

CURRICULUM VITAE (C.V.)



MR. EHSAN ULLAH KHAN (Ph. D)

PERSONAL DETAILS:

Father's Name: Rustam Khan

Date of Birth: April 12, 1971.

Marital Status: Married

C. N. I. C. No: 11201-0356481-1

Passport No: NT 4104811

Nationality: Pakistani

Current Address: Senior Scientist,

Nuclear Institute for Agriculture & Biology (NIAB),

(Pakistan Atomic Energy Commission), P.O. Box 128, Jhang Road,

Faisalabad, (Pakistan).

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**Permanent Address: Post Office: Tajazai, District: Lakki Marwat, Khyber
Pakhtunkhwa, PAKISTAN**

EDUCATION:

2007-2010:

**Ph. D. (Plant Biotechnology) College of Horticulture & Forestry Sciences,
Huazhong Agricultural University, Wuhan -430070, Hubei Province, (P. R. China).**

1993-1996:

**M. Sc. (Honours) (Horticulture) (1st Division, A⁺) Faculty of Agriculture,
Gomal University, D. I. Khan, Khyber Pakhtunkhwa, Pakistan.**

1989 - 1993:

**B.Sc. (Honours)(Horticulture) (1st Division, A) Faculty of Agriculture, Gomal
University, D. I. Khan, Khyber Pakhtunkhwa, Pakistan.**

1996-1997:

**B. Ed. (Biosciences) (1st Division, B) Institute of Education and Research, Gomal
University, D. I. Khan, Khyber Pakhtunkhwa, Pakistan.**

TITLE of Ph. D. DISSERTATION:

***Agrobacterium tumefaciens* -mediated transformation in *Citrus* and
characterization of transgenic regenerants**

AWARDS/DISTINCTIONS

2007-2010:

**Awarded PhD Merit Scholarship by Islamic Development Bank (IDB),
Jeddah, Saudi Arabia under IDB's "Merit Scholarship Programme for High
Technology".**

2009:

Declared “An Excellent Student in Studies” by Huazhong Agricultural University, Wuhan, P. R. China (November 11).

2009:

Awarded Wencai Zhang Scholarship by Huazhong Agricultural University, Wuhan, P. R. China.

2007-2008:

Declared “Productive Scientist of Pakistan” by the Ministry of Science and Technology, Pakistan for my published research work in reputed international scientific journals.

1993-1996:

1st Position in Department of Horticulture, Gomal University, D.I. Khan, Khyber Pakhtunkhwa, Pakistan (MSc. Hons. Agriculture).

1993-1996:

2nd Position in Faculty of Agriculture, Gomal University, D.I. Khan, Khyber Pakhtunkhwa, Pakistan (MSc. Hons. Agriculture).

EMPLOYMENT RECORD:

2007-2010:

Worked as PhD scholar sponsored by Islamic Development Bank (IDB), Saudi Arabia at Huazhong Agricultural University, Wuhan, China on a project “Improvement of

citrus fruit crops through *Agrobacterium* mediated genetic transformation and other important biotechnological techniques”.

2002 to Present:

Working as a Senior Scientist on improvement of fruit crops through various biotechnological techniques (In vitro, Genetic transformation, Protoplast fusion etc) and conventional breeding techniques (Selection, Induced mutation, and Hybridization etc).

2000-2002:

Worked as a Citrus breeder (Scientific Officer) at Nuclear Institute for Agriculture and Biology (NIAB), Faisalabad for the improvement of citrus fruit crops through in vitro, induced mutation and other conventional breeding techniques.

1998-2000:

Worked as citrus breeder (Trainee Research Fellow) at Nuclear Institute for Agriculture and Biology (NIAB), Faisalabad for the improvement of citrus fruit crops through in vitro, induced mutation and other conventional breeding techniques.

TRAININGS AND COURSES:

2006:

Attended and successfully completed a practical training course on “Civil Defence in Nuclear, Biological & Chemical Warfare organized” by Civil Defence Academy, Lahore, Pakistan (September, 25 to October, 14).

