

Dr. Gayatri Mishra

Assistant Professor grade-I

Agricultural and Food Engineering Department

Indian Institute of Technology Kharagpur

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Academic information

Indian Institute of Technology Kharagpur, West Bengal, 06-2019

India Ph.D.: *Agricultural and Food Engineering*

Thesis Title: Development of rapid and non-destructive methods for quality analysis and disinfestation of stored wheat grain

Anand Agricultural University, Anand, Gujarat Master 08-2014

of Technology: *Food Processing Technology*

Thesis Title: Technology development for popping of sorghum grain using microwave energy.

Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, 06-2012

India Bachelor of Technology: *Agricultural Engineering*

Thesis Title: Development of Herbal Tea Bags using Stevia as a Sugar Substitute

Relevant expertise

Skills

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| <ul style="list-style-type: none">▪ Food quality and safety▪ Food analytical chemistry▪ Spectroscopy, machine vision (hyperspectral imaging, x-ray imaging)▪ Food Process Modelling▪ Food process equipment design & development | <ul style="list-style-type: none">▪ Analytical instruments: FTNIR, hyperspectral imaging, E-nose, GC-MS, HPLC, LC-MS, rheometer, spectrophotometer▪ Quality analysis: texture, color, pH, proximate composition, micronutrient profiling, colony count, rancidity▪ Software: C, MATLAB, ENVI▪ Statistical tools: Design Expert, Origin, SPSS, Minitab |
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Research Interest

- Application of Nondestructive techniques for food quality and safety analysis.
- Development of portable sensors for detection of food adulterants and contaminants.
- Process automation in food industries.
- AI applications in food processing
- Food industry waste valorization

Professional experience

- Serving as assistant professor in the Agricultural and Food Engineering Department, IIT Kharagpur since 13th February 2024.
- ✓ Research and teaching in the specialization of Food Process Engineering
 - Technical Advisor Spectral Imaging at Doctor Spectra, Pvt Ltd., India (*1st January-2022 to 12th February-2024*)
- ✓ R &D consultant of spectral imaging for analyzing quality of various food materials.
 - Adjunct Research Fellow at Lethbridge College, Lethbridge, Alberta, Canada (*September-2021 to December-2022*)
- ✓ Development of a non-destructive technology for quality analysis of various agricultural commodities of Alberta.
 - Research associate in agriculture Machinery Research and Development Centre (AMRDC), University of South Australia, Mawson Lakes (*Dec-2019 to April-2021*)
- ✓ Development of a non-destructive technology for quality analysis and aflatoxin detection in single-kernel almond using hyperspectral imaging.
- ✓ Combining RGB and multispectral almond image data for sorting of in-line aflatoxin-contaminated kernels.
 - Senior research fellow in Department of Agricultural and Food Engineering, Indian Institute of Technology Kharagpur, India (*Dec-2014 to Jun-2019*) and joined as academic researcher up to *August-2019*.
- ✓ Development of non-destructive technologies for detection of stored cereal grain insect infestation using NIR spectroscopy, E-nose, hyperspectral imaging, x-ray micro-computed tomography.
- ✓ Development of low-cost electrochemical sensor for detection of stored wheat insect infestation in grain storage warehouses in India.
- ✓ Development of disinfestation technology for stored wheat insects using ozone and microwave technologies.

Awards and Honors

- Received **BIRAC-Gandhiyan Young Technological Innovation Award 2019** from honorable **Vice-President** of India.
- Received **Venkata Seethamma Siripurapu Memorial Gold Medal** for best postgraduate student for academic year of 2013-2014.
- Received fellowship from Ministry of Human Resource Development, Government of India during the PhD tenure.
- Qualified National Eligibility Test (ICAR-NET) in the discipline of **Food Technology and Agricultural Process Engineering**.
- Awarded as best paper presentation in annual convention of Indian Society of Agricultural Engineers (ISAE 2014).

