitro* shoot tip grafting in kinnow mandarin (Raj kumar, Kaul M. K. Saxena, S. N., Singh, A.K. and Khadda, B. S. (2014). *Indian J. Agril. Sci.* 84(11): 1376-81)
- Plant regeneration protocol of anise (*Pimpinella anisum* L.). (*J. of Spices and Aromatic Crops* 21(1). 59-63)
- Regeneration protocol of fennel (*Foeniculum vulgare* L.) (*Int. J. Seed Spices* 2(2) 1-4)
- Regeneration protocol of coriander (*Coriandrum sativum* L.) (*Int. J. Seed Spices* 5 (2), 63- 66)
- Standardized GC-MS parameters for essential oil profiling in cumin/ coriander/ fennel/ anise/ ajwain and dill seed (*J. Food Sci. and Tech.* 53(6), 2827-2834; *J. Essential Oil-Bearing Plants.* 19 (4) 989-999)
- Standardized GC-MS parameters for Fatty acids profiling in fenugreek (*Legume Research.* DOI:10.18805/lr. V 0iOF.11047)
- Use of plant growth regulators for improvement in yield performance of coriander (*Coriandrum sativum* L.) (*J. of Spices and Aromatic Crops* 23(2): 193-200)
- GC aided method for extraction and quantification of dithiocarbamate residues in cumin seeds (*Int. J. of Seed Spices.* 6(1):78-81)
- Multi Residue Evaluation Protocol for Coriander (*Coriandrum sativum*) Seeds (*Int. J. of Seed Spices.* 6(1):82-85)
- Rapid and mass screening methods for 4-hydroxyisoleucine in fenugreek seeds (*Int. J. of Seed Spices* 4(1): 93-94)

Designing and developing research infrastructure facilities

At ICAR-NRCSS, Ajmer:

- Plant Tissue Culture and Biotechnology Laboratory (As per order no. F. No. PA/Dir/19 dated June 24, 2008)
- Plant Physiology and Biochemistry Laboratory (As Sr. Scientist, Plant Physiology)
- Cryogenic Grinding and Essential Oil Extraction Laboratory (As CCPI, NAIP-IV project)
- Quality analysis Laboratory (GC-MS Laboratory) (As Incharge)
- A Seed Spices Knowledge Area has also developed under IPR scheme at NRCSS, Ajmer. (As PI, IPR scheme, ICAR)

Developed MoU with SAUs and Private companies/NGOs (As Director/Incharge ITMU HRD/Incharge ITMU)

- MoU with SAUs for carried out collaborative activities in research, extension and teaching:10
- MoU for technology commercialization developed by the institute: 10
- Consultancy given:01

Teaching and research guidance:

- Courses in Plant Physiology, Biotechnology taught at UG/PG and Ph.D. level: 06
- M.Sc. Student guided: 24
- Ph. D. Student guided: 06

International and National assignments

- Chairman of the panel constituted by BIS FAD 9 for revision of terminology for spice and condiments. Revision has been done and submitted to BIS, India
- Member, Spices, Culinary Herbs and Condiments Sectional Committee, FAD 9 of Food and Agriculture Department, Bureau of Indian Standards, Govt. of India, New Delhi.
- Expert member and BIS representative in ISO SAG Smart Farming Consultative group.
- Member Seed Spice Task Force Committee constituted by Spice Board, India
- Expert member for updating Comprehensive Glossary of Agriculture Terms by Commission for Scientific & Technical Terminology, Ministry of Human Resource Development, GOI
- Member, committee of courses for designing of course curriculum of Plant Physiology at SKRAU, Bikaner.
- Member, committee of courses for designing of course curriculum of Biotechnology at SKRAU, Bikaner.

Awards/ Special Attainments/Peer recognition

- Awarded fellow of Indian Society for Seed Spices, Ajmer, Rajasthan
- Awarded fellow of Indian Society for Spices, Calicut, Kerala
- President of Indian Society of Seed Spices, Ajmer and Publisher of International Journal of Seed Spices from March 2021 to 2023.
- Treasurer, Indian Society of Seed Spices, Ajmer up to 2015
- Elected Vice President of Indian Society of Seed Spices, Ajmer (2019-Cont.)
- Chief Editor of International Journal of Seed Spices published by Indian Society of Seed Spices, Ajmer (up to December 2019).
- Awarded as Most Industrious Scientist of NRCSS during 2012-13.
- Awarded as Best Scientist of Basic Science Division during 2010-11
- Awarded by Hon'ble Vice Chancellor on Republic Day on account of bringing externally funded project from BRNS, Mumbai (2006), S. K. Rajasthan Agricultural University, Bikaner
- Awarded Gold Medal for standing first in order of merit during M.Sc. (Ag.) (1997), S. K. Rajasthan Agricultural University, Bikaner