1998:

Attended and successfully completed a practical training course on “Safety Measures in the Use of Radiation in Agriculture & Biology”, organized by Pakistan Atomic Energy Commission (PAEC) at NIAB, Faisalabad, Pakistan (September 14 - 18).

1998:

Attended and successfully completed a practical training course on “Nuclear and Other Advance Techniques in Agriculture and Biological Research” organized by PAEC at NIAB, Faisalabad, Pakistan (November 16 – 27).

WORK EXPERIENCE:

A- Work Experience from 1998 – May 2007 (In Pakistan):

Currently working as a Senior Scientist at Nuclear Institute for Agriculture & Biology (NIAB), Faisalabad, Pakistan and applied following techniques for genetic improvement of citrus fruit crops:

- **In vitro techniques:** Optimized in vitro protocols and developed virus free citrus plants (Kinnow mandarin - most important citrus cultivar in Pakistan) using various explants.
- **Sprout grafting:** Used this technique for rapid and mass propagation of elite scions of Kinnow mandarin by grafting onto Rough lemon rootstocks.
- **In-vitro Micro-grafting:** Used this technique for rapid and mass propagation of virus free plants of kinnow mandarin by grafting apical meristems onto rootstocks

- **Induced Mutations:** Developed seedless kinnow mutant plants through application of various gamma irradiation doses of scions of kinnow mandarin (Currently these mutants are supervised and managed by colleagues in the institute).
- **Spontaneous Mutations:** Developed seedless kinnow mandarin plants through selection of spontaneous mutations cum sprout- grafting technique (Currently plants are supervised and disseminating by my colleagues in the institute).

B- Work Experience from June 2007- November 2010 (In P. R. China):

- Successfully completed PhD research studies in National Key Laboratory of Crop Genetic Improvement, National Center of Crop Molecular Breeding, Huazhong Agricultural University, Wuhan, China under the guidance of Professor Dr. Ji-Hong Liu.
- Reported for the first time an efficient protocol for regeneration and *Agrobacterium* - mediated transformation of citrus plants via direct organogenesis from leaf discs explants
- Developed/produced successfully transgenic citrus plants overexpressing stress (cold, salt) tolerant genes.
- Developed various other reproducible protocols for *Agrobacterium* - mediated transformation of different citrus species while using *GFP* as reporter gene
- Conducted experiments on the role of exogenous polyamines including D- Arginine, Putrescine, and Spermidine in citrus somatic embryogenesis and organogenesis.
- Gained experience in various techniques required in molecular characterization of transgenic plants.

EXPERTISE IN RESEARCH TECHNIQUES AND SKILLS

Excellent expertise in following research techniques and skills:-

1. Tissue culture techniques: Media preparation, tissue sterilization, tissue cultures maintenance, and regeneration techniques for citrus using various explants including nucellus, epicotyls, hypocotyls, protoplast, embryos and multiple shoot meristems etc.
2. DNA/RNA extraction from various parts of plants and calli using different protocols including "mini and maxi prep"
3. PCR (Polymerase Chain Reactions), RT-PCR, RAPD PCR
4. Electrophoresis
5. DNA cloning, DNA fingerprinting, DNA sequencing.
6. Design Primers and Probes for Molecular Biology Purpose.
7. *Agrobacterium*-mediated transformation
8. Molecular Characterization of Transgenic Plants
9. Southern Blot Analysis
10. Northern Blot Analysis
11. Western Blot Analysis of transgenic plants
12. Cell suspension culture
13. Protoplast isolation and somatic hybridization
14. Various staining techniques of Protein Gels i.e. silver staining and for Agarose gels Ethidium bromide.
15. Somatic embryogenesis is routinely being used in the lab as an alternative method of propagation.