Teaching and supervision experience

Sl No	Subject code	Subject name	L-T-P	Level
1	AG39006	Food Science & Technology Laboratory	0-0-3	UG
2	AG60205	Zero Waste Food Processing Industry	3-0-0	PG
3	AG69041	Food Chemistry & Microbiology Lab	0-0-3	PG
4	AG69345	Seminar	0-0-3	PG
5	AG60010	Food Process and Product Technology	4-0-0	PG
6	AG60124	Food Handling & Packaging	3-0-0	PG

Sponsored Research

1. Comparative study for the measurement of colour of vegetable oils, fats and fatty acids by manual and automatic tintometer (SMF), Role: Joint Principal Investigator (BUREAU OF INDIAN STANDARDS (BIS), Rs. 6.92 Lakh(s)), Duration (27- 09-2024 to 25-04-2025), Sponsor Type: Government
2. Development of test method(s)for determination of degree of milling of rice (DMS), Role: Joint Principal Investigator (BUREAU OF INDIAN STANDARDS (BIS), Rs. 7.52 Lakh(s)), Duration (27-09-2024 to 26-05-2025), Sponsor Type: Government
3. Moodies and Brews (MOA), Role: Principal Investigator (GloballyGI Experiences Pvt. Ltd., Rs. 117.10 Lakh(s)), Duration (01-08-2024 to 31-01-2027), Sponsor Type: Private
4. Study of Asafoetida for determining its quality and safety parameters (IQP), Role: Principal Investigator (BUREAU OF INDIAN STANDARDS (BIS), Rs. 8.76 Lakh(s)), Duration (27-09-2024 to 26-05-2025), Sponsor Type: Government

Mentoring/Supervising

Specification	Completed	Continuing
Research Associate		1
PhD		NA
MS		1
MTech	3	4
BTech		4

Institute Activities

Assistant Warden, Savitribai Phule Hall of Residence – 2

Other Academic Activities

1. Faculty representative, Departmental Career Development Cell.
2. Convener of the Audience Management Committee for Convocation 2024.
3. Member of Departmental Ethical Maintenance Committee.
4. Secretary of Department faculty meetings.
5. Selection Committee member in Agribusiness Incubation Center (ABIF) IIT Kharagpur

Member - Professional Body

1. Life Member: Indian Society of Agricultural Engineers (ISAE)
2. Life Member: Association of Food Scientists and Technologists (AFSTI) India

Plenary / Keynote / Invited - Lectures

1. Advanced Imaging Techniques for Food Quality and Safety Analysis: Exploring SEM and TEM at **National Institute of Technology Rourkela, India** (08-07-2024 to 10-07-2024), Type: Invited Lecture, Event Name: Workshop on Advanced Food Analytical Techniques: Theory and Practical Applications
2. Artificial Intelligence-Powered Food Personalization: Revolutionizing the Future of Nutrition at **All India Institute of Medical Sciences (AIIMS) Bhubaneswar, India** (15-02-2025 to 15-02-2025), Type: Invited Lecture, Event Name: International conference on Frontier in Nutrition: Challenges and Opportunities for Healthier Tomorrow
3. Application of Spectroscopic Techniques for Quality and Safety Assessment of Food at **IIT Kharagpur, India** (17-11-2024 to 25-11-2024), Type: Guest Lecture, Event Name: Training program on Emerging Trends in Agricultural Technologies.
4. Quick and Smart Estimation of Micronutrients and Homogeneity in Fortified Rice at **IIT Kharagpur, India** (08-01-2025 to 10-01-2025), Type: Guest Lecture, Event Name: FRK Manufacturing, Blending and QA/QC” training program organized by IHRF, IIT Kharagpur.
5. Advanced Imaging and Spectroscopic Techniques for Quality Analysis of Agricultural Produce at **Mahendra Engineering College, Mallasamudram West, Tamil Nadu, India** (10-10-2024 to 10-10-2024), Type: Guest Lecture, Event Name: Guest lecture series

Patent

- Martin, T., Ariza, W., & **Mishra, G.** (2021). A method for classification of an edible seed and a scanning device therefor (International patent application number: **PCT/AU2023/050805** and Australian patent application number: 2021901972).
- Personalized Coffee Recommendation System by Chatterjee A., Karmakar P. , Karale S. , Koppada S. , Dewal T. , **Mishra G.**, (Filed, Ref No.: 22075)

