

	<b>Dr. NARESH KUMAR KAKKER</b>
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<b>Educational Qualifications</b>	<ul style="list-style-type: none"> <li>• 1979 B.Sc. (Hons.) Agri. 1/4 Yr., HAU, Hisar</li> <li>• 1983 B.V.Sc.&amp; A.H., HAU, Hisar</li> <li>• 1989 M.V.Sc. (Veterinary Immunology), HAU, Hisar</li> <li>• 1999 Ph.D., Univ. of Oxford, Oxford, U. K.</li> <li>• 2008 Post-Doctoral Fellowship, Institute for Animal Health, Pirbright, Surrey, U. K.</li> </ul>
<b>Employment Details</b>	<ul style="list-style-type: none"> <li>• Consultant Faculty, Vety. Microbiology: August 2022 to till date</li> <li>• Professor and Head, Vety. Micro.: March 2019 - May 2022</li> <li>• I/c College Central Laboratory: June 2019 - May 2022</li> <li>• Principal Scientist/ Professor: June 2016 - May 2022</li> <li>• Officer Incharge (FMD) -cum- Pr. Scientist: Dec. 2013 - May 2016</li> <li>• Sr. Scientist, LUVAS/ CCSHAU: August 2008 - November 2013</li> <li>• Scientist (Immunology), CCSHAU: August 2000 - August 2008</li> <li>• Asstt. Scientist (Sr. Scale), CCSHAU: July 1998 - August 2000</li> <li>• Assistant Scientist, HAU/ CCSHAU: November 1990 - July 1998</li> <li>• Research Asstt./ Vety. Surgeon (Haryana): June 88 - Nov. 1990</li> <li>• Field Coordinator (Ranbaxy Labs): March 1984 - November 1985</li> </ul>
<b>Research Interests</b>	<ul style="list-style-type: none"> <li>• Veterinary Immunology, Diagnostic Microbiology, Molecular Virology, Biotechnology, Vaccine Monitoring, Intellectual Property Rights, Business Planning and Development</li> </ul>
<b>Membership of Scientific Societies</b>	<ul style="list-style-type: none"> <li>• Life Member, Indian Immunology Society (IIS)</li> <li>• Life Member, Indian Association of Veterinary Microbiologists, Immunologists and Specialists in Infectious Diseases (IAVMI)</li> <li>• Life Member, Association of Microbiologists of India (AMI)</li> <li>• Life Member, Society for Immunology &amp; Immunopathology (SIIP)</li> <li>• Member, Haryana Veterinary Council</li> </ul>
<b>Research Publications</b>	<ul style="list-style-type: none"> <li>• Research Papers in International and National Journals: 54</li> <li>• Scientific Reports: 40</li> <li>• Editor, Journals/ Manuals/ Books: 20</li> <li>• Chapters in Manuals: 100; Chapters in Books: 10</li> <li>• Chapters in Conference Proceedings, Popular Articles, etc.: 20</li> <li>• Participation and Presentation of Abstracts/ Papers in Conferences/ Seminars/ Symposia/ Workshops, etc.: 60</li> </ul>

## I. RECOGNITION/ AWARDS/ SPECIAL ACHIEVEMENTS

### A. Recognitions and Awards

Items of Recognition	Year	Awarding Organization/ Institution/ Professional Society/ Academy
Fellow Award, IAVMI	2022	Indian Association of Veterinary Microbiologists, Immunologists and Specialists in Infectious Diseases, 34 <sup>th</sup> IAVMI Conference, LUVAS, Hisar
Best Oral Presentation Award (Three Research Papers: First=2, Second=1)	2022	34 <sup>th</sup> IAVMI Conference, LUVAS, Hisar
Certificate of Appreciation	2021	ICAR-Directorate of Foot-and-Mouth Disease, Bhubaneswar
Best Researcher Award (2017-18)	2020	Vice-Chancellor, LUVAS, Hisar
Member, Expert Committee to assess the quality parameters of the extant FMD vaccine vis-a-vis the OIE FMD Expert Missions recommendations	2020	Deptt. Animal Husbandry & Dairying, Govt. of India, New Delhi
Honoured for being the "Chairman" in the Technical Session	2020	20 <sup>th</sup> Indian Veterinary Congress, Madras Veterinary College, TANUVAS, Chennai
First Oral Presentation Award	2020	14 <sup>th</sup> National Conference of Association of Public Health Veterinarians, DUVASU, Mathura
Member, Expert Committee on the usage of FMD+HS combined vaccine	2018	Deptt. Animal Husbandry & Dairying, Govt. of India, New Delhi
Honoured for delivering Invited talk	2018	ICAR-CIRB, Hisar
Member, Expert Committee for Developing the uniform Standard Operating Procedure for Quality Control of FMD vaccine(s)	2016	Deptt. Animal Husbandry & Dairying, Govt. of India, New Delhi
Best Oral Presentation Award	2014	25 <sup>th</sup> IAVMI Conference, DUVASU, Mathura
Certificate of Appreciation (Outside funded NAIP-ICAR Project)	2013	Vice-Chancellor, LUVAS, Hisar
Certificate of Appreciation (Outside funded ICAR Projects)	2013	Vice-Chancellor, LUVAS, Hisar
Certificate of Appreciation for Best Centre of the PD on FMD	2013	Vice-Chancellor, LUVAS, Hisar
Second Position for Technology Demonstration (BPD Vety. Unit)	2013	Organizers of 'Kisan va Krishi Navi Taknik Mela' at Sirsa, Haryana
Best AICRP on FMD Center	2012-13	Project Directorate on FMD, Mukteswar
Certificate of Appreciation for Best Centre of the PD on FMD	2012	Vice-Chancellor, LUVAS, Hisar
First Prize for Best Display in Kisan Mela 2012 (Deptt. LPT Display and Products, BPD Unit)	2012	Directorate of Extension Education CCS HAU, Hisar
Best AICRP on FMD Center	2011-12	Project Directorate on FMD, Mukteswar
Best AICRP on FMD Center	2010-11	Project Directorate on FMD, Mukteswar
Best AICRP on FMD Center	2009-10	Project Directorate on FMD, Mukteswar
Letter of Appreciation	2009-10	Project Directorate on FMD, Mukteswar
Letter of Recommendation	2008	Institute for Animal Health, Pirbright, UK

Certificate of Honour	2004-07	CCS HAU Teachers' Association, Hisar
Conference Travel Grant	1999	Royal Society, London, U. K. (International)
Best Poster Award	1999	Organizers, 9 <sup>th</sup> HTLV Conference, Japan
Certificate of Appreciation	1996	United States Department of Agriculture, Florida, USA
Letter of Appreciation	1993	Prof. and Head, Vety. Microbiology, CCSHAU

### **B. Special Achievements ( Concepts, Technologies, Products, Methodologies, etc.)**

Category	Title	Year	Additional Details/Information
Methodology	LUVAS FMD Economic Losses Calculator	2022	Developed formula in Excel Sheet for calculation of economic losses in animals due to FMD
Concept/ Methodology	Concept of FMD+HS combined Vaccination	2018-2020	Sufficient data generated for FMD+HS combined vaccination in animals at organized farms in Haryana. This has led to implementation of FMD+HS combined vaccination in cattle and buffaloes as a pilot scale in Haryana only in the whole country.
Technology/ Product (Kit)	Conversion of Milk Urea Detection Test (VPHE) into two Kits (10 and 30 tests) (Developed by Deptt. VPHE)	2010	Both the Milk Urea Detection Kits: Small (10 tests) and Big (30 tests) were widely accepted by public and are still in demand at ATIC, Kisan Sewa Kendra, CCSHAU, Hisar.
Technology (Kit)	Development of a single dilution ELISA test for detection of antibodies in animals vaccinated against Haemorrhagic Septicemia	2004	The technology has been widely validated and used at several Veterinary Colleges/ Universities/ State Disease Diagnosis Labs across India, IVRI, Bareilly and HSADL (ICAR), Bhopal.

