Faculty Details proforma for DU Web-site

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Title	Professor	First Name	Veena	Last Name	Agrawal	Photograph
Designation	Professor					
Address	**Department of Botany North Campus University of Delhi Delhi-110007**					
Phone No Office	+91-11-27666802					
Residence	+91-11-27666400					
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Educational Qualifications

Degree	Institution	Year
Ph.D. Botany	Kurukshetra University	1982
M.Sc. (Botany)	---do--	1977
B.Sc. (Med.)	---do--	1975
C. C. in French	---do--	1979

Career Profile

Institution	Designation	Duration	Role
Univ. of Delhi	Professor	Nov. 2003-to till date	Teaching & Research
Univ. of Delhi	UGC Research Scientist 'B' (Reader)	Nov.1995-Nov.2003	Teaching & Research
Univ. of Delhi	UGC Research Scientist 'A' (Lecturer) through open Selection at National Level	Nov. 1990 - Nov. 1995	Teaching & Research
Univ. of Delhi	Research Associate, CSIR open selection at National Level	Feb.4,1986-Nov. 28, 1990	Research & Teaching
Kurukshetra Univ.	Pool Officer,CSIR,through open selection at National Level	Feb,2,1983-Feb,2,1986	Research & Teaching

Administrative Assignments

- **Provost, University Meghdoot Hostel for women**, Delhi University w.e.f. May 1, 2015 to till date.
- **Nominated Member of assessors' National NAAC (National Assessment and Accreditation Council), MHRD, In w.e.f. May,2019 to till date for evaluation of Progress of Universities in India.**
- **Served Chairperson: Governing Body of Indira Gandhi Institute of Physical Education & Sports Science University of Delhi, w.e.f. Feb. 2017 to Dec.2017.**
- **Serving as Member Program Advisory Committee (PAC) of Organismal and Evolutionary Biology of SERB, DS Govt. of India w.e.f.Feb.2019-2022.**
- **Served as nominated Core member of Program Advisory Committee (PAC) of Plant Sciences of (Science a Engineering Research Board (SERB), Ministry of Science and Terchnology, Govt. of India w.e.f. December 2018 2019.**
- **Serving as Nominated Expert Member of Apex Committees of RUSA (Rashtrya Uchhatar Siksha Abhiyan), MHRD, Govt.of India for M.D. University,Rohtak and Rajasthan Univ. Jaipur.w.e.f. September 2019 to till date evaluation of research Projects and approval for funding to Univ. teachers.**
- **Serving as Nominated Expert Member of selection committee** by Ministry of Forest and Environment C (Mo Govt. of India, for promotion and selection of Scientists for various Institutes in India w.e.f.2009 to till date.
- **Serving as Nominated Expert Member of selection committee** by Council of Scientific and Industrial Resear (CSIR), Govt. of India, for promotion and selection of Scientists w.e.f.2009 to till date.
- **Nominated by Vice Chancellor as Delhi University representative to Governing body of Motila Nehru College, w.e.f. April 2020 t0 2021.**
- **Served as TEAM LEADER, NAAC (Internal Peer team)** Delhi University for inspecting academic, health and hygiene different Faculties and University Departments, w.e.f. 2015 to to 2019.
- **Served University representative, on the Governing body** of Vivekananda Mahila College, Vivek Vihar, Univ. of Del w.e.f. April 2018 to April, 2020.
- **Vice Chancellor's Nominee to Departmental Research Council of Delhi Institute of Pharmaceutical Sciences Research (DIPSAR), w.e.f. 2016-till date.**
- **Serving as Expert of academic audit committee** of the Department of Genetics and Dept. of Botany, M.D. Univers Rohtak, Haryana w.e.f. 2016 to till date.
- **Serving as Co-ordinator, refreshment Committee of Annual Delhi University Convocation , w.e.f. 2016-till date.**
- **Served as Provost, University Hostel for Women (UHW),** University of Delhi, w.e.f. October 5, 2018 to March, 20 .**(Additional Charge).**
- **Nominated Member of Advisory Committee by UGC for reviewing the Dev Samaj College ,Ferojpur(Panjab) un d**

College with Potential of Excellence, 2018- till date.

- **University representative, on the Governing body** of Indira Gandhi Institute of Physical Education & Sports Scien c (IGIPESS), University of Delhi w.e.f. December 13,2015 to Dec.2017.
- **Member Delhi University Hostel admission Committee to frame uniform guide lines for admission to Hostels. 20 2019.**
- **Member, managing committee** of the Gandhi Bhawan, Univ. of Delhi W.e.f. July, 2015 to 2018.
- **Served as Team Leader of Inspecting Team, Delhi University Proctor's Office for inspecting health and hygiene different Departments, w.e.f. 2015 to till date.**
- **Nominated Member of Expert panel of selection committee of** the Department of Higher Education Ministry Human Resource Development, Govt. of India, New Delhi for selection of the awards for foreign scholarships w. 2008 to till date.
- **Nominated member as Expert of selection committee of C.S.I.R. U.P.S.C** (Govt. of India,New Delhi), for selection Post Doctoral Fellow/SRF and scientists.w.e.f.2009-to till date.
- **Nominated Member of Expert panel for selection of Professor, Associate Professor and Assistant Profesors** Central/State Universities.
- **Served as Nominated Member of various** administrative committees constituted by the **University Gra Commission,** New Delhi w.e.f. May, 2009 onward.
- **Served UGC Nominee on Governing Body of Sahayadri College, Shimoga from 2005-2006 to 2010-2011.**
- **Member UGC Team Visiting for XIth Plan in CDLU, Sirsa (Haryana) from 08.06.2009 to 10.06.2009.**
- **Member UGC Visiting Team for considering Davangere University, Karnataka for its inclusion under Section 12 for receiving grants under XI Five Year Plan.**
- **Member, UGC Expert Committee for evaluation and recommendation of Travel Grants to college Teachers (20 2011)**
- **Member UGC Expert committee for** providing Financial Grants to University/Colleges under **Innovative Program m (2009-2011).**
- **Member. UGC Committee for Evaluating the standard and performance of UGC- NET for JRF** and Lecturer-s conducted by different State Agencies/ Board/ Commission(2009-2011).
- **Expert Member in the RDC of** Department of Botany & Microbiology, Gurukul Kangri University, Haridwar (U. w.e.f. September, 2014.
- **Member Committee of Courses and Studies in Botany**, Jai Narain Vyas University, Jodhpur (Rajasthan).
- **Member**, School Board of Studies,(BOS) **Central University of Gujarat.**
- **Member Board of Studies in Botany, Jamia** Hamdard, New Delhi. Member Committee of Courses, M.D. Universi Rohtak (Haryana), Jan 31, 2013 to 2015.
- **Member Executive committee, Delhi university Women Association(DUWA).w.e.f.2016-2019. Member Scie n Faculty, University of Delhi w.e.f.2010 to till date.**

- **Member, Delhi University Flower Show Committee** (2012 to till date).
- **Member Swachhata Committee, University of Delhi, w.e.f.2016 to till date.**
- **Member Delhi University Court. 2018-to till date.**
- **Member Department Research Council**(DRC),Dept . Botany w.e.f. 2015 to 2017,
- **Co-ordinator of M.Sc. Entrance Examination for admission to M.Sc. Botany Course 2015-2016**
- **Suprintendent for M.Sc. Practicals and Theory Examination**, w.e.f. 2014 to 2016.
- **Advisor,** Delhi University Botanical Society(**DUBS**) 2014 – 2017.
- **Member Souvenir and Purchase Committees, DUWA (2015-to till date).**
- **Nodal Officer** for sexual Harassment, anti-ragging Committees, Dept of Botany, w.e.f. 2014 to till date.
- **Member M.Sc. Admission Entrance** Examination Committee (1999 to till date).
- **Served as Member of Subcommittees for restructuring of M.Sc. and M.Phil. Courses 2005-2007 and 2009 (Semes System) at Dept. of** Botany, Delhi University.
- **Member Central Instruments Facilities (HPLC**) Committee.
- **Teacher in charge Central Plant Tissue Culture** Lab., Glass Houses, Deptt. of Botany (2002 to till date).
- **Teacher In-charge of M.Sc. Teaching Laboratory (2009 – till date**).
- **Member Departmental Library Committee** (2001–2002; 2008 to till date).
- **Member Departmental Purchase Committee** for Equipments of Central Instrumentation Facility (2008-to - 2011).
- **Served as Member Departmental Garden Committee** (2001-2002) **Served as observer, in the University Flyi Squad** Team appointed by Controller of Examination (1998- to till date).

Areas of Interest / Specialization

Plant Biotechnology,(Micropropagation and genetic transformation), nano-biotechnology (green synthesis of metal nanoparticles and efficacy studies against cancer cell lines and malaria vectors) , plant metabolic engineering (evaluation, isolation and elicitation of naturally occurring anti-cancerous, anti-diabetic, larvicidal bioactive compounds in medicinal plants), development of sex-linked molecular markers for dioecious crops, metal stress-induced phytotoxicity and its amelioration through abiotic and biotic approaches.

Subjects Taught

Subjects Taught: 34 years Taught to **M.Sc. & M.Phil.** in the following areas: (i) Cell Biology & Plant Biotechnology,

(ii) Experimental embryology, (iii) Biotechnology of Archegoniatae. **Genetics and Plant Molecular Biology (to M.Phil.)**

(iv) Methods for molecular Techniques and Plant Tissue Culture. To Ph.D. (v) Methods for Physiology and biochemistry to Ph.D. (vi) Core course BOT-203 taught to Plant biotechnology & Resource Utilization. To SEM-II

Currently Teaching:

(i) Plant Biotechnology & Resource Utilization to M.Sc. SEM-III Course Code BOT-3002

(ii) *In Vitro* Technologies & Industrial Applications to M.Sc. SEM-IV. Course No. BOT- 401

(iii Plant Metabolic Engineering to M.Phil.& Ph.D. Revised integrated programme

S.No.