16. Shoot-tip grafting
17. In-vitro micro-grafting
18. A-sexual grafting techniques
19. Gamma irradiation technique for induction of mutations

COMPUTER EXPERIENCE:

1. Gained experience in Microsoft Office (MS Word, MS Excel, and MS PowerPoint).
2. Experienced in using Word Perfect
3. Experienced in using statistic software (SAS, STATISTICA-Version 5.5, and Stats Soft)
4. Experienced in using Photoshop CS.
5. Gained experience in designing screens for multimedia presentations.

RESEARCH INTERESTS:

Genetic improvement of fruit and vegetable crops through:

- *Agrobacterium tumefaciens* -mediated genetic transformation system
- Induced/spontaneous mutation techniques
- Different in vitro cell and tissue culture techniques

PROTOCOLS DEVELOPED:

1. Developed and reported for the first time an efficient protocol for regeneration and transformation of citrus cultivars from leaf explants via direct organogenesis. This technique will play an important role in citrus genetic engineering in future.
2. Optimized gamma irradiation doses for induction of useful mutations (seedlessness,

high quality fruits) in citrus using dormant budwoods.

3. Developed a highly economical micrografting technique for production of virus free citrus plants

MEMBERSHIPS OF PROFESSIONAL SOCIETIES & EDITORIAL BOARD:

1. Member of Horticulture Society of Pakistan
2. Member of International Society of Citriculture
3. Member of Botanical Society of Pakistan
4. Member of International Society for Horticulture Sciences (ISHS), Belgium
5. Member of Editorial Board of the African Journal of Plant Science
6. Life time member of Khwarzimid Science Society of Pakistan
7. Member of American Society for Quality
8. Member of Asian Federation of Biotechnology (AFOB)
9. Member of American Society of Agronomy

OTHER MEMBERSHIPS:

(a) International Agricultural Association (IAA); (b) Horticulture; (c) The Plant Kingdom (d) Biotech and Pharma Network Professionals; (e) Agriculture; (f) Commission Fruits and Vegetables and Health; (g) Plant Breeders and Agents Group; (i) Horticulture Interests; (j) OFA – An association of Horticulture Professional; (k) Bio Tech Regulatory and Quality Professionals; and (l) Plant Breeders and Agent Groups

LIST OF PUBLICATIONS:

1. **Khan, E. U., Fu, X. Z., Wang, J., Fan, Q. J., Huang, X. S., Zhang, G. N., Shi, J., and Liu, J. H. (2009)** Regeneration and characterization of plants derived from leaf in vitro culture of two Sweet orange (*Citrus sinensis* (L.) Osbeck) cultivars. *Scientia Horticulturae*, 120:70-76.
2. **Khan, E. U., and Liu, J. H. (2009)** Plant biotechnological approaches for the production and commercialization of transgenic crops *J. Biotechnology & Biotechnological Equipment* 23 (3): 1281-1288.
3. **Khan, E. U., Liu, J. H., Fu, X. Z., Wang, J., and Fan, Q. J. (2009)** Optimization of *Agrobacterium*-mediated transformation factors for citrus embryogenic callus using Green Fluorescent Protein (*GFP*) as a reporter gene. *Plant Genomics in China X, Chongqing (August 19-21, 2009)*, pp. 173 (Abstracts)
4. **Khan, E. U., Khan, A. R., and Ziaf, K. (2008)** Citriculture Scenario in Pakistan. XIth Intl. Soc. Citriculture Congress (October 26-30, 2008), Wuhan, China, pp. 136. (Program and Abstracts).
5. **Khan, E. U. (2007)**. In vitro plant regeneration in Kinnow. *Life Sci. Intl. J.*, 1(2):153-156.
6. **Khan, E. U., Altaf, N., and Chaudhary, M. A. (2006)** Modified technique of micrografting for producing sparsely seeded and virus free Kinnow fruit plants. *Indus J. Biol. Sci.* 3 (1): 604-608.
7. **Khan, E. U., and Altaf, N. (2005)** Somatic embryogenesis and regeneration of plants from nucellar tissue of Kinnow mandarin (*Citrus reticulata* Blanco). *Indus J.*

Plant Sci. 4 (3): 362-368.