## **II. TRAININGS IN THE FIELD OF SPECIALIZATION**

### **A. National Trainings**

Title	Duration	Institution	Year
Management Development Programme on Leadership Development	Two weeks	ICAR-NAARM	2020
Brainstorming workshop on Foot-and-Mouth Disease	Two Days	ICAR-CIRB	2018
Capacity Building in Intellectual Property Rights	One Day	LUVAS, Hisar	2017
Workshop on RTI Act 2005	Two Days	HIPA	2017
High Throughput Single Dilution Liquid Phase Blocking ELISA	One week	PD on FMD, Mukteswar	2014
MDP Training Workshop on Prioritization, Monitoring and Evaluation of Agricultural Research Project	One week	NAARM, Hyderabad	2013
Business Incubator Operations, Management and Technology Transfer	One week	ICRISAT, Hyderabad	2011
IPR Management and Commercialization Techniques	Ten Days	NAARM, Hyderabad	2010

Intellectual Property and its Commercialization in Agriculture	Ten Days	CCS HAU, Hisar	2009
Development of 3AB3 NSP ELISA for Detection of Carrier Status of FMD in Animals	One week	PD on FMD, Mukteswar	2008
<b>B. International Trainings</b>			
Vaccination against FMD - Principles and Practice	One Day	OIE/ FAO/ EuFMD	2021
FMD investigation training course for India	Five weeks	EuFMD, FAO and ICAR-DFMD	2019
Post-Doctoral Fellow, Commonwealth Academic Fellowship	Six Months	Institute for Animal Health, Pirbright, UK	2007-08
Genomics and Molecular Virology, Wellcome Trust Advanced Centre	One week	Wellcome Trust, Hilton, Cambridge, U.K.	2008
Molecular Virology Research, Deptt. of Biochemistry, University of Oxford	Four weeks	University of Oxford, Oxford, U.K.	1997
Doctoral Studies (Ph. D.) under Commonwealth Scholarship Programme	Three Years	University of Oxford, Oxford, U.K.	1995-98
<b>C. Other National Trainings (under Career Advancement Scheme)</b>			
Phage Display Technology for Production of Single Domain Antibodies	Three weeks	CAS in Veterinary Microbiology, CCSHAU	2008
Antimicrobials, Disinfectants and Immunomodulators: The Indian Heritage	Three weeks	CAS in Veterinary Microbiology, CCSHAU	2004
Faculty Development Programme in Education Technology	Four weeks	CCS HAU, Hisar	2002
Interactive Skills and Scientific Writing	Four weeks	CCS HAU, Hisar	2001
Computer Education for Agricultural Scientists	Four weeks	CCS HAU, Hisar	2000
First Computer Appreciation Course	Three weeks	CCS HAU, Hisar	1995
IUIS-AIIMS Advanced Course on Basic Immunology	One week	AIIMS, New Delhi	1993
Science and Engineering Research Council (SERC) School in Immunology	Three weeks	Deptt of Biochemistry, SGPGIMS, Lucknow	1991
Improved Methods of Diagnosis and Control of Theileriosis in Cattle ( <i>Theileria annulata</i> DOT-EIA Technique)	One week	PAU, Ludhiana	1990
ELISA and Basic Techniques in the Mycoplasma Researches	One week	Deptt. VPHE, CCSHAU	1989

### III. INTERNATIONAL RECOGNITION

Country	Type of Recognition	Year	Duration	Funding agency
United Kingdom	Conference Travel Grant	1999	One week	The Royal Society, UK
Japan	Fellowship Award for Excellent Abstract	1999	One week	Organizers, 9 <sup>th</sup> HTLV

### IV. TEACHING/ RESEARCH / EXTENSION

Area	Details
A. Teaching	Teaching Post-Graduate (M.V.Sc. and Ph.D.) and Under-Graduate (B.V.Sc.&A.H.) Courses in Vety. Microbiology and Immunology

B. Extension	Awareness in farmers for control of virological (FMD, Bluetongue), bacteriological (Hemorrhagic Septicemia) and protozoan diseases
C. Research (Priority Area)	Research work in Veterinary Virology (FMD, Bluetongue), Bacteriology (Hemorrhagic Septicemia), Vety. Immunology (Buffalo Immunoglobulins), Blood Protozoans (Theileria, Babesia, Anaplasma)

#### A. Teaching:

Item	Details
Courses taught	Taught several UG and PG Courses in Vety. Microbiology and Immunology as Individual as well as in collaboration with other teachers
Designing of course curriculum	Involved in designing of new/ revised Course Curriculum as and when required
Innovation in teaching methods	Use and adoption of latest/ modern teaching aids to teach students, group discussions, assignments, multi-media presentations, hands-on-trainings, etc.
M.V.Sc / Ph.D. students guided	M.V.Sc. Students: 3
	Ph.D. Students: 3
	Advisory Committee Member in > 60 M.V.Sc./ Ph.D. Student's Committee

#### B. Extension: Actively participated in following extension activities

S. No.	Extension Activities	Impact
1.	Attended Kisan Melas, Kisan Diwas, etc. and educated the farmers about prevention of FMD through vaccination under FMD-Control Programme	Due to increased awareness in farmers about the importance of FMD vaccination, there is almost 100% vaccination of susceptible cattle and buffaloes resulting in development of 80-90% herd immunity.
2.	While touring different villages and districts of Haryana, the field staff of Deptt. Animal Husbandry were made aware about the preventive measures to be taken for FMD Control and inform them about proper collection of serum for seromonitoring under FMD-CP.	The proper serum samples sent by the field staff resulted in receipt of the quality samples in the FMD Lab, Hisar and quality of the analyzed data has improved very much. With the subsequent vaccinations and increased herd immunity, the FMD virus activity has decreased very much resulting in drastic decrease in FMD outbreaks/incidences.
3.	During 2010-2014, as Co-PI of BPD (NAIP-ICAR) Unit, initiated the public awareness and market sensitization campaigns on World Veterinary Day, World Milk Day and demonstrated the Milk Urea Detection Technology (Deptt. of VPHE) to public at large. Subsequently, about 50 such campaigns were organized with the help of concerned Scientists.	The Milk Urea Detection Technology (Deptt. of VPHE) became popular amongst the public. The Entrepreneurs approached the BPD Unit for licensing of the technology and also bought Milk Urea Detection Reagent (Deptt. VPHE) for revalidation and market surveys. Likewise, several universities and institutes approached for supply of the HS Antibody ELISA Kit and were provided at a limited scale of commercialization.

**C. Research:** The following research projects have been handled/ completed in various capacities:

<b>Research Project and Funding Agency</b>	<b>Status</b>	<b>Duration</b>	<b>Major Accomplishments</b>
Phage Display Technologies for production of Immunobiologicals without scarifying animals (ICAR-NICHE Area of Excellence)	Principal Investigator	Dec. 2019 to Dec. 2021	<ul style="list-style-type: none"> <li>Immunobiologicals produced against FMDV, <i>Pasteurella multocida</i>, <i>Brucella abortus</i> and <i>Staphylococcus aureus</i> (<math>\beta</math>- haemolysin) antigens for use in immunodiagnosics.</li> <li>Organized trainings for faculty members, youth entrepreneurs and women farmers</li> </ul>
Sero-monitoring of HS+FMD combined vaccination in Haryana (RKVY-RAFTAAR)	Principal Investigator	Oct. 2019 to Dec.21	<ul style="list-style-type: none"> <li>Sero-monitoring of HS+FMD combined vaccination in Haryana initially under FMD-CP and recently under NADCP, DAH&amp;D, GoI.</li> </ul>
Scheduled Caste livelihood Support Programme (SCSP) activities under ICAR-DFMD	Head of the Department/ Course Convener	Feb. 2022 to March 2022	<ul style="list-style-type: none"> <li>Four Extension trainings, lecture demonstration, skill development, capacity building, scientific animal husbandry, preventive health care, medicine kits, Awareness camps, etc.</li> </ul>
Strengthening of Sero-monitoring and diagnostic activities on FMD, HS and Brucellosis (RKVY-RAFTAAR)	Co-PI/ Assoc. PI	May 2017 to March 2021	<ul style="list-style-type: none"> <li>Diagnostic and Sero-monitoring facilities created for FMD, HS and Brucellosis.</li> <li>Established Serum Bank for storage of large number of serum samples and other immunobiologicals.</li> </ul>
ICAR-Centre for Advanced Faculty Training in Veterinary Microbiology (ICAR)	Director, ICAR-CAFT	Feb. 2019 to May 2022	<ul style="list-style-type: none"> <li>Organized trainings for mid-career faculty members and scientists of SAUs/ SVUs and ICAR institutes under NARES.</li> </ul>
Infection and Immunity in relation to Haemorrhagic Septicemia (State)	Scheme Incharge	June 2016 to May 2022	<ul style="list-style-type: none"> <li>Seromonitoring of Haemorrhagic Septicemia Vaccination in Haryana</li> <li>Development of HS diagnostics</li> </ul>
AICRP on Epidemiological studies on foot and mouth disease (FMD) (ICAR)	Officer Incharge	Dec.2013 to May 2016	<ul style="list-style-type: none"> <li>FMD research work involving surveillance and epidemiological studies on FMD</li> <li>Seromonitoring of FMD vaccination</li> </ul>
FMD – Control Programme (ICAR)	Officer Incharge	-do-	<ul style="list-style-type: none"> <li>Seromonitoring of FMD – Control Programme in Haryana and Delhi</li> </ul>
Socio-economic Impact of FMD Control in India (ICAR)	Co-PI	April 2013 to Dec. 15	<ul style="list-style-type: none"> <li>Studies on Socio-economic Impact of FMD Control in Haryana</li> </ul>
Establishment of Business Planning and Development Unit (Vety. Products Unit) (NAIP-ICAR)	Co-PI, BPD Unit and Nodal Officer, IPRM&C Unit	Oct. 2009 to June 2014	<ul style="list-style-type: none"> <li>Establishment of BPD Unit at COVS, LUVAS</li> <li>Technology Business Incubator</li> <li>Commercialization of Technologies</li> <li>IPR Management &amp; Commercialization Unit</li> </ul>
AICRP on Epidemiological studies on FMD (ICAR)	Associate	Apr. 2001 to Nov.13	<ul style="list-style-type: none"> <li>FMD research work involving surveillance and epidemiological studies on FMD</li> </ul>
FMD – Control Programme (ICAR)	Associate	Apr. 2006 to Nov.13	<ul style="list-style-type: none"> <li>Seromonitoring of FMD-Control Programme (FMD-CP) in Haryana and Delhi</li> </ul>
Seromonitoring of FMD Control Programme in Haryana (State)	Co-PI	Apr. 2004 to March 06	<ul style="list-style-type: none"> <li>Seromonitoring of FMD-Control Programme in Haryana</li> </ul>