S.No.	Subject	Days	Time	Classroom
1	**BOT- 3002: M.Sc. (P) SEM-III: Plant Biotechnology and Resource utilization**	**Wednesday, Friday**	**8.45 am to 9.40 am (theory class) 10.35 am-02.15 pm (practical class)**	**Room no. 37 Lab no. 43**
2	**BOT- 401*:* M.Sc. final SEM-IV: *In vitro* technologies and industrial applications**	**Monday**	**8.45 am to 10.35 am (theory class) 10.35 am-04.00 pm (practical class)**	**Room No. 42 Lab no. 45**
3	**Elective Course EL-14 Plant Metabolic Engineering**	**Tuesday/Thursday**	**11 am to 1 p.m. (Theory) 2.0 to 5. 30 pm Practical Hand on training & demonstration**	**Room no. 37 Research Lab.204, and Central Instrument Facilities**

Research Guidance

Ph.D.: (25) Supervised 20; Supervising 05 (All at the University of Delhi including one foreign national Assistant Teacher Nilufar of Samarkand State University, Uzbekistan)

M.Phil. Supervised : 21 ; Post Doc. Mentored: 7, ; Supervised **over 40 M.Sc. students for completion of their M.Sc. Dissertations.**

a) Ph.D. Students:

Sl. No.	**Name of Candidate**	**Title of Ph.D. Thesis**	Status of PH.D.	**Year of Award**
1.	Upasana Sharma	Biotechnological and Biochemical investigation of two Traditional Medicinal Plants: Chitrak (*Plumbago zeylanica* L. and Karu (*Gentiana kurroo* Royle) and	Awarded	2019

		evaluation of their anticancerous potential against human cancer Cell lines		
2.	Dinesh Kumar	Biotechnological and Biochemical investigation on two medicinal plants, *Holarrhena pubescens* Wall. ex G. Don and *Nerium oleander* L. and bioefficacy of green synthesized nanoparticles against malaria ,filariasis and dengue vector	Awarded	2019
3.	Rajeshwari Nanda	Heavy metal induced phytotoxicity, oxidative stress and cellular damage in *Senna alexandrina* Mill. (Syn: *Cassia angustifolia* Vahl) and their reversal through *Piriformospora indica* and glutathione.	Awarded	2018
4.	Himanshi Kapoor	*In vitro* and *in silico* evaluation of anti-cancerous potential of two important medicinal herbs, *Nardostachys jatamansi* (D. Don) DC. and *Cullen corylifolium* (L.) Medik. (Syn: *Psoralea corylifolia* L.) against human glioblastoma cell lines.	Awarded	2017
5.	Monika Heikrujam	Development of sex-linked markers and genetic diversity analysis among different genotypes of *Simmondsia chinensis* (Link) Schneider (Jojoba) employing DNA fingerprinting.	Awarded	2016
6.	Siva Prasad Konwar Chetri	Biotechnological and biochemical investigations on two medicinal plants *Cassia angustifolia* and *Psoralea corylifolia* Linn. And cloning of isochorismate synthase, key enzyme gene involved in sennoside biosynthetic pathway.	Awarded	2015
7.	Gaurav Sharma	Bioprospecting of *Artemisia annua* L. micropropagation, bioassay driven isolation and elicitation of artemisinin effective against vectors of malaria, filarial, dengue and Japanese encephalitis.	Awarded	2014
8.	Vinay Shankar	Studies of abiotic stress induced physiological and biochemical changes during *in vitro* morphogenesis of chickpea *(Cicer Arietinum* L.*)* and their amelioration through antioxidant glutathione.	Awarded	2013
9.	Kuldeep Sharma	Studies on sexual dimorphism in *Simmondsia chinensis* (Link) Schneider: Differential morphogenic behaviour and DNA fingerprinting.	Awarded	2010
10.	Anuradha Yadav	In vitro micropropagation in six novel genotypes of chickpea (*Cicer arietinum* L.)- a recalcitrant crop.	Awarded	2010
11.	Vibha Pandey	Bioprospecting of *Spilanthes* species-micropropagation and bioassay guided isolation of larvicidal compounds against malaria and filarial vectors.	Awarded	2010
12.	Behrooz Zaffr Parast	*In vitro* evaluation of some anticancerous compounds from *Psoralea corylifolia* and *Centella asiatica* and molecular analysis of key enzyme gene (*psoralen synthase*) involved in psoralen synthesis.	Awarded	2010
13.	Divya Bhatt	Genetic transformation of tomato (*Solanum lycopersicum* L. cv. Pusa Ruby) for improved tolerance	Awarded	2010

			to salt stress.		

14.	Ravindra Kumar	Isolation and identification of genes involved in development and differentiation in Anthers of *Nicotiana tabacum* by suppression sultractive hybridization.	Awarded	2007
15.	Pratima Rani Sardar	*In vitro* morphogenic studies in two traditional medicinal taxa: *Cassia angustifolia* Vahl and *Terminalia bellerica* Roxb.	Awarded	2007
16.	Ranjana Roy	Stress tolerance studies of three tomato cultivars and *Agrobacterium* mediated transformation of cultivar 'PUSA Ruby' with *bspa* gene for drought tolerance.	Awarded	2006
17.	Ram Singh	Effect of a *Sesbania sesban* var. bicolor: isolation cloning and charterization of gene coding for boiling stable protein	Awarded	2005
18.	Shahnaz Subhan	*In vitro* propagation of three medicinal taxa: *Centella asiatica* (Linn.) Urban, *Psoralea corylifolia* Linn. and *Vernonia anthelmintica* Willd	Awarded	2003
19.	Surya Prakash	*In vitro* morphogenic studies in Jojoba [(*Simmondsia chinensis* (Link) Schneider]	Awarded	2002
20.	Jatin Kumar	Generation of molecular markers for selection and characterization of male and female plants in some economically important dioecious taxa.	Submitted Viva awaited	--
21.	Shruti Nindawat	Genetic engineering for raising anti-diabetic plants	To be submitted shortly	--
22.	Shubhra Rajput	Biochemical and molecular investigation of some rare/ endangered plants.	On going	--
23.	Renuka Yadav	Bioassay guided isolation & elicitation of anticancerous compounds from *Piper longum.*	On going	--
24.	Tikkam Singh	Bioassay guided isolation & elicitation of anticancerous compounds from *Nardostachys* and *Plumbago* spp.	On-going	--
25.	Nilufar Vakhbova	Biotechnological and biochemical investigation of some medicinal plants (as foreign Co-supervisor, supervisor is at Samarkand State University, Uzbekistan	On going	

b) M.Phil. Students: 21 (awarded);

Sl. No.	Name of Candidate	Title of M.Phil. Dissertation	Status	Year of Award
1.	Himanshu Saini	Green synthesis of silver nanoparticles from seed extracts of *Cullen corylifolium*, their characterization and its bioefficacy against cancer cell lines and mosquito vectors.	awarded	2019--
2.	Krishan	Isolation and in vitro elevation of the amount of bioactive compound in Senna by elicitation with heavy metals	Awarded	2016

3.	Shraboni Ghosh	*In vitro* studies on *Linum usitatissimum*	Awarded	2015
4.	Lalita Pal	Elucidation of lead and arsenic induced phyto-toxicity in *S. lycopersicum* L. and alleviation using glutathione and citric acid.	Awarded	2015
5.	Saransh Gupta	Biotechnological approaches for elicitation of bioactive compounds: Establishment and optimization of hairy root culture for enhanced production of artemisinin in *A. annua* L.	Awarded	2013
6.	Mohd. Razaq	*In vitro* morphogenic, biochemical and molecular diversity of antimalarial plant *Spilanthes* spp.	Awarded	2012
7.	Prince Chaubey	*In vitro* studies on *Jatropha curcas*, an important biodiesel crop.	Awarded	2012
8.	Veena T.	Study of plant metabolomics and impact of heavy metal stress on in vitro regeneration in a medicinal herb *Spilanthescalva* L.	Awarded	2009
9.	Vibha Aggrawal	Biotechnological aspects of *Stevia rebaudiana* (an antidiabetic plant): Mass production and Impact of heavy metal stress	Awarded	2008
10.	Siva P. K. Chetri	*In vitro* studies on *Tephrosia purpurea* and its bioefficacy against *Spodoptera litura*, a polyphagous pest.	Awarded	2007
11.	Satish Kumar	Effect of metal stress on in vitro regeneration of traditional medicinal taxon *Cassia angustifolia* (Senna)	Awarded	2007
12.	Deepak Bhardwaj	Studies on abiotic stress: effect of NaCl, sorbitol, drought and ABA on seed germination and protein profiles of a desert legume- *Tephrosia purpurea* Pers.	Awarded	2006
13.	Mukesh Kumar	Effect of salt stress on *in vitro* morphogenesis of Chickpea (*Cicer arietinum* L.) Genotypes.	Awarded	2005
14.	Sheetal Sharma	Micropropagation of *Arnica Montana* L.: A medicinally valuable endangered plant.	Awarded	2004
15.	Satendra Khari	Effect of some Heavy Metals on *in vitro* morphogenesis and Psoralen content in *Psoralea corylifolia* L.: An endangered medicinal legume	Awarded	2004
16.	Anuradha Yadav	*In vitro* plantlet regeneration in a drought tolerant variety BGD 72 of chickpea (*Cicer arietinum* L.)	Awarded	2003
17.	Kuldeep Sharma	Influence of Heavy Metals on *in vitro* morphogenesis in *Holarrhena antidysenterica* (L.) Wall. Tree.	Awarded	2003

18.	Rajni Goswami	*In vitro* morphogenic studies in *Cinnamomum camphora* (L.) Ness & Eberm. Tree: A potential source of camphor	Awarded	2002
19.	Ravindra Kumar	*In vitro* morphogenesis and protein profile of differentiating and non differentiating tissues of *Holarrhena antidysenterica* (L.) Wall Tree	Awarded	2002
20.	Vikrant Nain	Somatic embryogenesis in jojoba [*Simmondsia chinensis* (Link) Schinder]- A potential source of liquid wax.	Awarded	2000
21.	Kumar Ji Rout	Micropropagation of Indian Coral Tree *Erythrina indica* Lam. A multipurpose nitrogen- fixing legume	Awarded	1999