Publications

- Kabir, M. A., Lee, I., Singh, C. B., **Mishra, G.**, Panda, B. K., & Lee, S. H. (2025). Detection of Mycotoxins in Cereal Grains and Nuts Using Machine Learning Integrated Hyperspectral Imaging: A Review. *Toxins*, 17(5), 219.
- Kabir, M. A., Lee, I., Singh, C. B., **Mishra, G.**, Panda, B. K., & Lee, S. H. (2025). Correlation awareness evolutionary sparse hybrid spectral band selection algorithm to detect aflatoxin B1 contaminated almonds using hyperspectral images. *Food Chemistry*, 143381.
- Kabir, M. A., Lee, I., Singh, C. B., **Mishra, G.**, Panda, B. K., & Lee, S. H. (2024). Multilayer Perception-Based Hybrid Spectral Band Selection Algorithm for Aflatoxin B1 Detection Using Hyperspectral Imaging. *Applied Sciences*, 14(20), 9313.
- Kaur, G., Tripathy, S., Rout, S., **Mishra, G.**, Panda, B. K., & Srivastav, P. P. (2024). Formalin Adulteration in Fish: A State-of-the-art Review on its Prevalence, Detection Advancements, and Affordable Device Innovations. *Trends in Food Science & Technology*, 104708.
- Kabir, M. A., Lee, I., **Mishra, G.**, Singh, C. B., Panda, B. K., & Lee, S. H. (2024, July). Quantifying

Aflatoxin B1 Contamination Levels in Almonds Using Hyperspectral Imaging Utilizing Gaussian Process and Support Vector Regression. In *2024 IEEE Symposium on Wireless Technology & Applications (ISWTA)* (pp. 189-194). IEEE.

- **Mishra, G.**, Panda, B. K., Ramirez, W. A., Jung, H., Singh, C. B., Lee, S. H., & Lee, I. (2024). Detection of aflatoxin contamination in single kernel almonds using multispectral imaging system. *Journal of Food Composition and Analysis*, 125, 105701. (Impact factor: **4.3**)
- **Mishra, G.**, Sahni, P., Pandiselvam, R., Panda, B. K., Bhati, D., Mahanti, N. K., ... & Cozzolino, D. (2023). Emerging Non-destructive Techniques to Quantify the Textural Properties of Food: A State-of-Art Review. *Journal of Texture Studies*, 54 (2). (Impact factor: **3.2**)
- Ramirez, W. A., **Mishra, G.**, Panda, B. K., Jung, H. W., Lee, S. H., Lee, I., & Singh, C. B. (2022). Multispectral camera system design for replacement of hyperspectral cameras for detection of aflatoxinB1. *Computers and Electronics in Agriculture*, 198, 107078. (Impact factor: **8.3**)
- **Mishra, G.**, Panda, B. K., Ramirez, W. A., Jung, H., Singh, C. B., Lee, S. H., & Lee, I. (2021). Application of SWIR hyperspectral imaging coupled with chemometrics for rapid and non-destructive prediction of Aflatoxin B1 in single kernel almonds. *LWT*, 112954. (Impact factor: **6.0**)
- Panda, B. K., **Mishra, G.**, Ramirez, W. A., Jung, H., Singh, C. B., Lee, S. H., & Lee, I. (2022). Rancidity and moisture estimation in shelled almond kernels using NIR hyperspectral imaging and chemometric analysis. *Journal of Food Engineering*, 318, 110889. (Impact factor: **5.5**)
- Srivastava, S., **Mishra, G.**, and Mishra, H.N. (2021). Vulnerability of different life stages of *Sitophilus oryzae* insects in stored rice grain to ozone treatment and its effect on physico-chemical properties in rice grain. *Food Frontiers*, 2(4), 494-507. (Impact factor: **9.9**)
- **Mishra, G.**, Panda, B. K., Ramirez, W. A., Jung, H., Singh, C. B., Lee, S. H., & Lee, I. (2021). Research advancements in optical imaging and spectroscopic techniques for nondestructive detection of moldinfection and mycotoxins in cereal grains and nuts. *Comprehensive Reviews in Food Science and Food Safety*. (Impact factor: **14.8**)
- Panda, B. K., Panigrahi, S. S., **Mishra, G.**, & Shrivastava, S. L. (2021). Microwave-Assisted Hydration of Freshly Harvested Paddy (*Oryza sativa* L.): Process Development Based on Soaking Characterization and Energy Utilization. *Food and Bioprocess Technology*, 1-13. (Impact factor: **5.6**)
- Panda, B. K., **Mishra, G.**, Panigrahi, S. S., & Shrivastava, S. L. (2021). Microwave-assisted parboiling of high moisture paddy: A comparative study based on energy utilization, process economy and grain quality with conventional parboiling. *Energy*, 121011. (Impact factor: **9.0**)
- Srivastava, S., **Mishra, G.**, & Mishra, H. N. (2020). Application of an expert system of X-ray micro computed tomography imaging for identification of *Sitophilus oryzae* infestation in stored rice grains. *PestManagement Science*, 76(3), 952-960. (Impact factor: **4.1**)
- **Mishra, G.**, Amulya, P. A., Srivastava, S., & Mishra, H. N. (2019). Disinfestation of *Rhizopertha dominica* in stored wheat grain by ozone treatment: process optimization and effect study. *Journal of the Science of Food and Agriculture*. 99(11), 5008-5018. (Impact factor: **4.1**)
- Srivastava, S., **Mishra, G.**, & Mishra, H. N. (2019). Probabilistic artificial neural network and E-nose based classification of *Rhizopertha dominica* infestation in stored rice grains. *Chemometrics and Intelligent Laboratory Systems*, 186, 12-22. (Impact factor: **3.9**)
- Srivastava, S., **Mishra, G.**, & Mishra, H. N. (2019). Fuzzy controller-based E-nose classification