International exposure

- Three months training from 22 March to 21 June 2011 on “Fine mapping of *fullflesh* gene on chromosome 6 of tomato”, Boyce Thompson Institute for Plant Research, Cornell University, Ithaca, New York, USA.
- Attended “IFT annual meeting & food expo-2012” organized by the Institute of Food Technologists, Chicago at Las Vegas, USA during June 25-28, 2012

Life Membership of Scientific Societies

- Life membership of Indian Society for Spices (ISS). Indian Institute of spice Research, Calicut, India.
- Life membership of Indian Society of See Spices (ISSS). National Research Centre on Seed Spices, Ajmer
- The Medicinal and Aromatic Plants Association of India (MAPAI), Anand, Gujarat
- Life membership of The Horticulture Society of India, New Delhi
- Life membership of The Arid Horticulture Society of India, New Delhi (CIAH, Bikaner)

Capacity building programme organized as Organizing Chairman/ Organizing Secretary/ Joint Organizing Secretary/member organizing committee

- Farmer fairs: 15
- Farmers training program: 25
- Winter school/Summer Schools/Short course:03
- Seminar/Symposium/Workshop:10
- Seminar/Symposium/Workshop attended: 50
- Lectures/lead talk delivered in International/national Seminar/ Conference/Summer/ Winter Schools/ Refresher courses:30
- Presentations in /Conferences/ Symposia/ Seminars:110
- Best paper/ oral presentation/ poster award: 16
- Scientific meetings attended: 70

Research publications (International and National journals): 150

Significant publications:

Research publications (International and National journals):

- **Saxena, S.N.**, Rathore, S.S., Diwakar, Y., Kakani, R.K., Kant, K., Dubey, P.N., Solanki, R.K., Sharma, L.K., Agarwal, D., John, S. (2016). Genetic diversity in fatty acid composition and antioxidant capacity of *Nigella sativa* L. Genotypes. *LWT - Food Science and Technology*. **78**: 198-207
- Dubey, P. N., **Saxena, S. N.**, Mishra, B. K., Solanki, R. K., Vishal, M. K., Singh, B., Sharma, L. K., John, S., Agarwal, D., and Yogi, A. 2016. Preponderance of cumin (*Cuminum cyminum* L.) essential oil constituents across cumin growing Agro-Ecological Sub Regions, India. *Indus. Crops & Products*. **95**:50-59. **(Corresponding author)**
- Mehriya, M.L.; Singh, D.; Verma, A.; Saxena, S.N.; Alataway, A.; Al-Othman, A.A.; Dewidar, A.Z.; Mattar, M.A. (2022). Effect of date of sowing and spacing of plants on yield and quality of chamomile (*Matricaria chamomila* L.) grown in an arid environment. *Agronomy*, **12**: 2912. <https://doi.org/10.3390/agronomy12122912>.
- **S. N. Saxena**, Y. K. Sharma, S. S. Rathore, K. K. Singh, P. Barnwal, Rohit Saxena, Payal Upadhyaya & M. M. Anwer (2015). Effect of cryogenic grinding on volatile oil, oleoresin content and antioxidant properties of coriander (*Coriandrum sativum* L.) genotypes. *J. Food Sci. Tech.* **52(1)**: 568–573.
- L. K. Sharma, D. Agarwal, S. S. Rathore and **S. N. Saxena (2016)**. Effect of cryogenic grinding on volatile and fatty oil constituents of cumin (*Cuminum cyminum* L.) genotypes. *J. Food Sci. Tech.* **53(6)**: 2827-2834. **(Corresponding author)**.
- Barnwal P., Singh, K. K., Sharma, Alka., Choudhary, A. K. & **Saxena, S. N.** (2015). Influence of pin and hammer mill on grinding characteristics, thermal and antioxidant properties of coriander powder. *J. Food Sci. Tech.* DOI 10.1007/s13197-015-1975-0