Publications Profile

Full Papers : Published: 110 (92 peer reviewed Journal; 12 Chapters in Books: 6;Semi Technical Articles)
Book edited: 1: Journal Edited: 1
Patents : Granted : 1 (Patent number: 278934 granted on January 4, 2017)
Published: 5;
Novel Gene Sequences Submitted to Gene Bank: 8
Contribution to International and National Conferences: More than 90

Full Papers Published in peer reviewed International /national Journals:

1. Singh,T.; Sharma,U. & **Agrawal,Veena.2020**.Isolation and optimization of plumbagin synthesis in root callus of *Plumbago zeylanica* L. augmented with chitosan and yeast extract. **Indust. Crops. Product. Elsevier. On line. DOI: 10.1016/j.indcrop.2020.112446 IF: 4.191.**
2. Rajput, Shubhra;Kumar,D.& **Agrawal,Veena.2020.** Green synthesis of silver nanoparticles using Indian Belladonna extract and their potential antioxidant, anti-inflammatory, anticancer and larvicidal activities. **Plant Cell Rep. Springer -,UK. (published on line: (DOI: 10.1007/s00299-020-02539-7) . IF: 3.499.**
3. Singh, T.;Yadav, R.; & Agrawal, **Veena. 2020.** Effective protocol for isolation and marked enhancement of antitumorous compounds in the cotyledon callus cultures of *Cullen corylifolium* (L.) Medik.**Industrial Crops & Products, Elsevier:On line: https://doi.org/10.1016/j.indcrop.2019.111905. IF: 4.191.**
4. Kumar,D.; … **Agrawal, Veena.2020.** Biocontrol of mosquito vectors through herbal derived silver nanoparticles: prospects and challenges**. Environ. Sci. Pollut. Res. Springer, accepted: DOI: 10.1007/s11356-020-08444-6 ,IF 2.9.**
5. Yadav, R.; Saini, H.; Kumar, D. & **Agrawal, Veena**. **2019.** Bioengineering of *Piper longum* L. extract mediated silver nanoparticles and their potential biomedical applications. **Materials Science & Engineering C. Elsevier https://doi.org/10.1016/j.msec.2019.109984; IF: 4.959.**

6. Kumar, J.; Heikrujam, M.; Sharma, K. & **Agrawal, Veena. 2019.** SRAP and SSR marker-assisted genetic diversity, population structure analysis and sex identification in Jojoba (Simmondsia chinensis)**'. Indust. Crops & Prod. 133: 118-132. Elsevier, Netherlands. (IF: 4.191).**

7. Nindawat, S, & **Agrawal, Veena. 2019.** Fabrication of silver- nanoparticles using *Arnebia hispidissima* (Lehm.) A. DC. root extract and unraveling their potential biomedical applications. **Artificial cell Nanomedi. Nanobiotech. 47: 166-180. DOI: 10.1080/21691401.2018.1548469. Taylor & Francis, U.K.(IF: 4.642).**

8. Saini,H.; yadav,R.; Kumar,D. & **Agrawal Veena.2019**. *Cullen coryllifolium* L. Medik.) seed extract an excellent system for fabrication of silver nanoparticles and their multipotency validation against different mosquito vectors and human cervical cancer cell lines. **J. Cluster Science, 31: 161-175; On Line: DOI: 10.1007/s10876-019-01630-8, Springer. (IF: 2.125).**

9. Kumar, Jatin & **Agrawal, Veena. 2019.** Assessment of genetic diversity, population structure and sex identification in dioecious crop, *Trichosanthes dioica* employing ISSR, SCoT and SRAP markers. **Heliyon, doi: 10.1016/j.heliyon.2019. e01346, Elsevier**

10. Kumar, D., Kumar, G., Das, R. & **Agrawal, Veena.* 2018**. Strong larvicidal potential of silver nanoparticles (AgNPs) synthesized using *Holarrhena antidysenterica* bark extract against malarial vector, Anopheles stephensi **. Process Saf. Environ. Prot. 116:137-148. Elsevier, USA. (I.F. 4.384).**

11. Nanda, R **& Agrawal, Veena.* 2018**. *Piriformospora indica,* an excellent system for heavy metal sequestration and amelioration of oxidative stress and DNA damage in *Cassia angustifolia* Vahl under copper stress. **Ecotoxicol. & Environ. Safety 156:409-419. Elsevier, USA (I.F. 4.527).**

12. Sharma, U. & **Agrawal, Veena.* 2018.** In vitro shoot regeneration and enhanced synthesis of plumbagin in root callus of *Plumbago zeylanica* L.—an important medicinal herb. **In Vitro Cell Dev. Biol.-Pl. 54: 423-435: on line :https://doi.org/10.1007/s11627-018-9889-y Springer, USA. (I.F. 1.454).**

13. Kumar, D., Kumar, G., Das, R., Kumar, R.& **Agrawal, Veena. 2018**. In vitro elicitation, isolation and characterization of conessine biomolecule from *Holarrhena antidysenterica* callus and its larvicidal activity against malaria vector, *Anopheles stephensi*. **Env. Sci. Pol. Res. 25: 6783-6796. (Springer). (I.F. 2.914).**

14. Kumar, D., Kumar, G. & **Agrawal, Veena. 2018**. Green synthesis of silver nanoparticles using *Holarrhena antidysenterica* (L.) Wall. bark extract and their larvicidal activity against dengue and filariasis vectors. **Parasitol. Res. 117: 377-389 (Springer). (I.F. 2.067).**

15. Kumar, J. & **Agrawal, V.* 2017.** Analysis of genetic diversity and population genetic structure in *Simarouba glauca* DC. (an important bio-energy crop) employing ISSR and SRAP markers**. Ind. Crops Prod. 100: 198-207. (Elsevier, Netherlands). (I.F. 4.191).**

16. Kapoor, H., Yadav, N., Chopra, M., Mahapatra, S.C. & **Agrawal, V.* 2017**. Strong anti-tumorous potential of *Nardostachys jatamansi* rhizome extract on glioblastoma and in silico analysis of its molecular drug targets. **Curr. Can. Drug Target 17: 74-88 (Bentham Science, U.S.A.). (I.F. 3.112).**

17. Kumar, A., Pal, L., & **Agrawal, V.* 2017**. Glutathione and citric acid modulates lead-and arsenic-induced phytotoxicity and genotoxicity responses in two cultivars of *Solanum lycopersicum* L**. Acta Physiol. Plant. 39: 151. (Springer, Poland) (I.F. 1. 608).**

18. Kumar, D., Al Hassan, M., Naranjo, M. A., **Agrawal, V.,** Boscaiu, M., & Vicente, O. (**2017**). Effects of salinity and drought on growth, ionic relations, compatible solutes and activation of antioxidant systems in oleander (*Nerium oleander* L**.). PloS one, 12(9), e185017 (I.F. 3.5).**

19. Kumar, D.; Al Hassan, M.; Vicente, O.; **Agrawal, V.** & Boscaiu, M. 2016. Mechanisms of response to salt stress in Oleander (*Nerium oleander* L.). Bulletin of University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca. Horticulture, *73*(2): 249-251. (Romania).

20. Nanda, R. & **Agrawal, V.* 2016**. Elucidation of zinc and copper induced oxidative stress, DNA damage and activation of defence system during seed germination in *Cassia angustifolia* Vahl**. Environ. Exp. Bot. 125: 31-41 (Elsevier Netherlands). (I.F. 3.714).**

21. Chetri,S.K.; Kapoor,H. & **Agrawal, V.* 2016.** Marked enhancement of sennoside bioactive compounds through precursor feeding in *Cassia angustifolia* Vahl and cloning of isochorismate synthase gene involved in its biosynthesis. **Pl. Cell Tiss. Organ Cult. 124: 431-446. (Springer Netherlands), (I.F. 2.232).**

22. Kumar, J.; Heikrujam, M. & **Agrawal, V.* 2016.** Characterization of Male and Female Jojoba Plants Employing Antioxidants, Lipid Peroxidation and Physiological Studies. **J. Am. Oil Chem. Soc. 93: 911- 920. Springer, USA (I.F. 1.421).**

23. Kumar, J. & **Agrawal, V.* 2016**. Current status of diabetes mellitus: a life threatening disease**. J. Env. Appl. Biores. 4 (1): 20-26.**

24. Sharma, A.; & Sharma, S.; Sharma, K.; & Chetri, S.P.K.; Vashishtha, A.; Singh, P.; Kumar, R.; Rathi, B. & & **Agrawal, V. 2015.** Algae as crucial organisms in advancing nanotechnology: a systematic review**. J. Appl. Phycol. 28:1759–1774. (Springer Netherlands). (I.F. 2.635).**

25. Heikrujam, M.; Kumar, J. & **Agrawal, V. 2015**. Genetic diversity analysis among male and female Jojoba genotypes employing gene targetedmolecular markers, start codon targeted (SCoT) polymorphism and CAAT box-derived polymorphism (CBDP) markers. **Metagene** 5: 90-97. Elsevier, U.S.A.

