Curriculum Vitae

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Personnel details:

Date of Birth	Feb 24, 1973
Gender	Female
Nationality	Indian

Education:

Ph.D. (2004) in **Biotechnology** from Institute of Himalayan Bioresource Technology (IHBT), Palampur & Guru Nanak Dev University, Amritsar, India.
Thesis Title: Development of species-specific PCR primers for some common plant adulterants of tea.

M.Sc. (**1995-1997**) in **Biotechnology** from Himachal Pradesh University, Shimla, India with 62.5 percentile
Courses studied: Biochemistry, Microbiology, Cell biology, Animal Biotechnology, Plant Biotechnology, Immunotechnology, Biochemical Engineering & Fermentation technology.

B.Sc. (**1993-1995)** in **Biology** from Himachal Pradesh University, Shimla, India with 62.7 percentile
Courses studied: Zoology, Chemistry and Botany

Academic positions:

May 2003-Aug 2005: Senior Research Associate, Clinical Research & Development (CR&D) GVK BIOSCIENCES PVT. LTD, Hyderabad, India.

Mar 2000-Apr 2003: Senior Research Fellow, Division of Biotechnology, IHBT, Palampur, India (A National Research Laboratory of Council of Scientific and Industrial Research, Government of India).

Nov 1997-Apr 2000: Project Assistant, Division of Biotechnology, Institute of Himalayan Bioresource Technology, Palampur, India.

Technical expertise:

Molecular Biology: Isolation and purification of nucleic acids (plasmid and genomic DNA, RNA), PCR amplification, RT-PCR, cloning, transformation, sequencing, designing of primers, differential display based gene isolation, cDNA library preparation and screening. Dot blotting, southern and northern blotting.

I have an exposure on diagnosis based on nanotechnology technique.

Biochemistry: Isolation and purification of proteins, separation of proteins using native PAGE, SDS-PAGE, visualization of active proteins on gels using activity staining, western blotting and immunoprecipitation.

Biochemical analysis: Separation and analysis of compounds using TLC, HPLC and LC/MS/MS.

Computer skills: Identification of genetic relationship using Ntsys software, DNA and protein analysis using PC gene software and Homology search for proteins and nucleic acids using BLAST. Expertise in handling MS office, Adobe and other routine softwares.

I have an exposure on nanotechnology based diagnosis work

Publications\patents:

Patents:

1. Mahipal Singh and **Bandana Dhiman**. Method for detection and identification of Anacardium species **US Patent No.** 6942976, Sep 2005.
2. Mahipal Singh and **Bandana Dhiman**. Species specific genomic DNA sequences for identification of Anacardium occidentale and the method for its utilization in detection of cashew husk in made tea samples **US Patent No.** 6541624, May 2003

Original articles:

1. Mahipal Singh, **Bandana Dhiman** and Paramvir Singh Ahuja (1999). Isolation and PCR amplification of Genomic DNA isolated from market sample of dry tea. Plant Mol. Biol.Reporter 17: 171-78).
2. **Bandana Dhiman** and Mahipal Singh (2003). Molecular Detection of Cashew husk (Anacardium occidentale) Adulteration in market samples of dry tea (Camellia sinensis). Planta Medica 69 (09): 882-884.
3. Mahipal Singh, Jyoti Saroop and **Bandana Dhiman** (2004). Detection of intra-clonal genetic variability in vegetatively propagated tea using RAPD markers. Biologia Plantarum 48(1): 113-115.
4. Mahipal singh, Chandan Sharma, **Bandana Dhiman**, Dharam singh and Jyoti Raizada (2004). Cloning and characterization of repetitive DNA sequence elements from Camellia sinensis (L.) O. Kuntze. Physiol Mole Biol Pl 10 (2): 209-215.

Protocols in manuals / book chapters:

1. Mahipal Singh, Chandan Sharma and **Bandana Dhiman** (1999). Reverse transcription Polymerase Chain Reaction based detection of Viral genomes in plants In: Principles and Techniques of Viral diagnostics for Micropropagation and Flori-Horticultural Industry. A Practical Course Manual, Course director Dr. A. A. Zaidi, IHBT Palampur (HP), India.

2. **Bandana Dhiman**, Jyoti Dadwal and Dharam Singh (2001). DNA Fingerprinting: Techniques and Applications In: Production of disease free planting Materials. A basic training course for growers, Course Director Dr. Anil Sood, IHBT Palampur (HP), India. A basic training course for growers, Course Director Dr. Anil Sood, IHBT Palampur (HP), India.

Sequences deposited in Genbank:

1. Cloning, sequencing and characterization of a highly repetetive DNA fragment from Camellia sinensis L. (O.) Kuntze genome by Mahipal Singh, **Bandana Dhiman**, Chandan Sharma and Dharam Singh (GenBank Accession No AF 546881).
2. Anacardium occidentale 5S ribosomal RNA intergenic spacer, complete sequence by **Bandana Dhiman** and Mahipal Singh (Accesion No AY230649).
3. Camellia sinensis 5S ribosomal RNA intergenic spacer, complete sequence by **Bandana Dhiman** and Mahipal Singh (Accesion No AY230650).
4. Dendrocalamus hamiltonii 5S ribosomal RNA intergenic spacer, complete sequence by **Bandana Dhiman** and Mahipal Singh (Accesion No AY230651).