Monitoring of Immune Status of HS vaccinated Cattle and Buffalo (State)	Co-PI	April 2005 to March 07	<ul style="list-style-type: none"> <li>Monitoring of Immune Status of HS vaccinated Cattle &amp; Buffaloes</li> </ul>
Monitoring of Immune Status of HS vaccinated Cattle and Buffalo (State)	Co-PI	April 2005 to March 07	<ul style="list-style-type: none"> <li>Monitoring of Immune Status of HS vaccinated Cattle &amp; Buffaloes</li> </ul>
Development of MoAb and OMPs based ELISA kit for monitoring immune status of animals vaccinated against HS (DBT, New Delhi)	Co-PI	Sept. 2001 to Sept. 04	<ul style="list-style-type: none"> <li>Development of an ELISA Kit for Monitoring of H.S. vaccinated animals</li> <li>Validation of Kit at SAUs/ Institutes</li> </ul>
Immunobiology of Cattle and Buffalo (State)	Associate	Feb. 1995 to Mar.01	<ul style="list-style-type: none"> <li>Development of a single dilution ELISA for HS vaccinated animals</li> </ul>
Studies on Bovine Leukemia Virus Gag Polyprotein: Assembly and Compatibility with other Retroviruses (Ph.D. Research Project)	Ph.D. Thesis work	Nov. 1995 to July 1999	<ul style="list-style-type: none"> <li>Assembly of BLV Gag polyprotein into virus like particles</li> <li>Assembly of BLV Capsid protein into Chimeric VLPs with HTLV/ SIV Matrix/ Nucleocapsid Proteins</li> </ul>
Studies on Epidemiology and Immunobiology of Bluetongue Virus (USDA, PL-480)	Associate	Aug. 1992 to Mar. 93 & Feb. 94 to Feb.95	<ul style="list-style-type: none"> <li>Serosurveillance of BTV in animals in the Northern States of India</li> <li>Establishment of sentinel herds</li> </ul>
All India Coordinated Research Project on Blood Protista (USAID, World Bank)	Associate	Nov. 1990 to Aug. 92 & Apr. 93 to Feb.94	<ul style="list-style-type: none"> <li>Establishment of Immunobiochem. Lab.</li> <li>Clinical trials of <i>T. annulata</i> vaccine</li> <li>Standardization of <i>T. annulata</i> Dot ELISA</li> <li>Characterization of <i>B. equi</i> antigen</li> </ul>
Field & laboratory trials of new animal health care products	Field Coordinator/ Associate	March 84 to Nov. 85	<ul style="list-style-type: none"> <li>Field &amp; laboratory trials of new Animal Health Care Products</li> </ul>

## V. CAPACITY DEVELOPMENT AND COLLABORATIVE PROGRAMMES

S. No.	Activities and Details of Programmes	Contribution
1.	Phage Display Technology and its Applications (ICAR-NICHE Area of Excellence, 2020)	Course Director, Workshop
2.	Issues in Export of Livestock and Livestock Products vis-à-vis SPS Agreement (2020)	Course Director, Training Course (ICAR-CAFT) in Vety. Microbiology
3.	Microbiological Techniques for Diagnosis of Emerging and Re-emerging Diseases of Veterinary Importance	Course Director, Training Course (ICAR-CAFT) in Vety. Microbiology
4.	Diagnosis and Control of Emerging and Re-emerging Trans-boundary Diseases of Poultry (2018)	Course Coordinator, Training Course CAFT (ICAR) in Vety. Microbiology
5.	Microbial Genomics & Proteomics in Diagnosis and Control of Diseases of Veterinary Importance (2017)	Course Coordinator, Training Course CAFT (ICAR) in Vety. Microbiology
6.	Capacity Building in Intellectual Property Rights	Course Coordinator, Training Course
7.	Control of Infectious Diseases of animals with particular emphasis on FMD-CP (2012)	Course Coordinator, Training Course CAFT (ICAR) in Vety. Microbiology
8.	How to set up a New Entrepreneurship in Dairy Processing (2012)	Course Coordinator: Ninety farmers/ dairy entrepreneurs were trained
9.	Entrepreneurship Development Workshop for Veterinary and Livestock Products (2011)	Course Coordinator: Eighty farmers/ dairy entrepreneurs were trained
10.	Intellectual Property Rights in India: An Introduction	Course Coordinator, Training Course
11.	Capacity Building training on "IPR Management and Commercialization Techniques" at NAARM, Hyderabad (Dec. 14-21,2010)	Led a group of 12 Scientists from CCSHAU and LUVAS for Capacity Building training as Co-PI, BPD Unit
12.	Current Concepts in Immunoassays for Diagnosis of Animal Diseases(2009)	Course Coordinator, Training Course CAS (ICAR) in Vety. Microbiology
13.	One day workshop on "Review of FMD-Control Programme" of Regional Centres of PDFMD (2007)	Co-PI of FMD Project at Regional Research Centre on FMD, Hisar
14.	Current Methods in Veterinary Microbiology (2006)	Course Coordinator -do-
15.	Management of Microbes as an Instrument of SPS Compliance and International Livestock Trade (2003)	Course Coordinator, Training Course CAS (ICAR) in Vety. Microbiology