26. Shankar, V., Kumar, D. & **Agrawal, V. 2015**. Assessment of antioxidant enzyme activity and mineral nutrients in response to NaCl stress and its amelioration through glutathione in chickpea. **Appl. Biochem. Biotechnol. 178(2): 267-284. (Springer US). (I.F.: 2.140).**

27. Heikrujam, M.; Sharma, K.; Prasad, M. & **Agrawal, V. 2015**. Review on different mechanisms of sex determination and sex-linked molecular markers in dioecious crops- A current update. **Euphytica** 201: 161-194. Springer, Netherlands. **(I.F. 1.546)**

28. Mohammad, Parast, B.; Rasouli, M.; Rustaiee, A. R.; Zardari, S. & **Agrawal, V. 2015.** Quantification of Asiatic acid from plant parts of *Centella asiatica* L. and enhancement of its synthesis through organic elicitors in *in vitro*. Hortic. Environ. Biotech. **55**: 578-582. Springer, **Korean Society for Horticultural Science. (I.F. 1.193).**

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B. Chapters Contributed:

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C. SEMI-TECHNICAL ARTICLES:

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Patents filed, published and granted by Professor Veena Agrawal:

Patents filed: 6; Patent granted: 1; Patents published: 5

1. **Agrwal, Veena.2020. Indian patent Filed entitled** "An Improved And Cost Effective Method For Enhanced Production of Psoralen In The Green Seed Cotyledon Callus Of *Cullen Corylifolium*" through NDRC,India in the Indian Patent Office on March 29, 2020. Vide Application no. 202011013766
2. **Agrawal, Veena. 2017. Indian Patent (Patent number: 278934) granted on January 4, 2017** entitled "**A Process For Extraction Of Bioactive Psoralen Compound**" which was filed on April 17, 2006 vide Application No. 998/DEL/2006.
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Publications in the Last one year

1. Singh, T.;Yadav, R.; & Agrawal, **Veena. 2020.** Effective protocol for isolation and marked enhancement of antitumorous compounds in the cotyledon callus cultures of *Cullen corylifolium* (L.) Medik. **Industrial Crops & Products, Elsevier:On line: https://doi.org/10.1016/j.indcrop.2019.111905. IF: 4.191.**
2. Rajput, Shubhra; Kumar,D.& **Agrawal, Veena. 2020.** Green synthesis of nanoparticles using Indian Belladonna extract mediated silver nanoparticles and their potential antioxidant, anti-inflammatory, anticancer and larvicidal activities. **Plant Cell Rep. Springer, UK. (published on line: (DOI: 10.1007/s00299-020-02539-7) . IF: 3.499.**
3. Singh,T.; Sharma,U. & **Agrawal,Veena. 2020**. Isolation and optimization of plumbagin synthesis in root callus of *Plumbago zeylanica* L. augmented with chitosan and yeast extract. **Indust. Crops. Product. Elsevier. Accepted DOI: 10.1016/j.indcrop.2020.112446 IF: 4.191.**
4. Kumar,D.; … **Agrawal, Veena. 2020.** Biocontrol of mosquito vectors through herbal derived silver nanoparticles: prospects and challenges**. Environ. Sci. Pollut. Res. Springer, on line.: DOI: 10.1007/s11356-020-08444-6. IF: 2.9.**
5. Yadav, R.; Saini, H.; Kumar, D. & **Agrawal, Veena**. **2020.** Bioengineering of *Piper longum* L. extract mediated silver nanoparticles and their potential biomedical applications. **Materials Science & Engineering C. Elsevier ,https://doi.org/10.1016/j.msec.2019.109984. IF: 4.959.**
6. Nindavat,S.& **Agrawal, Veena.2020**. Arabian Primrose leaf extract mediated synthesis of silver nanoparticles: their industrial and biomedical applications.**Artificial Cell Nanomed.Biotech.(Accepted). Taylor & Francis. IF: 4.64.**
7. Kumar, J.; Heikrujam, M.; Sharma, K. & **Agrawal, Veena. 2019.** SRAP and SSR marker-assisted genetic diversity, population structure analysis and sex identification in Jojoba (Simmondsia chinensis**)'. Indust. Crops & Prod. 133: 118-132. Elsevier, Netherlands. (IF: 4.191).**
8. Nindawat, S, & **Agrawal, Veena. 2019.** Fabrication of silver- nanoparticles using *Arnebia hispidissima* (Lehm.) **A.** DC. root extract and unraveling their potential biomedical applications. **Artificial cell Nanomedi. Nanobiotech. 47: 166-180. DOI: 10.1080/21691401.2018.1548469. Taylor & Francis, U.K.(IF: 4.642).**
9. Saini,H.; yadav,R.; Kumar,D. & **Agrawal Veena.2019**. *Cullen coryllifolium* L. Medik.) seed extract an excellent system for fabrication of silver nanoparticles and their multipotency validation against different mosquito vectors and human cervical cancer cell lines. **J. Cluster Science, 31: 161-175; On Line: DOI: 10.1007/s10876-019-01630-8, Springer. (IF: 2.125).**
10. Nindavat,S.& **Agrawal, Veena.2020**. Arabian Primrose leaf extract mediated synthesis of silver

nanoparticles: their industrial and biomedical applications.**Artificial Cell Nanomed.Biotech.(Revised & under review) Taylor & Francis). IF: 4.64.** Kapoor, H.; Yadav,R,; Rajput,Shubhra **& Agrawal,Veena.2019.** In vitro and In silico validation of anti-tumourous potential of *Cullen corylifolium* extract and marker compounds against Glioblastoma cells (U87 MG and U373 MG).**Cytotechnology (under review). Springer.**

11. Rajput, **S. & Agrawal, Veena. 2019.** Micropropagation of *Atropa acuminata* Royle ex Lindl. (a critically endangered medicinal herb) through root callus and evaluation of genetic fidelity, enzymatic and non-enzymatic antioxidant activity of regenerants**. Acta Physiol. Plant. (**Revised & under review**).**

12. Kumar, Jatin & **Agrawal, Veena. 2019.** Assessment of genetic diversity, population structure and sex identification in dioecious crop, *Trichosanthes dioica* employing ISSR, SCoT and SRAP markers. **Heliyon, doi: 10.1016/j.heliyon.2019. e01346, Elsevier**

13. Kumar, D., Kumar, G., Das, R. & **Agrawal, Veena.* 2018**. Strong larvicidal potential of silver nanoparticles (AgNPs) synthesized using *Holarrhena antidysenterica* bark extract against malarial vector, Anopheles stephensi **. Process Saf. Environ. Prot. 116:137-148. Elsevier, USA. (I.F. 4.384).**

14. Nanda, R **& Agrawal, Veena.* 2018**. *Piriformospora indica,* an excellent system for heavy metal sequestration and amelioration of oxidative stress and DNA damage in *Cassia angustifolia* Vahl under copper stress. **Ecotoxicol. & Environ. Safety 156:409-419. Elsevier, USA (I.F. 4.527).**

15. Sharma, U. & **Agrawal, Veena.* 2018.** In vitro shoot regeneration and enhanced synthesis of plumbagin in root callus of *Plumbago zeylanica* L.—an important medicinal herb. **In Vitro Cell Dev. Biol.-Pl. 54: 423-435: on line :https://doi.org/10.1007/s11627-018-9889-y Springer, USA. (I.F. 1.454).**

16. Kumar, D., Kumar, G., Das, R., Kumar, R.& **Agrawal, Veena. 2018**. In vitro elicitation, isolation and characterization of conessine biomolecule from *Holarrhena antidysenterica* callus and its larvicidal activity against malaria vector, *Anopheles stephensi*. **Env. Sci. Pol. Res. 25: 6783-6796. (Springer). (I.F. 2.914).**

17. Kumar, D., Kumar, G. & **Agrawal, Veena. 2018**. Green synthesis of silver nanoparticles using *Holarrhena antidysenterica* (L.) Wall. bark extract and their larvicidal activity against dengue and filariasis vectors. **Parasitol. Res. 117: 377-389 (Springer). (I.F. 2.067).**

Conference Organization/ Presentations (in the last three years)

❖ **CHAIRPERSON OF CONFERENCES:**

Chaired the Technical Session during In Vitro Biology Meeting, 2019, organized by **Society for In Vitro Biology, held at Tampa, Florida, U.S.A. from 8 th to 12 th June, 2019.**

Chaired the Technical Session and member organizing Committee of 3$_{rd}$ National Conference of Seabuckthorn held at Botany dept, Univ. of Delhi w.e.f. 19-20 Dec.2019.

Chaired the technical Session: "**Best practices in micropropagation of herbaceous plants**" during 40$_{th}$ Meeting of Plant Tissue Culture Association-India & International Conference on Trends in Plant Sciences and Agrobiotechnology, held **at IIT, Gauhati w. e. f. February 14-16, 2019.Chaire Technical Session of the Conference**

❖ **Chaired Technical Sessions during an international Conference on** Integrative Chemistry, Biology &

Translational medicine organized by University of Loyola, Chicago, and Hansraj College, Univ. Of Delhi w.e.f. **February 25-26th, 2019.**

C**haired technical session during national** conference on Chemistry for human Health and Environment **organized at Delhi Univ., w.e.f.15-16, Dec.2018.**

Chaired the Technical Session during Plant Tissue Culture Assoc. Conference held at **Jodhpur, w.e.f. February 16-18, 2018.**

❖ **Chaired Technical Session** during International Conference on Pharma Sciences and Biotechnology (ICPSB-2017) held at **Bali, Indonesia w.e.f. January 16-18, 2017.**

❖ **Chaired Technical Session** during International Conference on Technological Advancement for Sustainable Agriculture and Rural Development (TASARD-India) held at **National Agricultural Science Complex (NASC), New Delhi, India w.e.f. Fe. 20-22, 2017.**

❖ **Chaired Technical Session** during National workshop on medicinal Botany to drug discovery held at **Ram Jas College Univ. Delhi, 30-31 Jan, 2017.**

❖ **Chaired Technical Session** during National Conference on Plant Science Research: Looking beyond 21st century for environmental and agricultural revolution held at **Department of Botany, University of Delhi w.e.f. Feb. 5-7, 2016.**

❖ **Chaired Technical Session & Member Organizing Committee** of 6th World Congress on Biotechnology held at New Delhi, India w.e.f. October 5-7, 2015.

❖ **Chaired Technical Session** during National Symposium on Genetic Improvement in Horticultural Crops held at Department of Botany, B. R. A. Bihar University, Muzaffarpur, w.e.f. 11-12 March., 2014.

❖ **Chaired Technical Session** during National Symposium on Medicinal Plants held at Ram Jas College Univ. Delhi, 12 March., 2014.