8. Altaf, N., Iqbal, M. M., and Khan, E. U. (2004) Development of seedless clones of Kinnow mandarin 1st Natl. Conf. Agric. Biotech (Aug. 16 – 18, 2004), Nathiagali (Pakistan.), pp. 94 (Program and Abstracts).
9. Altaf, N., Iqbal, M. M., and Khan, E. U. (2004) Towards a seedless cultivar of Kinnow mandarin. IV. Natural and induced variability. Pak. J. Bot. 36 (1): 93- 102.
10. Khan, E. U. (2003). Growth and yield response of Chilies (*Capsicum annuum* (L.) to weeding intervals. Baloch. J. Agric. Sci., 4 (1): 37-39.
11. Altaf, N., Iqbal, M. M., Gulnaz, A., and Khan, E. U. (2003) Towards a seedless cultivar of Kinnow mandarin (2) Variation in seed shape and seed size. Pak. J. Bot. 35 (1): 79-87.
12. Khattak, G. S. S., Haq, M. A., Marwat, E. U. K., Ashraf, M., and Srinives, P. (2002) Heterosis for seed yield and yield components in mungbean (*Vigna radiata* L. Wilczek) Sci. Asia 28: 345 – 350.
13. Khattak, G. S. S., Haq, M. A., Ashraf, M., Srinives, P. and Marwat, E. U. K. (2002) Genetic analysis of photoperiod-sensitivity, flowering and maturity response in mungbean (*Vigna radiata* L. Wilczek) J. I. S. S. A. A. S., 7 (2): 31 – 36.
14. Altaf, N., Iqbal, M. M., Marwat, E. K., Gulnaz, A., Chaudhary, G. A., Hafiz, I. A. and Ashraf M. (2002). Towards a seedless cultivar of Kinnow mandarin. 1. Embryogenesis of low seeded/seeded fruits. J. Agric. Res. 40 (1): 29-35.
15. Khan, E. U., and Alizai, A. A. (2002) Effect of weeding intervals on yield and

- yield components of chilies (*Capsicum annuum* L. Indus J. Plant Sci. 1 (1): 176-179.
16. **Khattak, G. S. S., Haq, M. A., Ashraf, M., Tahir, G. R., and Marwat, E. U. K.** (2001) Detection of epistasis and estimation of additive and dominance components of genetic variation for synchrony in pod maturity in mungbean (*Vigna radiata* L. Wilczek) Field Crops Res., 72: 211- 219.
 17. **Altaf, N., Iqbal, M. M., Marwat, E. K., and Bhatti, I. A.** (2001) Effect of gamma radiation on secondary somatic embryogenesis in nucellus culture of citrus cultivars Pak. J. Bot. 33 (4): 419- 422.
 18. **Altaf, N., Marwat, E. K., Bhatti, I. A., and Iqbal, M. M.** (2001) Nucellar regeneration and polyembryony of citrus cultivars Pak. J. Bot. 33(2): 211-215.
 19. **Iqbal, M. M., Altaf, N., Marwat, E. K., Hafiz, I. A., and Bhatti, I. A.** (2001) A marker for seedlessness in Kinnow mandarin Pak. J. Biol. Sci., 4 (1): 69.
 20. **Altaf, N., Khalil, S. A., Marwat, E. K., and Bhatti, I. A.** (2000) Effect of radiation on nucellar embryogenesis in sweet orange cultivars Pak. J. Biol. Sci., 3 (10): 1612-1614.
 21. **Altaf, N., Marwat, E. K., Khalil, S. A., and Bhatti, I. A.** (2000) Callus responses of explants from citrus cultivars J. Agric. Res., 38 (1): 53-60.
 22. **Altaf, N., Marwat, E. K., Khalil, S. A., and Bhatti, I. A.** (2000) Effect of gamma radiation on nucellar embryogenesis of various citrus cultivars Pak. J. Biol. Sci., 3 (5): 887- 889.