of *Sitophilus Oryzae* infestation in stored rice grains. *Food Chemistry*, 283, 604-610. (Impact factor: **8.8**)

- Panda, B. K., **Mishra, G.**, & Vishwakarma, R. K. (2019). Thin Layer Drying Kinetics of Indian Blackberry (*Syzygium cumini* L.) Pulp. *Journal of Agricultural Engineering*, 56(2), 91-99. (NAAS Rating: **4.79**)
- **Mishra, G.**, Srivastava, S., Panda, B. K. & Mishra, H. N. (2018). Rapid assessment of Quality Change and Insect Infestation in Stored Wheat Grain Using FT-NIR Spectroscopy and Chemometrics. *Food Analytical Methods*, 11(4), 1189-1198. (Impact factor: **2.9**)
- **Mishra G.**, Srivastava S., Panda B.K. & Mishra H N. (2018). Sensor array optimization and determination of *Rhizopertha dominica* infestation in wheat using hybrid neuro-fuzzy-assisted electronic nose analysis. *Analytical methods*, 10 (47), 5687-5695. (Impact factor: **3.1**)
- **Mishra G.**, Srivastava S., Panda B.K. & Mishra H. N. (2018). Prediction of *Sitophilus granarius* infestation in stored wheat grain using fuzzy logic based electronic nose Analysis. *Computer and Electronics in Agriculture*, 152, 324-332. (Impact factor: **8.8**)
- Pandey, P., **Mishra, G.** & Mishra, H. N. (2018). Development of a non-destructive method for wheat physico-chemical analysis by chemometric comparison of discrete light based near infrared and Fourier transform near infrared spectroscopy. *Journal of Food Measurement and Characterization*, 12(4), 2535- 2544. (Impact factor: **3.4**)
- Srivastava, S., **Mishra, G.** & Mishra & H. N. (2018). FTNIR-A robust diagnostic tool for the rapid detection of *Rhizopertha dominica* and *Sitophilus oryzae* infestation and quality changes in stored rice grains. *Food and Bioprocess Technology*, 1-12. (Impact factor: **5.6**)
- Srivastava S., **Mishra G.** & Mishra H. N. (2018). Identification and differentiation of insect infested rice grains varieties with FTNIR spectroscopy and hierarchical cluster analysis. *Food Chemistry*, 268, 402- 410. (Impact factor: **8.8**)
- Panda, B. K., **Mishra, G.** & Datta, A. K. (2018). Orthodox tea (*Camellia sinensis* L.) oxidation under the influence of compressed air: Process optimization. *Journal of Food Processing and Preservation*, 42(4), e13573. (Impact factor: **2.609**)
- **Mishra, G.**, Joshi, D.C. & Mohapatra, D. (2015). Varietal influence on the microwave popping characteristics of sorghum. *Journal of Cereal Science*, 65: 19-24. (Impact factor: **3.8**)
- **Mishra, G.**, Joshi, D.C. & Mohapatra, D. (2015). Optimization of pre-treatments and process parameters for sorghum popping in microwave oven using response surface methodology. *Journal of Food Science and Technology*, 52: 7839–7849. (Impact factor: **3.117**)
- **Mishra, G.**, Joshi, D. C., & Panda, B. K. (2014). Popping and puffing of cereal grains: a review. *Journal of Grain Processing and Storage*, 1(2), 34-46.
- Shaha, M., **Mishra, G.**, & Christian, N. (2014). Development of Nutritionally Superior and Eggless Vegetarian Cookies by Using Chiaseed Flour. *Journal of Grain Processing and Storage*, 1(2), 54-58.

