Dr. Sakshi Kaith
Scientist (Animal Biotechnology)

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Agricultural Biotechnology,
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Fields of scientific interest: Mass spectrometry-based proteomics, MS Data analysis, Bioinformatics, Cell culture, Assisted Reproductive Biotechnology, HMC, IVF

Education Qualifications:

- Ph.D. Animal Biotechnology (2014-2021), National Dairy Research Institute, Karnal,Haryana, **India.** CGPA:**8.7** out of 10
- M.Sc. Animal Biotechnology (2014), National Dairy Research Institute, Karnal, Haryana, **India.** CGPA:**8.0** out of 10
- B.Sc. (major subjects- Biotechnology, Chemistry, Zoology; 2012), Jammu University(GCW, Gandhinagar College), Jammu, **India**. CGPA: **7.67** out of 10

Ph. D. Project
Titled: **Understanding the development of Pashmina fibre through proteomic analysis.**

Major Advisor: Dr. J. K. Kaushik, PS, Proteomics and Structural Biology and, Animal Biotechnology Division, ICAR- National Dairy Research Institute (Deemed university), Karnal, Haryana**,** India.

M. Sc. Research Work
Titled: **Developmental competence, apoptosis and gene expression of early and late cleaving buffalo embryos produced by hand guided cloning.**

Major Advisor: Dr. S. K. Singla, PS, Embryo Biotechnology, Animal Biotechnology Centre, ICAR- NDRI, Karnal

Professional Experiences:
As a Master Student:
>   One year research experience in the field of Assisted Reproductive Technology (ART)
- ✓ Handmade cloning technique
- ✓ In vitro fertilization
- ✓ Animal cell culture

As a Doctoral Student

- ✓ Proteome profiling of pashmina fibre, guard hair, goat skin.
- ✓ Differential proteome profiling of goat skin throughout all the stages of hair follicle development using both LFQ and TMT based strategies.

MS sample preparation

- ✓ Efficient protein extraction from hard tissues like pashmina fibre, guard hair, goat skin using different protein extraction methods and further densitometric analysis using ImageJ from NIH.
- ✓ Digestion protocols: both In-gel and In-sol.
- ✓ Complex protein sample resolution or fractionation: HPLC based, IEF based both in-gel (2D) and in-sol fractionation by off gel fractionators (Agilent) and also through pH based Reverse phase manual columns (Pierce).
- ✓ Quantitative proteomics based on both labeled (iTRAQ, TMT) and label free quantitation

MS Data analysis

- ✓ Mass spectrometric data analysis right from beginning i.e. Raw data in any of the proprietary formats (.d/.BAF from Agilent/bruker, .RAW from thermo, .WIFF from AB SCIEX) and its conversion to any of the open format like mzXML, mzML by using tools like Proeowizard, AB SCIEX MS Data Converters.
- ✓ Data visualization: LC-MS/MS data visualization in Peak view, MZmine 3, Perseus
- ✓ LC-MS/MS data analysis using various proprietary and open softwares: Proteinscape, Protein pilot (Pro Group), Bio tools (Mascot), Proteome Discoverer (SEQUEST HT, MS Amanda), Trans proteomic pipeline suite (used Comet, Tandem), Global proteome machine (The GPM) and very vastly MAXQUANT (based on Andromeda search engine), an open software.
- ✓ Data normalization, pattern recognition, time-series analysis, graphics generation and the statistical analysis of quantitative data in Perseus software.
- ✓ Downstream data analysis:

  Gene Ontology: Using various online tools such as PANTHER, DAVID, GeneCodis, GeneMANIA and many more

  Protein-protein Interaction: Using STRING, CYTOSCAPE (Plugins used ClueGO, BINGO, ClusterViz, MCODE)

  Pathway analysis: Using KEGG, Reactome

  Gene descriptions: GeneCards

  Graphic plots generation: HeatMapper, Network Analyst, Perseus

Technical Expertise:

Technology: Mass spectrometry, Handmade Cloning, IVF

Molecular Biology: Total RNA and DNA isolation from goat hairs and skin, RNA isolation from cloned embryos, PCR, Quantitative Real Time-PCR, Isolation of total protein, SDS-PAGE, 2-DE and Western blotting, Off Gel Fractionation of protein sample.

Biophysical Techniques: Fluorescence microscopy, Scanning electron microscopy, Light microscopy, Optical microscopy.