## VI. PUBLICATIONS (Research Journals National/ International)

S. No.	Authors	Year	Title with full Reference	Journal, Volume & page number
1.	Dahiya, S, <b>Kakker, NK</b> , and Lather, A	2022	Epidemiological Studies and Economic Impact of Foot-and-Mouth Disease Outbreaks in Haryana: II (2017-2020).	<i>Haryana Vet.</i> <b>61</b> (1):
2.	<b>Kakker, NK</b> , Dahiya, S, Jhandai, S, Arora, D, Singh, R and Kumar, P	2022	Epidemiological Studies and Economic Impact of Foot-and-Mouth Disease Outbreaks in Haryana: I (2014-2016).	<i>Haryana Vet.</i> <b>61</b> (1):
3.	Sharma, BK, Kakker, NK., Bhadouriya, S and Chhabra, R	2022	Effect of CpG ODN on Infectious Bronchitis Virus Replication in Trachea and Kidneys of Chicken Embryos	<i>Journal of Animal Research</i> <b>12</b> (2): 177-82
4.	Gupta, AK, Malik, A, Singh, A, <b>Kakker, NK</b> and Rawat, J	2021	<i>In vitro</i> Effect of Single-Domain Antibody, Selected from the Phage Display Library of Indian Desert Camel, on <i>P. multocida</i> LPS-induced activation of buffalo peripheral leukocytes	<i>The Pharma Innovation Journal.</i> <b>SP-10</b> (11): 2346-51
5.	Kumar, V, <b>Kakker, NK</b> , Magotra, A, Mohapatra, JK and Dahiya, S	2021	Detection of Foot-and-Mouth Disease Virus Anti-3ab Non-Structural Protein Antibodies in Multiple Vaccinated Hardhenu Cattle at Organized Farm	<i>Haryana Vet.</i> <b>60</b> (2): 176-78.
6.	Govindaraj, G, Ganesh Kumar, B, Krishnamohan, A, ..., <b>Kakker, N, et al.</b>	2021	Foot and Mouth Disease (FMD) incidence in cattle and buffaloes and its associated farm-level economic costs in endemic India	<i>Preventive Veterinary Medicine.</i> <b>190</b> : 105318.
7.	Govindaraj, G, Ganesh Kumar, B, Krishnamohan, A, ..., <b>Kakker, N, et al.</b>	2020	Economic Impact of FMD in cattle and buffaloes in India	<i>Indian Journal of Animal Sciences.</i> <b>90</b> (7): 971-76.
8.	Sharma, BK, <b>Kakker, NK</b> , Bhadouriya, S and Chhabra, R.	2020	Effect of TLR agonist on infections bronchitis virus replication and cytokine expression in embryonated chicken eggs	<i>Molecular Immunology</i> <b>20</b> : 152–60.
9.	Attri, K, Dey, A, Dahiya, SS, Paul, SS, Jerome, A, Bharadwaj, A and <b>Kakker, NK.</b>	2020	Abatement of enteric methane production from lactating Murrah buffaloes ( <i>B. bubalis</i> ) with improving production performance and immune status through dietary supplement of composite feed additive.	<i>Environmental Science and Pollution Research</i> <a href="https://doi.org/10.1007/s11356-020-08601-x">https://doi.org/10.1007/s11356-020-08601-x</a>
10.	Audarya, S, <b>Kakker, NK</b> , Sharda, R and Chhabra, D.	2020	Immune response to an alum precipitated HS vaccine in buffaloes at a semiorganized farm of Madhya Pradesh in India.	<i>Turk J Vet Anim Sci.</i> <b>44</b> : 443-48.
11.	Bhadouriya, S., Sharma, B. K., <b>Kakker, NK</b> and Chhabra, R.	2019	Toll like receptors and cytokines as immunostimulatory adjuvants in poultry vaccines: Current status and future trends.	<i>World's Poultry Science Journal</i> , <b>75</b> : 417-27. doi:10.1017/S0043

**Publications (.....contd.)**

12.	Vijay, Dahiya, S., Chhabra, R. and <b>Kakker, NK</b>	2019	Isolation of bacteriophage from waste water against multidrug resistant <i>E. coli</i> from mastitic buffalo milk	<i>Haryana Vet.</i> <b>58</b> (2): 270-72
13.	Kundu P, Narang G, <b>Kakker, NK</b> , Kajal S, Chhabra R, and Mahajan NK.	2017	Estimation of Age of Infectious Bursal Disease Vaccination in Broiler Chickens in Haryana, India	<i>Int J Curr Microbiol and Applied Sciences</i> <b>6</b> (12): 2655-68
14.	Kundu P, Narang G, Chhabra R, Kajal S, Mahajan NK and <b>Kakker, NK</b>	2017	Immune Response Study to Live Infectious Bursal Disease Vaccines in Broiler Chickens	<i>Int J Curr Microbiol and Applied Sciences</i> <b>6</b> (12): 3391-406
15.	Maan S, Tiwari A, Chaudhary D, Dalal A, Bansal N, Kumar V, Batra K, Kumar A, <b>Kakker NK</b> and Maan NS	2017	A comprehensive study on seroprevalence of bluetongue virus in Haryana state of India	<i>Veterinary World</i> <b>10</b> (12): 1464-70
16.	Dalal A, Kumar V, Chaudhary D, Bansal N, Kumar A, <b>Kakker, NK</b> and Maan S	2017	Past and Present Overview of Orf	<i>Int J Curr Microbiol and Applied Sciences</i> <b>6</b> (12): 2159-73
17.	Dalal A, <b>Kakker, NK</b> , Kumar A, Chaudhary D, Bansal N, Sindhu, N, Kumar T, Maan, NS and Maan S	2017	Whole Genome Sequence Analysis of Bluetongue Virus Serotype 12 from Northern India	<i>Int J Curr Microbiol and Applied Sciences</i> <b>6</b> (12): 2346-48
18.	Dalal A, Maan S, Kumar A, Bansal N, Kumar V, Maan, NS and <b>Kakker, NK</b>	2017	Molecular Analysis of Genome Segment-3 of Bluetongue Virus Serotype 12 Isolates from Haryana	<i>Veterinary World</i> <b>10</b> (11): 1389-93.
19.	Dalal, A., Kumar, A., Maan, S., Batra, K., Sunayna and <b>Kakker, NK</b>	2015	Molecular Characterization of Contagious Ecthyma (ORF) Virus from Small Ruminants	<i>Indian J. Comp. Microbiol. Immunol. Infect. Dis.</i> <b>36</b> (2): 55-60.
20.	Lather, A., Kapoor, S., Sharma, R. and <b>Kakker, NK</b>	2015	Seromonitoring of Foot-and-Mouth Disease Vaccinated Animals in Eight Districts of Haryana	<i>Haryana Vet.</i> <b>54</b> (2): 181-83.
21.	Maloshrie Bora, Sharma, R. and <b>Kakker, N. K.</b>	2015	Rapid Detection of Persistent Foot-and-Mouth Disease Virus Infection in Buffaloes by RT-Lamp	<i>Indian J. Comp. Microbiol. Immunol. Infect. Dis.</i> <b>36</b> (2): 66-70.
22.	Lather, A., Kapoor, S., Sharma, R. and <b>Kakker, N. K.</b>	2014	Studies on carrier animals following a natural foot-and-mouth disease outbreak in bovines	<i>Vet. Practitioner</i> <b>15</b> (1): 5-9.
23.	Lather, A., Kapoor, S., Sharma, R. and <b>Kakker, N. K.</b>	2014	Comparison of r3A and r3AB3 NSP ELISA for detection of FMD virus carriers in vaccinated bovines	<i>Vet. Practitioner</i> <b>15</b> (2): 191-94.

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24.	Maloshrie Bora, Sharma, R and <b>Kakker, NK</b>	2014	Detection of anti-Non Structural Protein antibodies against Foot-and-Mouth Disease virus in the bovine population of Haryana	<i>Haryana Vet.</i> <b>53 (1):</b> 8-12.
25.	Berryman, S, Clark, S, <b>Kakker, NK</b> , ....., Knowles, NJ and Jackson, T	2013	Positively charged residues at the five-fold symmetry axis of cell culture-adapted FMD virus permit novel receptor interactions	<i>J. Virol.</i> <b>87:</b> 8735-44.
26.	<b>Kakker, NK</b> and Sharma, R	2012	Epidemiological studies on FMD outbreaks in Haryana during the years 2009 and 2010	<i>Haryana Vet.</i> <b>51:</b> 19-23.
27.	Sanyal, A, Sharma, R., <b>Kakker, NK</b> , Jyoti Misri, Pathak, KML and Pattnaik, B	2012	Foot-and-mouth disease in India and the All India Co-ordinated Research Project on FMD	<i>Indian Farming</i> <b>61:</b> 7-8.
28.	Sharma, R., <b>Kakker, NK</b> , Pattnaik, B and Prasad, G	2012	Foot-and-mouth disease control programme in Haryana and Delhi	<i>Indian Farming</i> <b>61:</b> 34-36.
29.	Bera, BC,..... <b>Kakker, NK</b> , ..... Pathak, KML and Singh, R.K.	2011	Zoonotic cases of camel pox infection in India	<i>Vet. Microbiology</i> <b>152:</b> 29-38.
30.	Bøtner, A., <b>Kakker, NK</b> , Barbezange, C, Berryman, S, Jackson, T and Belsham, GJ	2011	Capsid proteins from field strains of foot- and-mouth disease virus confer a pathogenic phenotype in cattle on an attenuated, cell- culture-adapted virus	<i>J. Gen. Virology</i> <b>92:</b> 1141-51.
31.	Joshi, G, Sharma, R. and <b>Kakker, NK</b>	2009	Phenotypic and functional characterization of T-cells and <i>in vitro</i> replication of FMDV serotypes in bovine lymphocytes	<i>Vaccine</i> <b>27:</b> 6656-61.
32.	Sharma, R and <b>Kakker, NK</b>	2009	Incidence of foot-and-mouth disease outbreaks in Haryana during the years 2007and 2008	<i>Haryana Vet.</i> <b>48:</b> 97-99.
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34.	<b>Kakker, NK</b> and Sharma, R	2008	Retrospective Diagnosis of FMD outbreaks by Liquid Phase Blocking ELISA	<i>Haryana Vet.</i> <b>47:</b> 28-31.
35.	<b>Kakker, NK</b> and Sharma, R	2007	FMD outbreaks after the launch of FMD-Control Programme in Haryana	<i>Haryana Vet.</i> <b>46:</b> 65-68.