- **Saxena, S. N.,** Kakani, R. K., Sharma, L. K., Agarwal, D., John, S., Sharma Y. (2017). Genetic variation in seed quality and fatty acid composition of fenugreek (*Trigonella foenum-graecum*L.) genotypes grown under limited moisture conditions. *Acta Physiologiae Plantarum*. **39**:218. Doi: DOI :10.1007/s11738-017-2522-6.
- S. N. Saxena, R. Swarup Meena, M. K. Vishal, S. John, L. K. Sharma, B. K. Mishra & D. Agarwal, (2022) variation in essential oil constituents of coriander (*Coriandrum sativum*) germplasm across coriander growing regions in India, *Journal of Essential oil Research*, DOI: 10.1080/10412905.2022.2036644
- **S. N. Saxena,** S. S. Rathore, R. Saxena, P. Barnwal, L. K.Sharma and B. Singh. (2014). Effect of cryogenic grinding on essential oil constituents of coriander (*Coriandrum sativum* L.) genotypes. *Journal of Essential Oil-Bearing Plants*. 17(3) 385–392 DOI: 10.1080/0972060x.2014.895197
- Agarwal D., **Saxena, S. N.,** Sharma, L. K. and Lal, G. (2018). Prevalence of essential and fatty oil constituents in fennel (*Foeniculum vulgare* Mill) genotypes grown in semi-arid regions of India. *Journal of essential oil-bearing plants*. 21 (1):40-51 DOI: 10.1080/0972060X.2018.1433072
- **S. N. Saxena,** R. K. Kakani, S. S. Rathore, R. S. Meena, M. K. Vishal, L. K. Sharma, D. Agrawal, S. John, A. Panwar and B. Singh (2016). Genetic variation in essential oil constituents of fennel (*Foeniculum vulgare* Mill) germplasm. *Journal of Essential Oil-Bearing Plants*. 19(4): 989-999. Doi: 10.1080/0972060X.2016.1191378
- Asangi. H., Saxena, S.N.* Kattimani, K.N. Kulkarni, M.S. Kotikal, Y.K. Mastiholi, A.B. Jameel Jhalegar M.D. & Siddappa R. (2020). Genetic Variation in Essential Oil Constituents of Ajwain (*Trachyspermum ammi* L. Sprague) Varieties at Varying Nitrogen Levels under Semiarid Tropics of Northern Karnataka, India, *Journal of Essential Oil-Bearing Plants*, 23:6, 1324-1333
- Barnwal, Pradyum18an; Singh, Krishna; Mohite, A; Sharma, Alka; Saxena, S.N. (2014). "Influence of cryogenic and ambient grinding on grinding characteristics of fenugreek powder: A comparative study". *Journal of Food Processing and Preservation*. DOI: 10.1111/jfpp.12342
- Identification, validation and quantification of thymoquinone in conjunction with assessment of bioactive possessions and GC-MS profiling of pharmaceutically valuable crop Nigella (*Nigella sativa* L.) varieties. 12:e17177 <https://doi.org/10.7717/peerj.17177>
- Bhargava, 15S., Saxena, S.N. and Sharma, R. (2003). In vitro multiplication of *Phoenix dactylifera*. *J. Plant Biochem. Biotech*. 12: 4317-47.
- Sushil Kumar, S.N. Saxena, R. Sharma and R.S. Jat (2008). Agrobacterium tumefaciens mediated genetic transformation of moth bean [*Vigna aconitifolia* (Jacq) Marechal]. *Indian Journal of Genetics and Plant Breeding* 68(3): 327-329.
- Biopriming of Coriander Seeds with Soaking Agents Improves Soil Properties, Crop Quality and Yield Under Arid-Semiarid Conditions. DOI: 10.1080/00103624.2025.2475975
- Saxena, S.N., Kaushik, N. and Sharma, R. (2008). Effect of abscisic acid and proline on in vitro flowering in *Vigna aconitifolia*. *Biologia Plantarum* 52 (1): 181-183.
- S.S. Rathore, S. N. Saxena, R. K. Kakani, L. K. Sharma, D. Agrawal, and B. Singh (2016). Genetic variation in fatty acid composition of fenugreek (*Trigonella foenum-graecum* L.) seed oil. *Legume Research* DOI:10.18805/lr.v0iOF.11047.
- Saxena, S. N., Kakani, R. K., Sharma, L. K., Agarwal, D., John, S., Sharma Y. (2017). Effect of water stress on morpho-physiological parameters of fenugreek (*Trigonella foenum-graecum* L.) genotypes. *Legume Research*. DOI: 10.18805/LR3830.
- Ghosaliya, B.K., Mittal, G.K., Shivran, A.C., Sharma, S.K., Saxena, S.N. and Jain, S.K. (2021). Water stress induced changes in seed quality of fenugreek (*Trigonella foenum-graecum* L.) genotypes. *Legume Research*. DOI: 10.18805/LR-4493.
- Narayan S., Saxena S.N., Jakhar M.L., Sharma R (2015). Enhancement of regeneration in moth bean [*Vigna aconitifolia* (Jacq) Marechal] through gamma irradiation. *Legume Research* 38(4): 519-523
- Agarwal, D., Saxena, S. N., Dubey, P. N., Mishra, B. K., Kant, K. and Lal, G. (2019). Genotypic variation in pharmacological potential of seed extracts of cumin (*Cuminum cyminum* l.) genotypes. *Indian J Pharm Sci* 81(5):946-954
- Raj kumar, Kaul M. K. Saxena, S. N., Singh, A.K. and Khadda, B. S. (2014). Standardization of protocol for in-vitro shoot tip grafting studies in Kinnow mandarin (*Citrus deliciosa*). *Indian Journal of Agricultural Sciences* 84(11): 1376-81.
- Dubey, P. N., Saxena, S. N., Mishra, B. K., Aishwath, O. P., Solanki, R. K., Singh, B., and Lal, G.