Manuscripts submitted/in preparation:

1. **Bandana Dhiman**, Sanjeevina Bhandari and Mahipal Singh (2005). Do ash content determination is an adequate method for adulterants detection in tea (Sri Lankan Journal of Tea Science).
2. Indra Sandal, Amita Bhattcharya, **Bandana Dhiman**, Sanjay Kumar and Parmvir Singh Ahuja (2005). Factors affecting biolistic mediated transformation of tea (Camellia sinensis (L.) O. Kuntze).(Transgenic Research).
3. **Bandana Dhiman** and Mahipal Singh. Detection of babul adulteration in tea with species specific sequences (Planta Medica)

Research experience:

Projects in GVKBiosciences Pvt. Ltd.: Worked as a Senior Research Associate in pharmaceutical company. There I was doing **histological** study of Mycobacterium tuberculosis and **pDNA isolation** from various clinical samples like CSF, sputum, blood, urine and tissues. During this period, I standardized a new set of **PCR amplification parameters**, for the diagnosis of Mycobacterium Tuberculosis in patients.

In other project, I was working on method development, validation and bioequivalence studies of drugs, metabolites and endogenous compounds from biological matrices using **HPLC and LC/MS/MS techniques**. Apart from this, I also had the responsibility of designing the SOPs, analysis & interpretation of data and report generation.

Doctoral Research Work: Ph.D. Research work was focused on the development of species-specific primers/molecular markers for the detection of biological adulterants in tea (black tea). Tea is adulterated with material which looks similar to it. It gets subjected to various conditions during processing i.e. crushing, enzymatic oxidation and enzyme inactivation at high temperature. It is difficult to identify the adulterants in tea by visual inspection and biochemical analysis. For the development of molecular markers, DNA was the prime requirement which is suitable for further experiments. Hence, the protocol was developed for DNA isolation from processed tea and their adulterants. The isolated DNA was efficiently amplified by using random and specific primers. Spacer regions of 5S rRNA gene were targeted and selected fragments were cloned and sequenced. Sequences were aligned by using PC gene software and species specific primers were designed. Specific PCR amplification parameters (magnesium Ion conc, primer conc, annealing time and temperature and extension time) were optimized for each plant by using their respective species specific designed primers. Checked the specificity of the designed primers by analyzing them across a wide spectrum of DNA. The species specific amplified fragments were used as a probe for dot blotting and southern hybridization. An attempt was also made to develop gene specific molecular markers by using differential display gene isolation technique. This study is useful in identification of specific species of biological sample even in a processed material.
Various molecular techniques employed for the above mentioned work includes isolation of **RNA** and **DNA**, **RT-PCR, differential display, gene isolation**, **cDNA library screening**, **cloning, transformation, sequencing, northern** and **southern hybridization.** From the above mentioned work, two US patents were filed.

Other Projects at IHBT, Palampur, India:

***DNA Fingerprinting of Tea germplasm*:** Tea genomic library was screened for the development of tea specific probes. The various techniques employed for this study were cloning, sequencing, PCR amplification, SSCP, dot blotting, northern and southern hybridization. Identified the genetic relatedness among various species of the same genus and prepared phylogenetic tree using Ntsys software. We found a highly repeated region in tea and the same sequences have been submitted in gene bank.
***Characterization of transgenic plants*:** Characterized the transgenic plants (Tea) for stable transformation of genes with standardized PCR amplification and southern hybridization conditions.
Characterization of chloroplast transformation Vector: Studies were carried out to check the universality of chloroplast vector in wide number of plant species. The constructed vector can be useful for the transformation in different types of plant species.

M.Sc. Projects: During my M.Sc. I have worked on two different projects. The first project, *"Biological decolourization of Methyl Blue by Phanerochaete Chrysosporium and Kurthia sp."* was done at the Institute of Microbial Technology Chandigarh (India). There, I worked on decolorization of dyes with bacteria and fungus at different temperature and cell stage, biochemical analysis of dyes by using TLC, isolation of active proteins, protein purification and separation of proteins using native PAGE and SDS-PAGE. In the second project entitled *"Isolation and selection of cellulase producing microbes and applications of cellulase in juice clarification"* in the Dept. of Biotechnology Himachal Pradesh University Shimla (India), I isolated the cellulase producing microorganisms (Bacterial and fungul) from various sources**.** The selected clones were grown and assayed for enzyme (cellulase) activity. Further the desired protein was purified with the help of column chromatography and was applied for the juice clarification at different enzyme units.

Professional memberships:

- Association for the promotion of DNA fingerprinting & other DNA Technologies, India (Life Member)
- Society of Biological Chemists of India (Life member).

References:

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   Hematology/ Oncology (MC 787),
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