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36.	Kumar, N, Sharma, R and <b>Kakker, NK</b>	2007	Non-Structural Protein 3A for differentiation of FMD infected and vaccinated animals in Haryana (India)	<i>Zoonoses and Public Health</i> <b>54</b> : 376-82.
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38.	Sharma, R, Kumar, N and <b>Kakker, NK</b>	2006	Detection of antibodies against non-structural protein of foot-and-mouth disease virus in milk of buffaloes	<i>J. Immunol. Immunopathol.</i> <b>8</b> : 57-58.
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44.	<b>Kakker, NK</b> , Prasad, G, Srivastava, RN and Bhatnagar, P	2003	Sero-prevalence of bluetongue virus infection in cattle in Haryana, Himachal Pradesh, Punjab and Rajasthan	<i>Indian J. Comp. Microbiol. Immunol. Inf. Dis.</i> <b>23</b> : 147-51.
45.	<b>Kakker, NK</b> , Mikhailov, MV, Jones, IM and Roy, P	2002	Comparative analysis of the roles of simian immunodeficiency and bovine leukemia virus MA proteins in Gag assembly in insect cells	<i>Virology</i> <b>299</b> : 48-55.
46.	Sharma, R, <b>Kakker, NK</b> and Kumar, A	2002	Occurrence of FMD outbreaks in Haryana during 2001	<i>Haryana Vet.</i> <b>41</b> : 12-17.
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48.	<b>Kakker, NK</b> , Mikhailov, MV, Nermut. MV, Burny, A and Roy, P	1999	BLV Gag particle assembly in insect cells: Formation of chimeric particles by domain-switched leukemia/lentivirus Gag polyprotein	<i>Virology</i> <b>265</b> : 308-18.
49.	Bhatnagar, P, Prasad, G, <b>Kakker, NK</b> , ....and Srivastava, RN	1997	A potential vector of bluetongue virus in north-western India	<i>Indian J. Anim. Sci.</i> <b>67</b> : 486-88.

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51.	<b>Kakker, NK</b> , Prasad, G, Bhatnagar, P, and Srivastava, RN	1996	Sentinel herd as a tool for studying Bluetongue virus infection in four northern states of India	<i>Indian J. Anim. Sci.</i> <b>66</b> : 1254-57.
52.	Prasad, G, Garg, AK, Minakshi, <b>Kakker, NK</b> and Srivastava, RN	1994	Isolation of bluetongue virus from sheep in Rajasthan, India	<i>Sci. Tech. Rev. Off. Int. Epiz.</i> <b>13</b> : 935-38.
53.	<b>Kakker, NK</b> and Goel, MC	1993	Purification and characterization of IgG1 and IgG2 from buffalo ( <i>Bubalus bubalis</i> ) serum and colostrum	<i>Vet. Immunol. Immunopathol.</i> <b>37</b> : 61-71.
54.	<b>Kakker, NK</b> and Goel, MC	1993	A methodological study on preparation of subclass specific	<i>Indian J. Anim. Sci.</i> <b>63</b> :1112-16.

**VII. SCIENTIFIC REPORTS (2001-2016)**

<b>S. No.</b>	<b>Authors</b>	<b>Year</b>	<b>Details</b>
1.	<b>Kakker, N. K.</b> Sharma, R. and Swati Dahiya	2015-16 to 2001-02	Annual Reports Regional Research Centre on FMD , Hisar
2.	<b>Kakker, N. K.</b> Sharma, R. and Swati Dahiya	2015	QRT Assessment Report Regional Research Centre on FMD(2009-14), Hisar
3.	<b>Kakker, N. K.</b>	2013-14 to 2009-10	Annual Reports Business Planning and Development Unit (VPU) and IPR Management and Commercialization Unit, LUVAS
4.	Sharma, R. and <b>Kakker, N. K.</b>	2009	QRT Assessment Report Regional Research Centre on FMD(2003-08), Hisar
5.	Sharma, R. and <b>Kakker, N. K.</b>	2007	Scientific Report Regional Research Centre on FMD(2000-2006), Hisar
6.	Kumar, A. and <b>Kakker, N. K.</b>	2006	Project Termination Report: Monitoring of immune status of Cattle & Buffaloes vaccinated with HS vaccine in the state of Haryana
7.	Kumar, A. and <b>Kakker, N. K.</b>	2005	Project Termination Report: Development of a MoAb and OMP based ELISA Kit for monitoring of immune status of animals vaccinated against HS (DBT Project)
8.	Kumar, A. and <b>Kakker, N. K.</b>	2002-03 and 2001-02	Annual Reports: Development of a MoAb and OMP based ELISA Kit for monitoring of immune status of animals vaccinated against HS (DBT Project)