Biochemical Techniques: Apoptosis diagnosis using TUNEL assay, Immuno fluorescence staining in blastocysts, Protein clean up using various precipitation methods, clean up kit and Dialysis; Protein estimation using Bradford**,** BCA, 2D quant kit, Image J.

Cell culture: Buffalo Somatic cells like fibroblast cell culture, epithelial cell culture

Computational skills in Biology: Primer Designing, BLAST, CLUSTAL W, Imaje J, many software and tools used in MS data analysis.

Academics and achievements:
- ICAR SRF-2015 Qualified– Rank 8 (Under Major subject:Veterinary and Animal Sciences- II (06); Sub subject: Animal Biotechnology)
- Qualified ICAR-National Eligibility Test (December, 2014)
- Qualified GATE Life sciences, 2012
- Qualified Combined Entrance Examination for Biotechnology program-M.Sc. Biotechnology.
- Received certificate of appreciation for outstanding research work during M.Sc. in field of Dairy Production during 2013-2014 at ICAR-NDRI Karnal.

Awards, scholarships and certifications:
- Awarded **Best Oral Presentation** by School of Life Sciences, University of Hyderabad, India in Virtual conference on **Proteomics in Agriculture and Healthcare** (March 13-14, 2021)
- Awarded **Institutional Fellowship** by National Dairy Research Institute, India for M.Sc. program (2012-2014).
- Awarded **Institutional Fellowship** by National Dairy Research Institute, India for Ph.D. program (2014-2015).
- Awarded **RGNF fellowship** during Ph.D. program (2014-2019)
- Awarded **CSIR-JRF** and **NET** in Life Sciences (72 Rank) held on Dec, 2014
- Selected for "**PSI Travel Award**" and "**Oral presentation**" at 9th Annual meeting of Proteomics Society, India.

Research Publications:
- **Kaith, S**., Saini, M., Raja, A. K., Sahare, A. A., Jyotsana, B., Madheshiya, P., ... & Singla, S. K. (2015). Early cleavage of handmade cloned buffalo (bubalus bubalis) embryos is an indicator of their developmental competence and quality. Reproduction in domestic animals, 50(2), 214-220.
- Madheshiya, P. K., Sahare, A. A., Jyotsana, B., Singh, K. P., Saini, M., Raja, A., **Kaith, S**….& Palta, P. (2015). Production of a cloned buffalo (Bubalus bubalis) calf from somatic cells isolated from urine. Cellular Reprogramming (Formerly" Cloning and Stem Cells"), 17(3), 160-169.

Popular Article:

- Soni, P.G., Kumar, A., Yadav, T., **Kaith, S.**, & Saharan, R. (2016). Salinity Stress in Plant. Indian Farmer, 3(4):272-275.
- Saharan, R., Soni, P. G., **Kaith, S**., & Yadav, T. (2016). Sweet Sorghum: An Alternative Energy Crop for Biofuel, Food and High Biomass. Indian Farmer, 3 (7) 507-512.

Abstracts

- **Kaith, S**., Kalra, S., Shiekh, F. D., Ayaaz, A., Ganai, N. A., Kumar , S., Mohanty, A. K. and Kaushik, J. K. "LC-MS/MS based comparative analysis of different protein extraction methods from Pashmina" in 11th Annual Meeting of Proteomics Society, India (PSI) & International Conference on "Proteomics for System Integrated Bio-Omics, One Health and Food Safety" Page no. 135, Dec 02-04, 2019, ICAR-National Dairy Research Institute, Karnal, Haryana.

- **Kaith, S**., Kalra, S., Bathla, S., Iqbal, Z., Bhat, B., Shiekh, F. D., Ayaaz, A., Ganai, N. A., Kumar , S., Mohanty, A. K. and Kaushik, J. K. "A comprehensive proteome map of Pashmina fibre by combining multiple protein extraction methods and proteogenomics approach" in 9th Annual Meeting of Proteomics Society, India (PSI) & International Conference on "Proteomics in Health and Disease" Page no. 21, Nov 30-Dec 02, 2017, ILS Bhubaneshwar, Odisha.