BOOK PUBLISHED:

Khan E. U. (2010). *Agrobacterium tumefaciens* Mediated Transformation in Agricultural Crops. (ISBN-NR 978-3-639-29986-1), VDM-Verlag Publishing Co., Germany.

PAPERS SUBMITTED:

1. **Khan, E. U., Fu, X. Z., and Liu, J. H. (2010)** Transformation and characterization of *TfGA2-ox2* gene in cell suspension cultures of Bingtangcheng Sweet orange (*Citrus sinensis* L. Osbeck). *Acta Horticulturae* (Accepted for publication).
2. **Fu, X. Z., Khan, E. U., Hu, S. S., Fan, Q. J. and Liu, J. H. (2010).** Overexpression of a *betaine aldehyde dehydrogenase* gene from *Artiplex hortensis* enhances salt tolerance in transgenic trifoliolate orange (*Poncirus trifoliata* L. Raf.). *Environmental and Experimental Botany* (Under review).
3. **Khan, E. U., Khan, A. R., and Ziaf, K. (2008)** Citriculture Scenario in Pakistan *Proc. Intl. Soc. Citriculture Congress* (October 26-30, 2008), Wuhan, China (Accepted for publication).

CONFERENCES, CONGRESSES AND SYMPOSIUMS

2010:

Participated in International Symposium on Molecular Biology and Biotechnology of Fruit trees (October 18-20).

2009:

Participated and presented one poster in **Plant Genomics in China X**, organized by Southwest University, Chongqing, China (August 19-21).

2009:

Participated and presented research work entitled “*Agrobacterium*-mediated transformation of *Citrus sinensis* L. (Osbeck) using leaf regeneration system’ in **Post Graduate Students Annual Research Work Presentations** organized by **Huazhong Agricultural University, Wuhan, China (November 26)**

2009:

Attended **Paris-Wuhan Meeting on Plant Functional Genomics**, organized by **Huazhong Agricultural University, Wuhan, China (Nov 19-21)**.

2008:

Participated and presented 2 posters in **XIth International Society of Citriculture Congress** organized by the **Chinese Society of Citriculture and Huazhong Agricultural University, Wuhan, China (October 26-30)**.

2008:

Attended **first International Symposium on Applied Biotechnology in Horticulture-08** organized by **Huazhong Agricultural University, Wuhan, China (April, 16-18)**.

2008:

Participated in **2008–Summer Institute in Plant Biology** organized by **Huazhong Agricultural University, Wuhan, China (June 9-13)**.

2008:

Participated in **International Symposium on Bio-energy and Biotechnology** organized by **Huazhong Agricultural University, Wuhan, China (March, 16-20)**.

POSTERS PRESENTED:

2009:

Optimization of *Agrobacterium*-mediated transformation factors for citrus embryogenic callus using Green Fluorescent Protein (*GFP*) as a reporter gene in **Plant Genomics in**

China- X, Chongqing, China (August, 19-21)

2008:

Citriculture Scenario in Pakistan in the XIth International Society of Citriculture Congress, Wuhan, China (October 26-30).

2008:

Regeneration and characterization of plants derived from leaf in vitro culture of two Sweet orange (*Citrus sinensis* (L.) Osbeck) cultivars in XIth International Society of Citriculture Congress, Wuhan, China (October 26-30)

REFERENCES:

1. Ji-Hong Liu (Ph. D)

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National Key Laboratory of Crop Genetic Improvement,
National Center of Crop Molecular Breeding, Huazhong Agricultural, University,
Wuhan -430070, P. R. China

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2. Gul Sanat Shah (Ph. D)

Principal Scientist

Nuclear Institute for Food and Agriculture (NIFA), P. O. Box 446 , Tarnab,
Peshawar, Khyber Pakhtunkhwa,
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