### VIII. JOURNALS/ MANUALS/ BOOKS (Edited)

Authors (Editors)	Year	Details of Journal/ Manuals/ Book edited
<b>Kakker, N. K.</b> , Kumar, R., Desai, G. S. and Virmani, M.	2015 Vol. 1&2	Indian Journal of Comparative Microbiology, Immunology and Infectious Diseases. Vol. 36 (1) pp. 48; Vol. 36 (2) pp. 44
<b>Kakker, N. K.</b> , Khanna, N. and Gupta, R.	2014	Intellectual Properties for Commercialization ..... LUVAS on the Move. Directorate of Research, LUVAS, Hisar. pp. 48
<b>Kakker, N. K.</b> , Kumar, R., Desai, G. S. and Virmani, M.	2014 Vol. 1&2	Indian Journal of Comparative Microbiology, Immunology and Infectious Diseases. Vol. 35 (1) pp. 56; Vol. 35 (2) pp. 40
Yadav, R. C. and <b>Kakker, N. K.</b>	2014	Final Report of NAIP sub-project. Business Planning and Development Unit, CCS HAU Hisar. pp.50
Sangwan, A. K., Sharma, R., <b>Kakker, N. K.</b> and Kumar, P.	2013	Contribution towards Research. Directorate of Research, LUVAS, Hisar. pp. 47
<b>Kakker, N. K.</b> , Kumar, R., Desai, G. S. and Virmani, M.	2013 Vol. 1&2	Indian Journal of Comparative Microbiology, Immunology and Infectious Diseases. Vol. 34 (1) pp. 59; Vol. 34 (2) pp. 41
Sharma, R. and <b>Kakker, N. K.</b>	2012	Control of Infectious Diseases of animals with particular emphasis on FMD-Control Programme. CAFT, Deptt. Vety. Microbiology, LUVAS, Hisar, pp. 121
Srivastava, R. B., Sethi, S.K., Yadav, R.C., <b>Kakker, N. K. et al.</b>	2012	CCS HAU Technologies for Commercialization (2 <sup>nd</sup> Edition). Business Planning and Development Unit, CCS HAU Hisar. pp.56
Dabur, R. S. and <b>Kakker, N. K.</b>	2012	How to set up a New Entrepreneurship in Dairy Processing. Business Planning and Development Unit, CCS HAU Hisar. pp.81
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<b>Kakker, N. K.</b> , Sharma, R. and Archana Sharma	2006	Current Methods in Veterinary Microbiology. Centre for Advanced Training (CAS) in Veterinary Microbiology (ICAR), Deptt. Vety. Microbiology, CCS HAU, Hisar. pp. 240
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Swati Dahiya, Anita Dalal and <b>Kakker, N.</b>	2016	Biosensor based Diagnostics: Principles and Applications. <i>i.b.i.d.</i> pp: 61-66
<b>Kakker, N. K.</b> , Anita Dalal, Renu Singh and Swati Dahiya	2016	Principles and Methods of Validation of a Serological Assay. <i>i.b.i.d.</i> pp: 67-72.
Swati Dahiya, Dalal, A., Singh, R. Arora, D. and <b>Kakker, N. K.</b>	2016	Typing of Foot and Mouth Disease Virus using Serological and Molecular Assays. <i>i.b.i.d.</i> pp: 105-10.
<b>Kakker, N. K.</b> , Arora, D., Renu Singh and Swati Dahiya	2016	Differentiation of Foot and Mouth Disease Infected and Vaccinated Animals by ELISA. <i>i.b.i.d.</i> pp: 117-20.
Swati Dahiya, Renu Singh, Arora, D. and <b>Kakker, N. K.</b>	2016	High Throughput Single Dilution Liquid Phase Blocking ELISA for Seromonitoring of Foot and Mouth Disease. <i>i.b.i.d.</i> pp: 127-30.
<b>Kakker, N. K.</b> , Arora, D., and Swati Dahiya	2015	OIE-listed diseases and their Diagnosis <i>In: Course Manual on "Capacity Building for Safe Exchange of Bovine Germplasm conforming to SPS Standards"</i> . Deptt. Vety. Micro., LUVAS, Hisar. pp: 53-56.
<b>Kakker, N. K.</b> , Swati Dahiya and Arora, D.	2015	Recombinant 3AB3 NSP ELISA for differentiation of FMD infected and vaccinated animals. <i>i.b.i.d.</i> pp: 57-60.
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Sharma, R., Joshi, G. and <b>Kakker, N. K.</b>	2008	Monoclonal Antibody based ELISA for the Detection of Foot-and-Mouth Disease Carrier Animals <i>In: Course manual, ICAR Centre for Advanced Studies.</i> Deptt. Vety. Micro., CCSHAU, Hisar. pp: 62-64.
<b>Kakker, N. K.</b> and Sharma, R.	2006	OIE recommended methods for diagnosis of animal diseases. <i>In: Course manual on "Current Methods in Veterinary Microbiology".</i> Deptt. Vety. Micro., CCSHAU, Hisar. pp: 1-7.
Sharma, R., Maitri Sharma and <b>Kakker, N. K.</b>	2006	Cell-virus interaction: Immuno-histochemical techniques. <i>i.b.i.d.</i> pp: 46-52.
<b>Kakker, N. K.</b> and Sharma, R.	2006	Isolation of foot-and-mouth disease virus in cell culture. <i>i.b.i.d.</i> pp: 171-72.
<b>Kakker, N. K.</b> and Maitri Sharma	2006	Double antibody sandwich ELISA for serotyping of FMD virus <i>i.b.i.d.</i> pp: 178-81.
<b>Kakker, N. K.</b> Himani and Maitri Sharma	2006	Liquid Phase Blocking ELISA for detection of antibodies against FMD virus types. <i>i.b.i.d.</i> pp: 187-89.
Sharma, R., and <b>Kakker, N. K.</b>	2006	Current techniques for elucidation of cellular-immunological interventions in viral diseases: An overview. <i>In: Course manual on "Methods in Virology for Disease Diagnosis".</i> Kapoor, S., Sharma, R. and Minakshi (eds.). pp: 19-25.

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<b>Kakker, N. K.</b> , Kumar, N. and Sharma, R.	2006	Current concepts in the diagnosis of Foot-and-Mouth disease. <i>i.b.i.d.</i> pp: 58-64.
Sharma, R., and <b>Kakker, N. K.</b>	2006	Current trends in the diagnosis of bovine respiratory viral infections. <i>i.b.i.d.</i> pp: 65-72.
Sharma, R., and <b>Kakker, N. K.</b>	2006	Serum neutralisation test for detection of antibodies against foot-and-mouth disease virus. <i>i.b.i.d.</i> pp: 121-123.
<b>Kakker, N. K.</b> and Sharma, R.	2006	Diagnosis and serotyping of foot-and-mouth disease virus by double antibody sandwich ELISA. <i>i.b.i.d.</i> pp: 124-27.
Sharma, R., and <b>Kakker, N. K.</b>	2006	Application of liquid phase blocking ELISA and non-structural protein based ELISA for the detection of FMDV antibodies. <i>i.b.i.d.</i> pp: 128-31.
Sharma, R., Joshi, G. and <b>Kakker, N. K.</b>	2006	Assessment of cell mediated immunity by lymphocyte proliferation assay. <i>i.b.i.d.</i> pp: 139.
Sharma, R., <b>Kakker, N. K.</b> and Maitri Sharma	2005	Current concepts in the diagnosis of foot-and-mouth disease. <i>In: Course manual on Advances in Clinical Diagnostic Techniques, Post-mortem Examination and Despatch of Specimens.</i> Mishra, S. K., Gupta, R. P. and Jakhar, K. K. (eds.). Deptt. of Veterinary Pathology, CCS HAU Hisar, Haryana, India. pp: 202-207.
Sharma, R., <b>Kakker, N. K.</b> and Maitri Sharma	2005	Current status of foot-and-mouth disease in India: Epidemiology, Control and Role of field Veterinarians. <i>In: Course manual on Disease Surveillance and monitoring, prevention and control of livestock diseases of economic importance and zoonotic diseases.</i> Mahajan, N. K., Narang, G. and Kumar, A. (eds.). pp: 84-91.
<b>Kakker, N. K.</b> , Sharma, R., and Himani	2005	Foot-and-mouth disease virus typing and seromonitoring by ELISA. <i>i.b.i.d.</i> pp: 92-96.
Sharma, R., and <b>Kakker, N. K.</b>	2005	Use of ELISA for characterisation of an antigen. <i>In: Course manual on Application of Techniques in Entomological Research.</i> Chillar, B. S., Kaushik, H. D., Jaglan, R. S. and Gulati, R.(eds.). Department of Entomology, CCS HAU, Hisar. pp: 241-42.
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<b>Kakker, N. K.</b> and Sharma, R.	2005	Diagnosis of foot-and-mouth disease through ELISA. <i>i.b.i.d.</i> pp: 161-66.
<b>Kakker, N. K.</b> and Sharma, R.	2005	Equine Viral Arteritis. <i>In: Course manual on Accreditation and Allied Issues With Focus on Development of Website of Core Courses of Department of Vety. Microbiology.</i> Kapoor, S.(ed.). Department of Vety. Microbiology, CCS HAU, Hisar. pp: 307-09.

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<b>Authors</b>	<b>Year</b>	<b>Details of Chapters in Manuals</b>
<b>Kakker, N. K.</b> and Sharma, R.	2005	Equine Encephalomyelitis. <i>i.b.i.d.</i> pp: 310-12.
Sharma, R., and <b>Kakker, N. K.</b>	2005	Foot-and-Mouth Disease and Duck Viral Hepatitis. <i>i.b.i.d.</i> pp: 317-21.
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<b>Kakker, N. K.</b> and Sharma, R.	2004	Serological Tests in Viral Identification. <i>i.b.i.d.</i> pp: 190-195.
Sharma, R., and <b>Kakker, N. K.</b>	2004	Foot and Mouth Disease. 6 <sup>th</sup> Animal Husbandry Officer's Workshop, COVS, CCS HAU, Hisar Dec., 22-23, 2003. pp: 14-18.
<b>Kakker, N. K.,</b> Chhabra, Rajesh and Sharma, R.	2003	Non-congenital pathogens and their epidemiology: Contagious Pathogens. <i>In: Course manual on Management of Microbes as an Instrument of SPS Compliance and International Livestock Trade.</i> Kalra, S. K., Kakker, N. K. and Rawat, J. (eds.). pp: 67-71.
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<b>Kakker, N. K.</b> and Sharma, R.	2003	Use of Double Antibody Sandwich ELISA for Typing of Foot and Mouth Disease Virus. <i>i.b.i.d.</i> pp: 136-138.
Sharma, R., and <b>Kakker, N. K.</b>	2003	Application of Cell Culture Technology for the Detection of Foot and Mouth Disease Virus. <i>i.b.i.d.</i> pp: 139.
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<b>Kakker, N. K.</b> and Sharma, R.	2002	Typing of Foot and Mouth Disease Virus by double antibody sandwich ELISA. <i>i.b.i.d.</i> pp: 153-157.
<b>Kakker, N. K.</b> and Kadian, S. K.	2002	Immunoglobulins I: Structure, Properties and Classification. <i>In: Course manual on Production and use of Instructional Material on Vety. Immunology and Serology.</i> Kadian, S. K.(ed.). pp: 49-54.
Kadian, S. K. and <b>Kakker, N. K.</b>	2002	Immunoglobulins II: Theories of Antibody Production and Generation of Antibody Diversity. <i>i.b.i.d.</i> pp: 55-60.
<b>Kakker, N. K.</b> and Chhabra, R.	2002	Use of ELISA for Typing of FMD Virus. <i>i.b.i.d.</i> pp: 204-206.