- **Kaith, S**., Kalra, S., Bhat, B., Iqbal, Z., Ganai, N. A., Kumar , S., Mohanty, A. K. and Kaushik, J. K. "Proteome profiling of Pashmina fibre by using proteogenomics approach" in 86th Conference of Society of Biological Chemists "Emerging Discoveries in Health and Agricultural Sciences" Page no. 220, 16 Nov -19 Nov 2017, School of Life Sciences, Jawaharlal Nehru University, New Delhi**.**

- Kalra, S., **Kaith, S**., Bathla, S., Iqbal, Z., Bhat, B. A., Ganai, N. A., Kumar, S., Mohanty, A. K. and Kaushik, J. K. "Proteome analysis of pashmina goat skin to understand fibre growth: Development of a platform for yield and quality specific biomarkers" In EMBL symposium "From Single- to Multiomics: Applications and Challenges in Data Integration" Page No. 120, 12 Nov-14 Nov 2017, EMBL, Heidelberg, Germany. **(Poster)**

- P.K. Madheshiya*, A.A. Sahare, B. Jyotsana, K.P. Singh, M. Saini, A.K. Raja, **S. Kaith**, S.K. Singla, M.S. Chauhan, R.S. Manik & P. Palta. "Production of buffalo embryos by Hand-made cloning using somatic cells isolated from urine and tail skin, and examination of their developmental competence, quality, epigenetic status and gene expression" in 12th Agricultural Science Congress on "sustainable livelihood security for small holder farmers" Page No. 158, 3-6 February, 2015, at ICAR-National Dairy Research Institute, Karnal**.**

Membership

- Life time membership of Proteomics Society, India (PSI)

Conferences, Symphosia Attended

- International symposium on "Biotechnological Advances in Cancer Biology" at S.M.V.D.University, Jammu on 13th feb, 2012.
- Conference on "Emerging trends in medical Biotechnology and Nanotechnology" at Arni University Kangra (H.P.) on 3-4 Dec, 2011.
- 12th Agricultural Science Congress on "Sustainable livelihood security for small holder farmers" held at ICAR-National Dairy Research Institute, Karnal on 3-6 February, 2015.

- 86th Conference of Society of Biological Chemists "Emerging Discoveries in Health and Agricultural Sciences" held at, School of Life Sciences, Jawaharlal Nehru University, New Delhi on 16 Nov -19 Nov 2017. (Poster)
- 9th Annual Meeting of Proteomics Society, India (PSI) & International Conference on "Proteomics in Health and Disease" held at ILS Bhubaneshwar, Odisha on Nov 30-Dec 02, 2017. (Oral & Poster)
- 11th Annual Meeting of Proteomics Society, India (PSI) & International Conference on "Proteomics for System Integrated Bio-Omics, One Health and Food Safety " held at ICAR-National Dairy Research Institute, Karnal, Haryana on Dec 02-04,2019. (Poster)
- Virtual conference on Proteomics in Agriculture and Healthcare held at School of Life Sciences, University of Hyderabad, India on Mar 13-14, 2021.

Workshops
- Workshop on "**Bioinformatics for Genomics & Proteomics analysis**" organised by the BTIS sub-DIC funded by Department of Biotechnology, Ministry of Science and Technology, Govt. of India on march 17, 2017
- Demonstrated and contributed in the National workshop on "**Structural and Functional Bioinformatics**" organised by the BTIS sub-DIC funded by DBT, Ministry of Science and Technology, Govt of India on March 28-29,2019.
- Participated in workshop entitled **''Mammalian Genome Editing by CRISPR Technique''** at ICAR-National Dairy Research Institute, Karnal on 15th November, 2019.
- International workshop on "**Targeted Proteomics**" held on Nov 28, 2019 at ICAR-National Dairy Rsearch Institute in association with Proteomics society, India
- International workshop on "**Quantitative Proteomics**" held on Nov 29, 2019 at ICAR-National Dairy Rsearch Institute in association with Proteomics society, India
- International workshop on "**Proteogenomics**" held on Nov 30- Dec 01, 2019 at ICAR-National Dairy Rsearch Institute in association with Proteomics society, India
- Four day online workshop on "**Mass Spectrometry in Proteomics**" held on 15th-18th July, 2020

Online trainings and courses

- Five day online Training Course on "Genomic Data Analysis and Experimental Strategy" held on June 26- 30, 2020 at Centre for Stem Cell and Cancer Genomics, AMI BioScience, Coimbatore.
- **Twenty workshops** during two months under **e-Refresher Course** to innovate by advanced biotechnology learning in this 21st Century: The Era of Biotechnology on emerging areas of biotechnology including genomics, NGS, CADD, Bioinformatics for metagenomics, CRISPR-CAS and many others conducted by Department of Biotechnology, AKS university Satna, M.P., India.