INVITED SPEAKER/PAPERS PRESENTED IN CONFERENCES:

Delivered plenary Lecture. Delivered plenary lecture **BIOASSAY GUIDED ISOLATION AND ELICITATION OF SOME IMPORTANT MARKER COMPOUND FROM *CULLEN CORYLIFOLIUM* POSSESSING STRONG ANTICANCEROUS ACTIVITY AGAINST HUMAN CANCER CELL LINES** on 15 .02.2020 during international Conference by Society of Ethno-pharmacology, India held at Jamia Hamdard **(15.02.2020-17.02.2020).**

Delivered invited Lecture during In Vitro Biology Meeting**, 2019, organized** by **Society for In Vitro Biology, held at Tampa,Florida, U.S.A.** from **8 th to 12 th June, 2019.**

Delivered keynote Lecture entitled "**Best practices in micropropagation of herbaceous plants**" during 40th Meeting of Plant Tissue Culture Association-India & International Conference on Trends in Plant Sciences and Agrobiotechnology, held at IIT, Gauhati w. e. f. **February 14-16, 2019.**

Delivered Lecture as Resource person during workshop organized in Venkteshwar College entitled " ADVANCES IN PLANT SCIENCES: SYNERGY BETWEEN BASIC &APPLIED ASPECTS," on

Delivered inaugural Lecture as Chief Guest at Botanical Society of Deen Dayal Upadhyay College, University of Delhi, on **21.08.2019**. on the topic entitled "**New Dimension in Medicinal plant Biotechnology: Biotherapeutics and Nanoparticles".**

- Delivered invited lecture at Miranda House on **29.10.2018** on "Innovations in Medicinal Plant Research for Human Welfare (Medicinal Plant Biotechnology)".
- Delivered invited talks at CPDH,Delhi Univ. on **26.07.2018.on the topic entitled,"Paradigms In Medicinal Plant Biotechnology: Resource Management of Elite Germplasm".**

- Delivered invited Lecture at CPDH Delhi Univ.on 26.7.2018 on the topic " Isolation And Elicitation of

Some Therapeutic Biomolecules from plants".

- Delivered invited lecture at the Plant Tissue Culture Assoc. Conference held at Jodhpur, w.e.f**. February 16-18, 2018** entitled "In vitro elucidation of anti-tumorous activity, isolation and elicitation of bioactive compounds from Cullen corylifolium: an important medicinal herb".

- Delivered invited lecture at the Plant Tissue Culture Assoc. Conference held at Jodhpur, w.e.f. **February 16-18, 2018** entitled "***In vitro* elucidation of anti-tumorous activity, isolation and elicitation of bioactive compounds from *Cullen corylifolium*: an important medicinal herb**".

- Paper presented (oral presentation) at the Plant Tissue Culture Assoc. Conference held at Jodhpur, w.e.f. February 16-18, 2018, "Kumar, J. and **Agrawal, V. 2018.** Genetic diversity and population structure analysis in *Simarouba glauca* DC. (an important bio-energy crop) employing ISSR and SRAP markers".

- Paper presented (oral presentation) at the Plant Tissue Culture Assoc. Conference held at Jodhpur, w.e.f. February 16-18, 2018, "Kumar, D., Saini, H. and **Agrawal, V. 2018.** *In vitro* elicitation, isolation and characterization of conessine bioactive molecule using green bark derived callus culture of *Holarrhena antidysenterica* (L.) Wall., and bioefficacy against malaria mosquito vector".

- Paper presented (oral presentation) at the Plant Tissue Culture Assoc. Conference held at Jodhpur, w.e.f. February 16-18, 2018, "Tikkam, S.. and **Agrawal, V. 2018.** *In vitro* micropropagation and elicitation of plumbagin bioactive compound in root callus of Chitrak *(Plumbago zeylanica* L.*)* - an important medicinal herb"

- Delivered inaugural Lecture entitled " **Frontiers in Biotechnology: GM Crops and Biopharmaceuticals"** at Kirori Mal College, Univ. of Delhi, during Annual function of Botanical Society, held on 15.02.2018. Delivered invited lecture entitled "*In vitro* elucidation of anti-tumorous activity, isolation and elicitation of bioactive compounds from *Cullen corylifolium* : an important medicinal herb.

- Poster presented at the International Conference on Technological Advancement for Sustainable Agriculture and Rural Development (TASARD-India) held at National Agricultural Science Complex (NASC), New Delhi, India w.e.f. **Feb. 20-22, 2017, "**Kumar, J. and **Agrawal, V. 2017**. Elucidation of phyto-toxicity through antioxidant profiling, lipid peroxidation and physiological parameters in *Simarouba glauca* DC. seedlings under salinity, heavy metals and drought stresses"
- .
- Delivered invited Lecture entitled "**Medicinal Herbs: Booster of Human Health and Clean Environment**" during Environmental Day celebration **on 21$_{st}$ June, 2017 at Gandhi Bhawan, University of Delhi.**

- Delivered invited lecture entitled " **Generation and validation of molecular markers for identification of sex and genetic diversity analysis in Jojoba (*Simmondsia chinensis* (Link) Schneider): a potential oil yielding dioecious crop"** during International Conference on Technological Advancement for Sustainable Agriculture and Rural Development (TASARD-India) held at National Agricultural Science Complex (NASC), New Delhi, India w.e.f. Fe. **20-22, 2017.**

- Delivered invited lecture entitled **" Unravelling plant based therapeutic biomolecules: Bioassay guided isolation and elicitation of anti-malarial and anticancerous compounds from potential medicinal plants"** during International Conference on Pharma Sciences and **Biotechnology (ICPSB-2017) held at Bali, Indonesia w.e.f January 16-18, 2017.**

- Delivered invited lectue entitled **"Phytochemical analysis: Extraction and evaluation through TLC and HPLC"** during National workshop on medicinal Botany to drug discovery held **at Ram Jas College Univ. Delhi, 30-31 Jan, 2017.**

- Delivered invited lecture entitled **"In vitro conservation of elite germplasm, bioassay guided isolation and elicitation of anticancerous bioactive molecules from some traditional medicinal herbs"** during National Conference on Pharmacognosy: Scope of Phytochemically Unexplored Medicinal Plants, held at Zakir Husain Delhi **College on Jan. 12, 2017.**

- **Delivered session keynote lecture** entitled "Bioassay guided isolation and elicitation of anti-malarial and anti-cancerous bioactive compounds from medicinal plants employing metabolic engineering" in National conference on Plant Science Research: Looking beyond 21_{st} Century for Environmental & Agricultural Revolution, February 5th-7th, 2016, New Delhi, India.

- Paper presented at the National Conference on Plant Science Research: Looking beyond 21_{st} century for environmental and agricultural revolution held at Department of Botany, University of Delhi w.e.f. **Feb. 5-7, 2016, "** Kumar, J., Heikrujam, M., Sharma, K. and **Agrawal, V. 2016**. Identification and validation of sex linked molecular markers and genetic diversity studies in Jojoba [*Simmondsia chinensis* (Link) Schneider] - important dioecious petrocrop".

- Poster presented at the National symposium on Plant biotechnology for crop improvement and 37_{th} annual meeting of PTCA held at CSIR- National Botanical Research Institute (Lucknow) w.e.f. **Feb. 25-27, 2016, "** Kumar, J., Heikrujam, M., Sharma, K. and **Agrawal, V. 2016.** Identification and authentication of sex linked molecular markers and genetic diversity studies in Jojoba [*Simmondsia chinensis* (Link) Schneider]: a molecular approach for crop improvement for dioecious taxa".

- **Invited to deliver Lecture** during National symposium on Plant biotechnology for crop improvement and 37_{th} annual meeting of PTCA held at CSIR- National Botanical Research Institute (Lucknow) w.e.f. Feb. 25-27, 2016.

- **Delivered invited lecture during** 6_{th} World Congress on Biotechnology entitled "Biotechnological approaches for rapid elicitation of artemisinin in Artemisia annua L. employing biotic and abiotic stresses, its isolation and evaluation of bio-efficacy against cancer cell lines, malaria and dengue vectors" held at New Delhi, India, w.e.f. October 5-7, 2015.

- Paper presented at the 6_{th} World Congress on Biotechnology, held at New Delhi, India w.e.f. **October 5-7, 2015, "** Kumar, J., Heikrujam, M. and **Agrawal, V. 2015.** Screening of male and female plants and genetic diversity studies in Jojoba [*Simmondsia chinensis* (Link) Schneider] employing PCR based molecular markers".

- **Delivered invited lecture (as resourse person) entitled** "Micropropagation: A potential Tool for Conservation, Agri- and Industrial Applications" at Daulat Ram College during Conference from 28_{th} Sept. to 1_{st} October, 2015.

- Poster presented at the 102nd Indian Science Congress, held at University of Mumbai, Mumbai from **Jan. 3-7, 2015, "** Kumar, J., Heikrujam, M., Sharma, K. and Agrawal, V. 2015. Screening of male and female plants in Jojoba [*Simmondsia chinensis* (Link) Schneider] employing DNA finger printing technique".

- **Delivered invited lecture (as resourse person) entitled** "Strong Therapeutic Potential of Medicinal Plants(Indigenous Herbal Drugs) in the Management of Diabetes, Obesity, B.P. & Cholesterol" in Delhi University Women's Association on July, 6, 2015.

- **Delivered invited lecture entitled "**Paradigms in medicinal plant biotechnology: Resource management of elite germplasm, isolation and elicitation of some therapeutic biomolecules" at Department of Botany, Ramjas College, University of Delhi, Delhi-110007 on February 10-11, 2015.

- **Delivered invited lecture (as resourse person) and demonstrated experiments during Workshops for Biology Teachers entitled** "Micro-organisms: an experimental approach" **in Bal Bharti School, Delhi on June, 2015.**

- **Delivered invited lecture entitled "**Improvement in crop plants through anti-oxidants and genetic engineering under climate induced abiotic stress" in 10_{2nd} Indian Science Congress, Mumbai, 2015.