## X. CHAPTERS IN BOOKS (Selected)

Authors	Year	Details of Chapters in Books
Sharma, R. and <b>Kakker, N. K.</b>	2012	Advances in diagnosis of foot-and-mouth disease. <i>In: Veterinary Diagnostics: Current Trends</i> . Garg, S. R. (Ed). Satish Serial Publishing, New Delhi. pp: 369-78.
Sharma, R. and <b>Kakker, N. K.</b>	2011	Foot and Mouth Disease Control. <i>In: Veterinary and Livestock Sector: A Blueprint for Capacity Building</i> . Garg, S. R. (Ed). Satish Serial Publishing, New Delhi. pp: 369-80.
Lather, A., Nidhi, Sharma, R. and <b>Kakker, N. K.</b>	2010	Foot-and-Mouth Disease – An Overview <i>Spectrum: PG Magazine</i> , Dean PGS, CCSHAU, Hisar. pp: 117-18.
Srivastava, R.N., Prasad, G., <b>Kakker, N. K.</b> , and Bhatnagar, P.	1995	Epizootiology of bluetongue virus in particular reference to India. <i>In: Bluetongue: Indian Perspective</i> . CCS HAU Press, Hisar. pp: 1-31.
<b>Kakker, N. K.</b> , Prasad, G., Bhatnagar, P., and Srivastava, R.N.	1995	Studies on current infection of bluetongue virus in north India using sentinel herds. <i>i.b.i.d.</i> pp: 32-36.
Naresh, A., Prasad, G., Srivastava, R.N., <b>Kakker, N. K.</b> , and Bhatnagar, P.	1995	Bluetongue virus: diagnostic applications. <i>i.b.i.d.</i> pp: 43-69.
Prasad, G., Srivastava, R.N., <b>Kakker, N. K.</b> , and Bhatnagar, P.	1995	Clinical bluetongue. <i>i.b.i.d.</i> pp 70-89.
Bhatnagar, P., Prasad, G., <b>Kakker, N. K.</b> ,..... And Srivastava, R. N.	1995	<i>Culicoides</i> : Vector of bluetongue virus. <i>i.b.i.d.</i> pp: 96-114.

## XI. THESES/ POST DOCTORAL FELLOWSHIP RESEARCH TITLES

Degree/ PDF	Year	Title and Institution
Post-Doctoral Fellow	2008	Rapid Generation of Recombinant FMD Vaccine Strains Containing Capsids Derived from Virulent Field Viruses. Institute for Animal Health, Pirbright, U. K. (Commonwealth Fellowship)
Ph. D.	1999	Studies on Bovine Leukemia Virus Gag Polyprotein: Assembly and Compatibility with other Retroviruses. Oxford University, Oxford, U.K. (Commonwealth Scholarship)
M.V.Sc.	1988	Purification and Characterization of Buffalo Immunoglobulins G1 and G2 and Production of Monospecific Antisera. HAU, Hisar, Haryana, India. (HAU Merit Scholarship)

## XII. CONFERENCE PROCEEDINGS/ PAPERS/ ABSTRACTS, POPULAR ARTICLES, BULLETINS (Selected)

Authors	Year	Details of Conference Proceedings/ Papers/ Abstracts
<b>Kakker, N. K.</b> , Sharma, R. and Swati Dahiya	2015	Success of FMD-Control Programme in Haryana. <i>In: XXII Annual Convention ISVIB</i> , NRCE, Hisar (Dec. 17-19, 2015). VT-2. pp: 34.
Swati Dahiya, <b>Kakker, N. K.</b> , Arora, D., Sonia	2015	Foot-and-Mouth Disease incidences in Haryana during 2013-15. <i>i.b.i.d.</i> PP-2. pp: 169.
Tiwari, A., Maan, N. S., ..... Gupta, A., <b>Kakker, N. K.</b> and Maan, S.	2015	A comprehensive study on seroprevalence of bluetongue virus in Haryana state of India. <i>i.b.i.d.</i> PP-4. pp: 171.
Anita Dalal, Kumar, A., Batra, K., Maan, S. and <b>Kakker, N. K.</b>	2015	B2L and IL-2 gene sequence based characterization of Orf viruses from North-India. <i>i.b.i.d.</i> PP-43. pp: 210.
<b>Kakker, N. K.</b> , Chander, S. and Khanna, N.	2014	Intellectual Property Management of Veterinary and Livestock Products & Technologies at LUVAS: A Way Forward. (12 <sup>th</sup> Convocation of NAVS), LUVAS, Hisar. pp: 36-41.
Anita Dalal, Kumar, A., Maan, S. and <b>Kakker, N. K.</b>	2014	Detection and genetic variability amongst different isolates of CPD virus in sheep and goats. <i>In: XXVIII Annual Conference of IAVMI, COVS, Mathura, U.P.</i> (Oct. 30 – Nov. 1, 2014). pp: S6:O3.
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Joshi, G., Sharma, R. and <b>Kakker, N. K.</b>	2012	FMD virus down regulates the bovine PBMCs <i>in vitro</i> . <i>i.b.i.d.</i> Abst. No. 13.
Nidhi Samania, Sharma, P. C., Sharma, R. and <b>Kakker, N. K.</b>	2012	Prevalence of antibodies against structural and NSPs of FMD virus in sheep from rural cohorts in Haryana, India. <i>i.b.i.d.</i> Abst. No. 14.
Sharma, R., <b>Kakker, N. K.</b> and Pattnaik, B.	2012	Success of FMD-CP in Haryana, India: Epidemiological and sero-monitoring studies (2004-2010). <i>i.b.i.d.</i> Abst. No. 15.
Joshi, G., Sharma, R. and <b>Kakker, N. K.</b>	2010	Functional characterization of macrophages in the bovine PBMCs infected <i>in vitro</i> with FMD virus. XXVI World Buiatrics Congress, Santiago, Chile (November 14-18, 2010). A-224.
Bera, B.C., Gnanavel, S. ... <b>Kakker, N. K.</b> ... and Singh, R. K.	2010	Zoonotic camelpox virus infection in India. <i>In: International Conference and XXIV Annual Convention of IAVMI, COVS &amp; A.H.</i> , IGKV, Raipur, Chhattisgarh (Jan. 27-29, 2010). pp: 197-98.
Sharma, R. <b>Kakker, N. K.</b> and Sharma, A.	2010	Detection of antibodies against nonstructural protein of FMD virus in milk of mastitic buffaloes. <i>J. Immunol. Immunopathol.</i> 12: pp: 165 (Abstract No. IBT/021).
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Sharma, R. and <b>Kakker, N. K.</b>	2009	Sero-monitoring of FMD-CP in the state of Haryana, India. <i>OIE/FAO Global Conference on FMD</i> . Paraguay (June 24-26, 2009).