- (2016). Assessment of variability in physical and chemical composition of *Cuminum cyminum* seeds from arid and semiarid India. *Indian Journal of Agricultural Sciences* 86 (10): 1366-1370.
- S. N. Saxena, S. Janjharia, A.K. Sharma, R. Sharma and G. Singh (2008). High frequency in vitro shoots regeneration of *Capparis deciduas* from shoot tip culture. *Journal of Applied Horticulture*, 9(2):153-156.
 - Raj kumar, Kaul M. K. Saxena, S. N., Singh, A.K. and Khadda, B. S. (2014). Standardization of protocol for in-vitro shoot tip grafting studies in Kinnow mandarin (*Citrus deliciosa*). *Indian Journal of Agricultural Sciences* 84(11): 1376-81
 - Raj Kumar, Kaul, M. K., Saxena, S.N., Bhargava, S. And Singh A. K. (2013). In vitro propagation of virus tolerant root stock of Carrizo ctranze. *Indian Journal of Horticulture* 70 (2): 179-184
 - Kumar, R Kaul, M. K., Saxena, S. N., Bhargava, S. and Singh S. S. (2010). Acclimatization of in vitro generated citrus plantlets. *Indian Journal of Horticulture* (67) (Special issue) 423-425.
 - Shiv Lal, Gopal Lal, NK Meena, RD Meena, N Chaudhary, MK Choudhary, SN Saxena (2023). Stability analysis of yield, yield attributes and essential oil content in fennel (*Foeniculum vulgare* Mill.) evaluated under a long-term organic production system. *J. Hort. Sciences* 18(1). 90-97
 - Brijesh Kumar Mishra, Chetan Kumar Jangir*, Shailendra Nath Saxena, Yugal Kishore Sharma, Krishna Kant, Mahesh Kumar Mahatma & Vinay Bhardwaj (2025): Biopriming of Coriander Seeds with Soaking Agents Improves Soil Properties, Crop Quality and Yield Under Arid-Semiarid Conditions, *Communications in Soil Science and Plant Analysis*, DOI: 10.1080/00103624.2025.2475975
 - Y Ravi, Periyannadar I. V., Saxena S. N., Muthurajan R, Sundararajan V, Pridiuldi S. V., Meena S. S., Naik A. N., Harisha C. B., Asangi H., Choudhary S., Singh R., Dengeru Y., V. K. K., Meena N. K., Meena R. S., Verma A. K. (2024). Identification, validation and quantification of thymoquinone in conjunction with assessment of bioactive possessions and GC-MS profiling of pharmaceutically valuable crop *Nigella* (*Nigella sativa* L.) varieties. *Peer J* 12: e17177 <https://doi.org/10.7717/peerj.17177>
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I hereby declare that the statements made above are true.

Date

Place

Candidate's Signature