- **Delivered invited lecture, (as resource person) entitled** "Frontiers in Biotechnology: GM Crops and Biopharmaceuticals" during orientation Course organized by CPDH, University of Delhi, Delhi in June, 2015.

- Participated and presented 3 (oral) papers on, (1) Generation of sex linked ISSR, RAPD, STS and SRAP markers in Jojoba [*Simmondsia chinensis* (Link) Schneider]-a promising dioecious petrocrop, (2) *In vitro* strategies for enhanced production and isolation of sesquiterpenes from *Artemisia annua* employing biotic and abiotic stress and their bioefficacy against malaria, f ilarial and dengue mosquito vectors, (3) Bio-prospecting of medicinal shrub senna (*Casia angustifolia* Vahl): isolation, elicitation of sennosides and cloning of key enzyme gene of sennoside biosynthesis, in the **13_{th} International Association for Plant Biotechnology Congress 2014** at **the Melbourne Convention and Exhibition Centre in Melbourne, Australia** *w.e.f.* August 10-15, 2014.

- **Delivered invited Lecture entitled** " Strong Therauptic Potential of Indigenous Herbal Drugs in the management of different types of cancer: A Prospective area of Future research"during Conclave of Scientists on Science, Technology and Innovations Policy held at INSA, New Delhi w.e.f. Nov. 27-29, 2014 organized by Zaheer Science Foundation UNESCO.

- **Delivered invited lecture as resource person for Teacher refreshers course, entitled** "Herbal biotechnology: germplasm conservation, screening, isolation and elicitation of biomlecules" in Dept. of Botany, University of Delhi, December, 2014.

- **Delivered plenary lecture entitled, "Improvement of horticultural plants Delivered Plenary lecture entitled through micropropagation and genetic engineering"** in the IIIrd National Symposium on Genetic improvement in Horticultural crops at Babasaheb Bhimrao Ambedkar Bihar Univ., Muzzafarpur, Bihar, w.e.f 11-12 March, 2014.

- **Delivered invited lecture entitled "Paradigm in medicinal plant Biotechnology: Germplasm conservation, isolation and upregulation of some important biomolecules"** in the Workshop sponsored by Department of Biotechnology on Techniques in Plant Cell Tissue and Organ Culture at Daulat Ram College, University of Delhi w.e.f. 26-28 March, 2014.

- Presented paper entitled "Molecular markers assisted selection of male and female plants in dioecious crops with special reference to Jojoba [Simmondsia chinensis (Link) Schneider] - a shrub of immense economic importance" in the 35_{th}Annual Meeting of Plant Tissue Culture Association (India) & National Symposium on Advances in Plant Molecular Biology & Biotechnology held at Pune, w.e.f. 10-12_{th} March, 2014.

- **Presented paper entitled "Biotechnological approaches for enhanced production of artemisinin in Artemisia annua employing biotic and abiotic stress and their bioefficacy against cancer cell lines and malaria and filarial vectors"** in the 35_{th}Annual Meeting of Plant Tissue Culture Association (India) & National Symposium on Advances in Plant Molecular Biology & Biotechnology held at Pune, w.e.f. 10-12_{th} March, 2014.

- Poster presented at the 7th Annual Convention of ABAP & International Conference on Plant Biotechnology, Molecular Medicine & Human Health, held at Department of Genetics, University of Delhi, South Campus, New Delhi- 110021, w.e.f. **October 18-20, 2013, "** Heikrujam, M., Sharma, K., Kumar, J. and **Agrawal, V. 2015.** Generation of sex linked ISSR, RAPD, STS and SRAP markers in Jojoba [*Simmondsia chinensis* (Link) Schneider] - a promising dioecious petrocrop".

Research Projects (Major Grants/Research Collaboration)

Total Research Projects: 9 (Ongoing: 1 funded from SERB, Completed: 8 funded from SERB (DST), UGC, ICMR, NOVOD and ICAR).

1. Awarded SERB Research Project of Rs. 33,18,480.00 entitled "**Bio-assay guided Isolation, Identification and Elicitation of Anticancerous bioactive compounds from *Nardostachys jatamansi*, *Psoralea corylifolia* and *Plumbago zeylenica***" for three years w.e.f. March 30, 2017- March 29, 2020.

2. Awarded SERB/DST Major Research Project of Rs. 45 Lacs entitled **"Marker Assisted Selection of Male and Female Plants of *Simmondsia chinesis* (Link) Schneider (Jojoba) – A multipurpose dioecious crop"** for three years w.e.f. 2013-2017.

3. Awarded UGC Major Research Project of Rs. 13 Lacs **"*In vitro* evaluation, isolation and up regulation of anticancerous bioactive compounds from *Cassia angustifolia* (Senna), through elicitors and their bioefficacy against human cancer cell lines"** for three years w.e.f. 2013-2016.

4. Worked as Principal Investigator of ICMR Project in collaboration with Malaria Research Centre on the topic entitled "**Survey of North Indian Medicinal Plants for their larvicidal activity against malaria and filarial vectors**" for three years w.e.f. 2010 -2013.

5. Worked as Principal Investigator of a Major Research Project sanctioned by the University Grants Commission on ***In vitro* clonal propagation of Male and Female *Simmondsia chinensis* Elite Plants** (Started on October, 1994) which has been successfully completed on February 12, 1998. One Ph.D. student Mr. Surya Prakash worked as Project fellow under my supervision and obtained Ph.D. degree.

6. Worked as Principal Investigator of another Major Research Project of University Grants Commission entitled "***In vitro* Morphogenic studies: Mass Propagation and Somatic Embryogenesis**" on Oct. 18, 1998 to Oct. 18, 2001. The project has been successfully completed One Project Fellow Miss Shahnaz Subhan, worked for her Ph.D. degree.

7. Worked as Principal Investigator of UGC's Major Research Project entitled **"Micropropagation and Evaluation of Genetic fidelity of off-springs of two important medicinal plants *Centella asiatica* and *Holarrhena antidysenterica***". w.e.f. June 20, 2002 to July 26, 2005.

8. Worked as Principal Investigator of UGC's Major Research Project entitled "**Biodiversity and *in vitro* selection of *Psoralea corylifolia* plants yielding high content of anticancerous bioactive compounds genistein, diadzein and psoralen".** w.e.f. April 2007-September, 2010.

9. Worked as Principal Investigator of a National Oilseeds and Vegetable Oils Development (NOVOD) Board Major Research Project entitled **"Development of Tissue culture protocol for mass propagation using elite *Jatropha* line & their biochemical evaluation"** sanctioned for three years from 2008-2012.

Awards and Distinctions

❖ **Conferred Honorary Professor, by Samarkand State University, Uzbekistan in 2018 (Distinction by a Foreign University in recognition of distinct academic services).**

❖ **Elected Fellow Botanical Society (FBS) ,by Indian Botanical Society in 2019.**

❖ **Awarded Fellow of the Linnean Society of London (FLS), a forum for natural history, founded in 1788) at a meeting of the society on October 19, 2017.**

❖ Awarded **"Scientist of Eminence Award, 2016"** by the Society of Plant Research during an international Conference on Technological Advancement and sustainable Agriculture in Rural Development held at NAAS Auditorium, New Delhi on Feb.22-24,2017.

❖ **Awarded FISPP, (Fellowship** of **Indian Society for Plant Physiology in** December 2013 (at Junagarh)

ISPP, IARI, New Delhi for contributions in the field of Plant Physiology and cognate Sciences**.**

❖ **Fellowship of FISPM, 2014 by International Society of Plant Morphology (ISPM).**

❖ **Nominated Member of assessors' National NAAC (National Assessment and Accreditation Council), MHRD, India w.e.f. May,2019 to till date for evaluation of Progress of Universities in India**

❖ **Expert Member RUSA (Rashtrya Uchhatar Siksha Abhiyan), Apex Committees of MHRD, Govt.of India for M.D. University , Rohtak and Rajasthan Univ. Jaipur.w.e.f.September 2019 to till date.**

❖ **Member: Program Advisory Committee (PAC) of SERB: (Organismal and Evolutionary biology – Plant Sciences Committee of Science & Engineering Research Board (SERB), Ministry of Science &Terchnology, Govt. of India w.e.f. July 2019 to July 2022.**

❖

❖ **Awarded UGC National Research Scientist 'A'** award in 1990; elevated to **Research Scientist 'B' (Reader)** in the year 1995 and promoted to **Research Scientist 'C' (Professor)** in the year 2003 at the Dept. Botany, Univ. Delhi.

❖ **Elected Member of Plant Tissue Culture Association of India (PTCAI) from 2010, onwards.**

❖ **Member of the Editorial Board of the Medicinal and Aromatic Plants Abstracts (MAPA),** approved by National Institute of Science Communication and Information Research (NISCAIR).

❖ **Editor, Phytomorphology**: An International Journal of Plant Sciences, from July 2012-2014.

❖ **Member Editorial Board of International Journal of Pharma Medicines and Biosciences (IJPMBS).**

❖ **Member Organizing Committee**, 6th World Congress on Biotechnology (October 5-7, 2015, New Delhi. organized by OMICS.

❖ Awarded **IAPTC&B Fellowship for participation in** the '**XI Int. Cong. Pl. Tiss. Cult. Biotech.**' held **at Beijing, (China), August, 2006.**

❖ **Awarded the Best Poster Award** for our work entitled **"Biotechnological approaches for enhanced production of artemisinin in *Artemisia annua* employing biotic and abiotic stress and their bioefficacy against cancer cell lines and malaria and filarial vectors"** during National Conference organized by (PTCAI) at Pune (Maharashtra) from 10-12 March, 2014.

❖ **University of Delhi has awarded Third Prize** to our research work during annual event of **"Antardhvani" in Feb., 2014 which was displayed Under Good Practices on Behalf of Botany Department. The work was evaluated by Eminent Jury outside Delhi University.**

❖ lected and Participated in the Indo-US Workshop organized by Scientists of Michigan State University (MSU, USA) on **"Application of Molecular Marker Technology for Rapid Development and Delivery of New Crop Varieties for Enhancing Food and Nutritional Security"** at TERI University, India in Dec. 2011.