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<b>Authors</b>	<b>Year</b>	<b>Details of Conference Proceedings/ Papers/ Abstracts</b>
Sharma, R. , Kumar, N., and <b>Kakker, N. K.</b>	2006	Detection of antibodies against 3A non structural protein of FMD virus in milk of buffaloes. <i>In: 4<sup>th</sup> SIIP</i> , Abst. No. 32.
<b>Kakker, N. K.</b> and Sharma, R.	2006	Epidemiological Studies on FMD in Haryana during 2003-2004. <i>In: XVI Annual Convention of Indian Virological Society and International Symposium on Management of Vector Born Viruses</i> . ICRISAT, Hyderabad (Feb. 7-10, 2006). OP9/39 pp: 71.
Sharma, R., <b>Kakker, N. K.</b> , Chhabra, R. and Khatri, M.	2004	Cell mediated immunity in Foot-and-Mouth Disease. <i>In: XVI Annual Scientist's Meet of PDFMD</i> . COVS, Mathura (Jan. 9-10, 2004). pp: 30-34.
<b>Kakker, N. K.</b> and Sharma, R.	2004	LPB-ELISA as a tool for the retrospective diagnosis of FMD outbreaks. <i>In: XXII<sup>nd</sup> Annual Conference of IAVMI</i> , Deptt. of Vety. Microbiology, CSK HPKV, Palampur. (Oct. 18-19, 2004). pp: 17.
Sharma, R. Kumar, A. and <b>Kakker, N. K.</b> ,	2004	Studies on FMD vaccination in a rural cohort. <i>In: XII 4<sup>th</sup> Annual Convention of IAAVR</i> , COVAS, RAU, Bikaner. Abst. No. 1.C.11.
Kumar, A., Dahiya, G. and <b>Kakker, N. K.</b>	2004	Monoclonal antibody and OMP based single dilution ELISA for antibodies against HS in serum of cattle and buffaloes. <i>In: XI<sup>th</sup> Annual Convention of ISVIB</i> , IVRI, Mukteswar, Nainital (Nov., 3-4, 2004). ADD-O-8. pp: 19.
<b>Kakker, N. K.</b> and Sharma, R.	2004	Incidence of FMD outbreaks in Haryana during 2002-2003. <i>In: 3<sup>rd</sup> Annual Convention, Society of Immunol. and Immunopathology</i> , Agra (Feb. 13-15, 2004). pp. S78-79.
<b>Kakker, N. K.</b> and Sharma, R.	2002	FMD outbreaks in Haryana during 2001-2002. <i>In: 43<sup>rd</sup> Annual Conference of AMI, Deptt. of Microbiology</i> , COBSc&H, CCS HAU, Hisar, Haryana, India (December 11-13, 2002).
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<b>Kakker, N. K.</b> , Mikhailov, M. V., Jones, I. M. and Roy, P.	2001	Structure based mutagenesis of bovine leukemia and simian immunodeficiency virus matrix proteins for analysis of amino acid residues involved in Gag assembly in insect cells. <i>In: 6<sup>th</sup> International Vety. Immunology Symposium</i> . PS 7:18. p. 158.
<b>Kakker, N. K.</b> , Mikhailov, M., Jones, I. M. and Roy, P.	2001	Assembly of BLV Gag particles in insect cells: Structure based mutagenesis of MA and CA-NC proteins. <i>In: X Int. Conf. on Human Retrovirology</i> , Dublin, Ireland (June 25-29, 2001). P063.
<b>Kakker, N. K.</b> , Prasad, G., Bhatnagar, P., and Srivastava, R.N.	2000	Epizootiology of bluetongue virus in five northern states of India. <i>In: 7th International Symposium on dsRNA viruses</i> . Aruba, Caribbean (Dec. 2-7, 2000).
<b>Kakker, N. K.</b> , Mikhailov, M. V., ..... and Roy, P.	1999	Assembly proficiency of MA and CA-NC proteins of BLV and related retroviruses in insect cells. <i>In: XI Int. Congress of Virology</i> . Sydney, Australia (August 9-13, 1999) Abst. No. VP48.07.

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<b>Kakker, N. K.,</b> Mikhailov, M. V., ..... and Roy, P.	1999	Assembly of BLV Gag particles in insect cells: Formation of leukemia/ lentivirus chimeric particles. <i>In: 9<sup>th</sup> Int. conference on human retrovirology</i> , Kagoshima, Japan (April 5-9, 1999). <i>J. AIDS Hum. Ret.</i> <b>20</b> : 4.
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<b>Kakker, N. K.,</b> Mikhailov, M. V. and Roy, P.	1997	Assembly of bovine leukemia virus Gag particle and its relationship with other retroviruses. <i>D. Phil. Symposium</i> , Deptt. Of Biochemistry, Oxford University, Oxford, U.K. (June 30, 1997).
Naresh, A., Prasad, G., <b>Kakker, N. K.,</b> Bhatnagar, P. and Srivastava, R. N.	1994	Detection of bluetongue virus antibodies in ruminant livestock in north India by monoclonal antibody based cELISA. <i>In: 15<sup>th</sup> Annual Conference of IAVMI</i> , Bombay Veterinary College, India (Dec. 27-29, 1994). Abst. No. 6:12, pp. 58.
Prasad, G., <b>Kakker, N. K.,</b> Bhatnagar, P. and Srivastava, R. N.	1994	Epizootiology of bluetongue virus infection in H.P., India. <i>In: 15<sup>th</sup> Annual Conference of IAVMI</i> , Bombay Veterinary College, Maharashtra, India (Dec. 27-29, 1994). Abst. No. 8:19, pp. 103.
Prasad, G., <b>Kakker, N. K.,</b> Bhatnagar, P., ..... and Srivastava, R. N.	1994	Serological survey of bluetongue virus infection in four states of northern India. <i>In: 9<sup>th</sup> Annual Convention of Indian Virology Society</i> , HAU Hisar, India (Feb. 8-10, 1994).
Gupta, S. K., Malhotra, D. V., .... <b>Kakker, N. K.,</b> and Bhattacharyullu, Y.	1994	Equine babesiosis: Serodiagnosis by complement fixation test. <i>In: 11<sup>th</sup> National Congress of Parasitology</i> , Mohan Lal Sukhadia University, Rajasthan, India (Feb. 22-24, 1994). Abst. No. PS: 4.4.
Gupta, S. K., Malhotra, D. V., .... <b>Kakker, N. K.,</b> and Bhattacharyullu, Y.	1994	Immuno-kinetic studies of <i>Babesia equi</i> infection - a comparison of dot-ELISA and capillary tube agglutination test. <i>In: XII ISVM</i> , Madras Vet. College, Madras (Feb. 4-6, 1994). Abst. No. 5.20.
Sharma, C. S., Gupta, S. L., Dhar, S. and <b>Kakker, N. K.</b>	1993	Evaluation of dot-ELISA test for serodiagnosis of bovine tropical theileriosis. Deptt. Vety. Medicine, B.C. Krishi Vishwavidyalaya, Mohanpur, W. B., India (April 23-25, 1993). Abst. No. 4.08.
<b>Kakker, N. K.</b> and Goel, M. C.	1990	Quantitation of IgG1, IgG2 and IgG levels in buffalo serum and lacteal secretions by SRID method. <i>11<sup>th</sup> Annual Conference of IAVMI</i> , RAU, Bikaner, India (Dec. 26- 28, 1990). pp. 59.



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<b>Authors</b>	<b>Year</b>	<b>Details of Conference Proceedings/ Papers/ Abstracts</b>
<b>Kakker, N. K.</b> and Goel, M. C.	1990	Physico-chemical and biological characterization of buffalo IgG1 and IgG2. <i>17<sup>th</sup> Annual Conference of IIS, SGP GIMS, Lucknow, India (Dec. 1- 3, 1990).</i> Abst. No. P 37.
<b>Kakker, N. K.</b> and Goel, M. C.	1989	Separation and characterization of heavy and light chains of buffalo IgG1 & IgG2. <i>16<sup>th</sup> Annual Conf. of IIS, MGIMS, Sevagram, Maharashtra, India (Oct. 12- 14, 1989).</i> Abst. No. P 111.

**XIII. Extension/ Popular Articles**

<b>Authors</b>	<b>Year</b>	<b>Details of Conference Abstracts, Popular Articles, Bulletins</b>
<b>Kakker, N. K.,</b> Swati Dahiya and Arora, D.	2015	Haryana mein muh-v-khur rog Niyantaran Karyakaram: Safalata ki Kahani – Aankaron ki Jubani (FMD-Control Programme in Haryana: A success story with scientific data). <i>HaryanaKheti.10:27-28.</i>
Swati Dahiya and <b>Kakker, N. K.</b>	2015	Pashuon mein muh-v-khur rog: Pahupalak ki bhumika. <i>Pashudhan Gyan, Directorate of Extension Education, LUVAS, Hisar 1: 18-19.</i>
Sharma, R. and <b>Kakker, N. K.</b>	2006	Pashuon mein muh-v-khur rog. (Foot-and-mouth Disease in animals). Pamphlet in Hindi. Deptt. Vety. Micro, CCSHAU, Hisar pp: 1-8.
Sharma, R. and <b>Kakker, N. K.</b>	2005	Foot-and-mouth Disease. In: VETS UPDATE. CCS HAU Press, Hisar. pp: 21-24.
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