Book chapters

- **Mishra G.**, Srivastava, S., and Mishra, H.n. (2016). Rapid method for determination of insect infestation in stored wheat grain. Excel India Publishers, New Delhi. ISSN: 978-93-86256-30-0.
- Pande, R., **Mishra, G.**, Srivastava, S. & Mishra, H. N. (2018). Safe storage of Food grains. Food

Products and Process Innovations, New India Publication Agency, volume 2, pp.125-164. ISSN: 978-93-86546-15-9.

- Panda, B.K., **Mishra, G.** & Kumar, V. (2018). Non thermal process: pulsed electric fields pulsed light, high hydrostatic pressure and ionizing radiation. In: Food Engineering Emerging Issues, Modeling, and Applications, Taylor and Francis Group, 2, pp.294-320. ISSN: 978-1-77188-368-9.
- **Mishra, G.** and Panda, B.K. (2022). Cereal based fermented foods and nonalcohol beverages. Springer Nature. ISSN: 978-3-031-05610-9.
- Panda, B.K., Panigrahi, S.S., **Mishra, G.** and Kumar, V. (2022). Robotics for general material handling machines in food plants. In: Jafri, S.M. and Malekjani, N. Transport operations of food materials within food factories, Elsevier. pp. 341-369. ISSN: 978-0-12-818585.

International Conferences

- **Mishra, G.**, Srivastava, S. & Mishra, H.N. (2018). Chemotaxonomic analysis of *R. dominica* infestation in stored wheat grain using near infrared hyperspectral imaging. Annual international meeting of American Society of Agricultural and Biological Engineering (**ASABE**), 27th July- 1st August, Detroit, Michigan, USA.
- **Mishra, G.**, Srivastava, S. & Mishra, H.N. (2018). Microwave-assisted ultra-violet treatment for disinfestation of *Rhyzopertha dominica* in stored wheat grains. 19th International Union of Food Science and Technology (**IUFoST**)-World Food Science and Technology Congress, 23rd-27th October 2019, Navi Mumbai, India.
- **Mishra, G.**, Srivastava, S. & Mishra, H.N. (2017). Determination of degree of *R. dominica* infestation in stored wheat grain using electronic nose. International conference on Annual meeting of Institute of Food Technologists (**IFT**), 26th -29th June, Las Vegas, USA.
- **Mishra G.**, Srivastava, S. & Mishra, H.N. (2016). Rapid method for determination of insect infestation in stored wheat grain: International Conference on Emerging Technologies in Agricultural and Food Engineering, 27th -30th December, IIT Kharagpur.
- **Mishra, G.** (2014). Bio-nanocomposite packaging: a review: International Conference on Emerging Food Safety Risks: Challenges for Developing Countries. 9th -11th January 2014, NIFTEM, Haryana, India
- **Mishra, G.**, Devanga, P. and Joshi, D.C. (2013). Effect of gamma radiation on shelf life of traditionally fermented fresh idli batter: International Conference on Fermented Foods, Health Status and Social Well- being. 6th -7th December 2013, Anand Agricultural University, Anand, Gujarat, India.

National Conferences

- **Mishra, G.**, Srivastava, S. & Mishra, H.N. (2019). Development of a low-cost electro-chemical sensor for detection of infestation in stored wheat grains: National Conference on Advances in Food Processing for Sustainable Food Security. 17th -18th May 2019, **NIT Rourkela**, India.
- **Mishra, G.**, Srivastava, S. & Mishra, H.N. (2018). Prediction of *Sitophilus granarius* infestation in stored wheat grain using fuzzy logic based electronic nose analysis: 52nd Annual Convention of Indian Society of Agricultural Engineering (**ISAE**). 8th-10th January 2018, Anand, Gujarat, India.
- **Mishra, G.** Shah, M., Christian, N. and Bava, A. (2014). Development of nutritionally superior eggless vegetarian cookies using chiaseed flour. 48th Annual Convention of Indian Society of Agricultural Engineering (**ISAE**). 8th-10th January 2014, Udaipur, Rajasthan, India.

Research Profile

- Google Scholar Id: JBJWcyQAAAAJ&hl=en
- Orchid Id: 0000-0001-8941-5445

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