❖ Awarded **IAPTC&B Fellowship for participation in** the '**XI Int. Cong. Pl. Tiss. Cult. Biotech.**' held **at Beijing, (China), August, 2006.**

❖ Selected Top Referee 2006 by Editors of Scientia Horticulture (Elsevier) for evaluating research paper and high quality review report vide letter of **Dr. Bernard Westerop, Senior Publishing Editor, Elsevier.**

❖ Awarded Cash prize and Certificate for best Poster entitled "***In vitro* plantlet regeneration through callus raised from Poplar trees during Non-regenerative period" at WWF Auditorium, Delhi, during Tree-Science Conf., 1998, April 10-13, 1998 Sponsored by Int. Union Forest Res. Org. (IFURO).**

❖ Invited by Organisers of IX Int. Cong. Pl. Tiss. Cult. Biotech. (USA) and delivered lecture on "**Differential Hormonal Requirements for Clonal Propagation of Male and Female Plants of Jojoba " at Jerusalem (Israel),in June , 1998).**

❖ Awarded **DST and UGC Fellowship** for participation in the Cong. sponsored by Int. Assoc. Pl. Tiss. Cult. Biotech.held at **Jerusalem (Israel)** in June 1998.

❖ Awarded prize (Certificate) **for best Poster** entitled "**High Efficiency *in vitro* clonal propagation of female jojoba plants**" presented during the Natal. Symp. Emerging Trends Pl. Tiss. Cult. Assoc., held at Dept. Genetics, Osmania Univ. Hyderabad, during Jan. 29-31 1997.

❖ Awarded CSIR (New Delhi) Research Associate-ship from Feb. 1986 to Nov. 1990 and Pool Officership(1983-1986) and UGC,JRF,SRF(1978-1982).Awarded **M.B.D. Merit Scholarship for M.Sc. (1975-77) for standing first in B.Sc.**Awarded **Gold Medal for standing first in B.Sc. in Kurukshetra University in 1974**.

Association With Professional Bodies

MEMBERSHIPS OF ACADEMIC/PROFESSIONAL SOCIETIES:

(A) International

1. International Association of Plant Biotechnology (IAPB), USA
2. Society for In Vitro Biology, USA
3. Society of Low Temperature Biology, London. (SLTB).
4. Life member of International Society of Plant Morphologists.

(B) National

1. Life member of Plant Tissue Culture Association of India (PTCA,India)
2. Life Member Indian Society of Nano-medicines (ISNM),,AIIMS, Delhi.
3. Life member of National Academy of Vector Borne Diseases (NAVBD)
4. Life membership of the Society for Advancement of Botany (SAB).
5. Life member of Indian Science Congress Association (ISCA).
6. Life member of Delhi University Botanical Society (DUBS).
7. Life member of Eco-Transformation Society.
8. Life member of Indian Society of Tree Scientists (ISTS).
9. Life member of Orchid Society of India.
10. Life member of Indian Society of Plant Physiology (ISPP).
11. Life member of Society for Biology and Biotechnology
12. Life member of Medicinal and Aromatic Plants of India.
13. Life Member for Society of plant Research.

Other Activities

RESEARCH ACHIEVEMENTS & CONTRIBUTIONS:

Co-ordinator of MoU between DU and Samarkand State University on behalf of Botany Dept. Univ. of Delhi. In order to promote research and academic activities an MoU between DU and Samarkand State University was signed in the month of January, 2018 for five year and I visited SSU as visiting Scientist and design course on Medicinal plant Biotechnology and delivered lectures.

FOREIGN VISITS: ●

Tampa, Florida, U.S.A.: Chaired the Techni Tampa, Florida, U.S.A.: Chaired the Technical Session and delivered Lecture during In Vitro Biology Meeting, 2019, organized by Society for In Vitro Biology, held at Tampa, Florida, U.S.A. from 8th to 12th June, 2019.

●**Samarkand State University, Uzbekistan: Visiting** Faculty at Samarkand State University, Samarkand, Uzbekistan, w.e.f. 15.09.2018 to 25.09.2018 under existing MoU between Delhi University and SSU, delivered seminars and designed course curricula in Medicinal Plant Biotechnology.

● **Bali, Indonesia: Participated** as member of technical program committee and delivered invited lecture entitled " Unravelling plant based therapeutic biomolecules: Bioassay guided isolation and elicitation of anti-malarial and anticancerous compounds from potential medicinal plants" during International Conference on Pharma Sciences and Biotechnology (ICPSB-2017) held at Bali, Indonesia w.e.f January 16-18, 2017.

● **Melbourne (Australia): Invited** by International Association of Plant Biotechnology(2014) and participated in the IAPB-2014 Congress held at Melbourne, Victoria (Australia) fromAugust 10-15,2014 and presented three papers and posters.

● **Jerusalem (Israel):** Invited by IX Int. Cong. Pl. Tiss. Cult. Biotech. (USA) to orally present research paper. There I orally presented paper entitled “Differential Hormonal Requirements for Clonal Propagation of Male and Female Plants of Jojoba” in June 14-19, 1998.

● **(Kathmandu (Nepal**): Invited by Biotechnological Assoc. Nepal to attend Int. Conf. “Genetic Engineering and Biotechnology” There, I Presented paper entitled “Seasonal variations in mophogenic responses of old Populus x euramericana tree explants and their call” in April 15-20, 199

- **Technologies Developed:** Developed **PCR based sex-linked molecular markers-RAPD, ISSR, SRAP, and STS markers** for identification and validation of male and female plants for dioecious crops, e.g. ,Jojoba (*Simmondsia chinensis*) applicable to mature plants as well as at seedlings.Based on these markers, genetic diversity analysis have been carried out in some other important crop plants *Simarouba glauca and Trichosanthes dioica, etc* .

- Developed micropropagation protocols in more than 25 commercially and medicinally important plants for their large scale plantation and improvement through genetic transformation such as *Arnica montana*, *Artemisia annua, Calliandra tweedii*, *Cassia angustifolia* (Senna), *Centella asiatica*, *Cicer arietinum, Cinamomum camphora* (Camphor), *Erythrina*

indica, Holarrhena antidysenterica (Kurchi), *Populus* x *euramericana, Psoralea corylifolia, Simmondsia chinensis*, *Spilanthes acmella* (Akarkara), *Spilanthes paniculata, Spilanthes calva, Stevia rebaudiana*, *Terminalia bellirica, Tephrosia purpurea* and *Vernonia anthelmintica*, etc.

- Developed technology for isolation, elicitation of plant based bioactive compounds possessing strong anticancerous activity , against different human cancer cell lines. And larvicidal efficacy **against Malaria, filarial, dengue and Japanese encephalitis vectors. The biosynthetic pathway genes of several bioactive compounds have been cloned to study their expression in bacteria/ higher plants for enhanced production of bioactive compounds.**

- Developing transgenics plant in *Daucas carota* and *Lycopersicun* incorporating pro-insulin synthesizing genes in collaboration with ICGEB.

- Alleviation of abiotic stress through glutathione antioxidants e and Biotic elicitors.

- Prepared one Audio-visual of University of Delhi link. https://**www.youtube.com/watch?v=DAhN41T403I&feature=youtu.be** **as an outreach program and creating awareness about the medicinal values of trees.**

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FOREIGN VISITS:

Florida(Tampa),USA: Visited Floridafrom June 8-15,2019, and participated in the International Conf, organized by the Society of In vitro biology,2019. There I Chaired the Technical Session on Biotechnology and delivered lecture.

Samarkand State University: Visiting Faculty at Samarkand State University, Samarkand, Uzbekistan, w.e.f.15.09.2018 to 25.09.2018 under existing MoU between Delhi University and SSU, delivered seminars and designed course curricula in Medicinal Plant Biotechnology.

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❖ Technologies Developed:

Nanobiotechnology: Green synthesis of nanoparticles and their bioefficacy: Silver nanoparticles have been fabricated

using herbal-extracts of different medicinal plants, characterized which showed remarkable larvicidal activity against vectors causing malaria, filarial and dengue (Kumar et al.2018a,b,c) against different cancer cell lines, and pathogenic microbes (Nindawat & Agrawal,2018:; Saini, Yadav, www.du.ac.in Page 30 Kumar.. & Agrawal,2019).

• **Molecular marker assisted sex identification**: Employing DNA markers (ISSR, RAPD, SRAP), developed sex-linked markers (UBC-8071120; VIS111317, ISSR-8481500)for dioecious crops such as Simmondsia chinensis (Agrawal, et al. 2007; Sharma et al.,2008), Simarouba glauca and Trichosanthes dioca. Sequence Tagged Sites (STS-UBC-8071120; VIS111317) markers were generated and validated over large population of Jojoba (Heikrujam, et al., 2014a,b).

• **Bioassay guided isolation and elicitation of bioactive compounds** in the plants tissues: Bioefficacy studies using herbal extracts of important medicinal plants were carried out against mosquito vectors causing malaria, filarial, dengue and Japanese encephalitis that showed cent percent mortality at minimum dozes (Pandey et al., 2007,Sharma et al, 2012,Hellert et al., 2012)

• **Isolation & elicitation of bioactive natural bioactive compounds using potential medicinal plants e**.g., psoralen (*Psoralea corylifolia*; Parast et el.,2011; Spilanthol (*Spilanthes* sp.; Pandey et al.,2011) artemisinin *(Artemisia annua*, Sharma et al.,2013), sennosides A&B (*Cassia angusifolia*; Chhetri et al., 2016), conessin(Holarrhena antidysenterica; Kumar et al., 2018), plumbagin (*Plumbago zeylanica*; Sharma & Agrawal,2018), gentiopicroside from *Gentiana* kurru; piperlongumin(*Piper longum*; Renuka et al. under review) have been achieved employing biotic(*Agrobacterium rhizigenes* and *Piriformospora indica*) and abiotic(precursors, trace elements,organic and inorganic compounds) elicitors.

• **Cloning of biosynthetic pathway genes**: The biosynthetic pathway genes of some bioactive compounds have www.du.ac.in Page 31 been cloned e.g., psoralen synthase (Psoralea corylifolia; Parast et al.2011) for psoralen, Ischorismate synthase (Cassia angustifolia; Chhetri et al., 2016) for sennosides A&B. to study their expression in bacteria/ higher plants for enhanced production of bioactive compounds.

• **Developed novel herbal anti-cancerous extracts** from *Nardostachys jatamanshi* and *Psoralea corylifoia, Gentiana kuroo, Arnebia hispidissima,* effective against Gliobastoma brain & HeLa cancer cell lines.

• **Prepared one Audio-visual of University** of Delhi link. https://www.youtube.com/watch?v=DAhN41T403I&feature=youtu.be as an outreach program and creating awareness about the medicinal values of trees.

• **Genetic diversity analysis:** Genetic diversity analysis was carried out for important oil yielding crops, *Simarouba glauca, Simmondsia chinensis and Trichosanthes dioca* to study the variations at genome level among different population conservation assessment (Kumar & Agrawal,2017).

• **Development of micropropagation protocols and** genetic fidelity study: Developed micropropagation protocols of over 25 economically important trees, shrubs and endangered plants using elite germplasm for their large scale plantation, improvement through genetic transformation and conservation for sustainable use by the industries and farmers (Agrawal & Gupta,1991,96;Agrawal et al.,2000,2002.2003; Agrawal & Sardar,2003,2006,2007;Pandey & Agrawal,2007,2009;Sharma et al.,2011, 2013; Razaqu et al.,2012; Heikrujam et al.,2014; Pandey et al.,2014Chhetri et al.,2015;Sharma & Agrawal2018.,etc.).

• **Transformation of Tomato (Lycopersicum esculentum)** cultivar 'Pusa Rubi' were achieved by incorporating bspA gene from Populus tremua for drought tolerance(Roy et al., 2006).

- . **One Indian Patent (Patent number: 278934**) entitled "A Process For Extraction Of Bioactive Psoralen Compound" has been granted on January 4, 2017 and four others are published in Indian patent Journals and are under examination. As an out come 8 novel gene sequences have been submitted to NCBI.

Alleviation of metal induced phytotoxicity: Alleviation of metal toxicity in plants such as in Cicer arietinum (Shankar et al,2015),Lycopersicum esculentum (Kumar et al.,2017) Cassia angustifolia (Nanda & Agrawal, 2016, 2018) has been achieved through glutathione and symbiotic fungus Pirif ormospora indica.

WORK SHOPS ATTENDED and IN HAND TRAINING RECEIVED:

1. Selected and Participated in the Indo-US Workshop on **"Application of Molecular Marker Technology for Rapid Development and Delivery of New Crop Varieties for Enhancing Food and Nutritional Se curity"** which is to be held at TERI University India and Bejo Sheetal, Jalna w.e.f. Dec. 3 -9, 2011.

2. Participated in the DBT sponsored training programme on "**Cloning, Characterization and Sequencing of Plant Genes**" held at Centre of Plant Molecular Biology, School of Life Sciences, Jawahar Lal Nehru Univ., (Dec. 1994) New Delhi and learned technique for isolation of plasmid DNA, RNA, Plant DNA, electrophoresis, *Agrobacterium* mediated gene transfer and assay for transgene expression.

3. Participated in DBT sponsored workshop-cum-symposium on **"Molecular immunology, gene structure and expressions**" held at **Indian Institute of Science, Bangalore** (Dec. 1991) and gained experience in handling modern tools of biochemistry e.g. Slab Gel Electrophoresis for protein/ DNA separation, Southern, Northern, Western, blotting and ELISA.

4. Participated and learned techniques during the workshop on Plant Genetic Transformation held at Delhi University in the Laboratory of Professor S. C. Gupta conducted by Professor S. C. Minocha, Univ. of New Hempshire, Durham, USA during 1990-91

5. Participated in the Dissemination Workshop: Cross Sectoral Implications of Biofuel Production and Use in India at Shangri-la Eros Hotel, New Delhi, India, 15 July 2011.

6. Participated in the Launch ceremony of Merck Millipore India Innovation Award 2012 at Hotel Inter Continental, New Delhi, 26 September 2011.

7. Participated as Member **Organising Committee in the International** Workshop on **Sustainability and Water Quality** Held at Hotel Maidens, 7 Sham Nath Marg, Delhi and Sponsored by The Green Chemistry Network Centre, Department of Chemistry, University of Delhi **w.e.f. Jan. 17-20, 2011.**

8. Participated **as Member Organising Committee in the Workshop on Green Chemistry Education: Necessity of a sustainable Future** held at Dept. Chemistry, Univ. Delhi and Sponsored by **Royal Society of Chemistry, London on Nov. 20, 2010.**

9. Participated in the Workshop on **Study of biofuels in India** organized by PriceWater House Coopers at Hyatt Regency, Delhi w.e.f. March 18-19, 2009.

10. Participated in the Seminar on New Technology HPLC Columns conducted by Merck at Hotel Ramada Plaza, Delhi on March 17, 2009.

11. Participated in the one day Workshop on Bioinformatics held at Delhi (February 18, 2008).

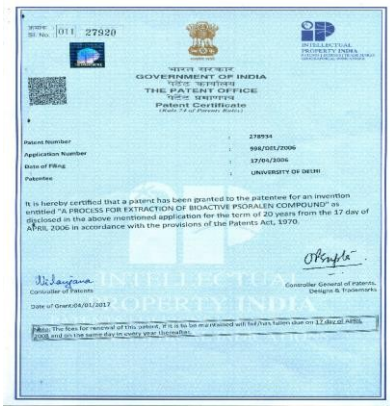
12. Participated in the Indo-US S&T Workshop on Green Chemistry held in New Delhi (January 7 -9, 2008).

13. Participated in a two day workshop held at Yamuna Nagar (January 11 -12, 1998) and attended all the four sessions on Biochemistry, Allergy & Applied Immunology, Biotechnology & Molecular Biology.

REVIEWER OF RESEARCH PROJECTS/PAPERS:

- **Reviewer of Foreign Research Projec:t reviewed Research Project Sent by Kuwait Research Foundation for the Advancement of Sciences, Kuwait.;**
- **Examiner 0f Ph. D. Theses of Malaya Univ. Malaysia 2018-till date.**
- **Reviewers of research papers:** . Physiol. Biochem (Elsevier); J. Nanotechnology Research; J. Genetics and Plant Breeding; Pl. Biol. (Germany); Scientia Horticulture (Elsevier);International Journal of the Association for the Advancement of Industrial Crops, The Netherlands;*In vitro* Cell. Dev. Biol. Pl., USA.;Ind. Jr. Forestry, Pub. ICFR Deharadun; Phytomorphology, Delhi.;J. Physiol. Mol. Bio. Pl.,Springer.

AS EXAMINER FOR M. Phil. & Ph. D. THESIS EVALUATION: All India Institute of Medical Science, New Delhi; Jadhavpur University, Kolkata; Rajasthan University, Jaipur M.D.U University, Rohtak, Haryana; C.C.S University, Meerut, Uttar Pradesh; Pt. Ravi Shankar Shukla University, Raipur (Chattisgarh) ; Jai Narain Vyas University, Jodhpur ; Sambalpur University, Orissa;Chattrapati Sahu Ji Maharaj University, Kanpur; University of Kashmir, Kashmir; Indian Institute of Chemical Biology, Kolkata; Banasthali University, Rajasthan; Pune University (Maharashtra); Jamia Hamdard, New Delhi. Aligarh Muslim University, Aligarh; Gauhati University,Gauhati; Gorakh Pur University.

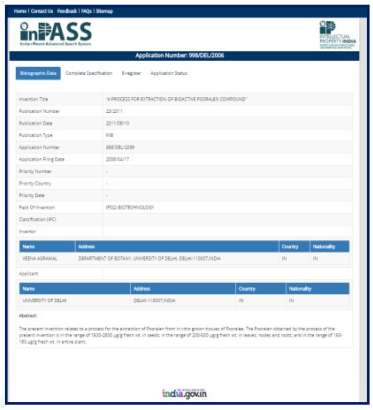

GOVERNMENT OF INDIA
THE PATENT OFFICE
Patent Certificate

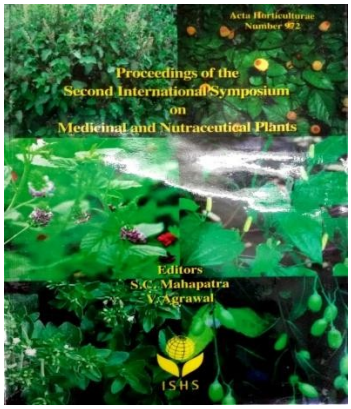
Patent Number : 278931
Application Number : 998/DEL/2006
Date of Filing : 17/04/2006
Patentee : UNIVERSITY OF DELHI

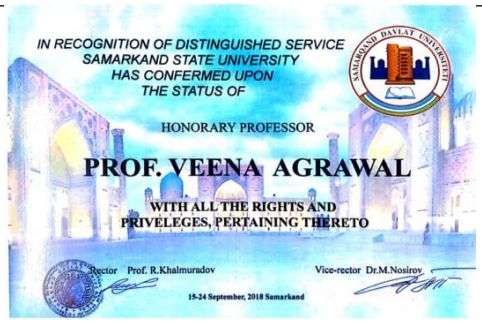
It is hereby certified that a patent has been granted to the patentee for an invention entitled "A PROCESS FOR EXTRACTION OF BIOACTIVE PSORALEN COMPOUND" as disclosed in the above mentioned application for the term of 20 years from the 17 day of April, 2006 in accordance with the provisions of the Patents Act, 1970.

Controller General of Patents, Designs & Trademarks

Date of Grant:04/01/2017







Professor veena Agrawal
Signature of Faculty Member

- ou are also requested to also give your complete resume as a DOC or PDF file to be attached as a link on your faculty page.