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PROFESSIONAL PROFILE

Food science and processing technology researcher at the Food science and Nutrition Research Directorate, Ethiopian Institute of Agricultural Research (EIAR), with academic training in Chemical Engineering and Food Engineering. Currently a full-time, EIAR-sponsored PhD candidate in Chemical Engineering (Food Engineering) at Addis Ababa University. Research experience spans food processing and engineering, cereal- and pulse-based product development, food quality and safety, nutritional and functional characterization, fermentation, food biotechnology, analytical methods and shelf-life assessment. Applies scientific and engineering approaches to develop and improve resource-efficient food-processing technologies that support product quality, agro-industrial development and food and nutrition security.

EDUCATION

Currently enrolled	***PhD in Chemical Engineering (Food Engineering)***, Addis Ababa University (AAU), Addis Ababa, Ethiopia.
March 2023	***MSc in Chemical Engineering (Food Engineering)***, AAU, Addis Ababa, Ethiopia. Thesis: "Investigating the effects of teff, sorghum, and fenugreek flour blending ratios on quality attributes of injera (Ethiopian traditional flatbread)." Advisor: Dr. Kumsa Delessa Kuffi.
July 2015	***BSc in Chemical Engineering (Process Engineering)***, Adama Science and Technology University (ASTU), Adama, Ethiopia. Project: "Laboratory-scale glucose production from locally available corn starch and a feasibility study for large-scale production." Advisor: Dr. Deresse Mekonnin Teshome.

PROFESSIONAL EXPERIENCE

Dec 2025–Present	Researcher II, Food Science and Nutrition Research Directorate, EIAR, Kulumsa Agricultural Research Center, Ethiopia. Currently undertaking full-time ***doctoral study at AAU under EIAR sponsorship***.
Oct 2023–Nov 2025	Researcher I, Food Science and Nutrition Research Directorate, EIAR, Kulumsa Agricultural Research Center, Ethiopia.
Feb–Oct 2023	Associate Researcher, Food Science and Nutrition Research, EIAR, Kulumsa Agricultural Research Center, Ethiopia.
Mar 2018–Feb 2023	Assistant Researcher II, Food Science and Nutrition Research, EIAR, Kulumsa Agricultural Research Center, Ethiopia.
Feb 2017–Mar 2018	Assistant Researcher I, Food Science and Nutrition Research, EIAR, Kulumsa Agricultural Research Center, Ethiopia.
Dec 2015–Feb 2017	Laboratory Technologist, Agricultural Chemistry and Nutrition Research Laboratories, Debre Zeit Agricultural Research Center, EIAR, Ethiopia.

RESEARCH AREAS

- Food engineering and processing: food materials, processing operations, process design, modelling, simulation, optimization and scale-up.
- Food composition and functionality: food chemistry and biochemistry; proteins, lipids, carbohydrates, bioactive compounds, ingredient interactions and structure–function relationships.
- Product and process innovation: formulation, ingredient development, product functionality, quality-by-design, process validation and technology transfer.
- Food biotechnology and bioprocessing: fermentation, food microbiology, enzyme applications, microbial processes, bioconversion and encapsulation.
- Nutrition and health: functional foods, nutrient stability, bioaccessibility and bioavailability.
- Food quality and safety: contaminants, preservation, shelf-life, packaging, process hygiene and sustainable food systems.

RESEARCH AND TECHNICAL COMPETENCIES

- Product development and evaluation: concept development, formulation, ingredient selection, prototype preparation, physicochemical, nutritional, techno-functional and sensory evaluation, optimization and validation.
- Food processing and engineering: bakery and traditional foods; cereal- and pulse-based processing; process improvement, scale-up and technology demonstration.
- Analytical research: sample preparation, compositional analysis, mineral determination, quantitative methods, data processing and interpretation.
- Fermentation and food biotechnology: sourdough systems, fermentation-based processing and encapsulation technologies.
- Research methods: experimental design, laboratory investigation, statistical analysis, scientific interpretation and technical reporting.
- Chromatography: gas chromatography (GC/TCD); high-performance liquid chromatography–mass spectrometry (HPLC–MS).
- Spectroscopy and elemental analysis: flame atomic absorption spectroscopy (FAAS), inductively coupled plasma optical emission spectroscopy (ICP–OES), UV–visible spectroscopy (UV–Vis) and Fourier-transform infrared spectroscopy (FTIR).
- Microstructure and materials characterization: scanning electron microscopy with energy-dispersive X-ray spectroscopy (SEM–EDX), transmission electron microscopy (TEM/HRTEM), X-ray diffraction (XRD) and X-ray photoelectron spectroscopy (XPS).
- Additional analytical platforms: Quantachrome Autosorb-iQ2, X-ray absorption fine structure (XAFS/EXAFS) and ultraviolet photoelectron spectroscopy (UPS).

AWARDS AND SCHOLARSHIPS

Year	**Award, scholarship or professional development**
2026	Full PhD Scholarship Sponsorship, Ethiopian Institute of Agricultural Research (EIAR), Ethiopia.
2024–2025	***ITEC International Residential Scholarship, Government of India***, for the Advanced Certificate in Food and Pharmaceutical Packaging, Indian Institute of Packaging, New Delhi, India.
2023	Research Grant Recipient, Droga Pharma PLC, Research and Development, Addis Ababa, Ethiopia.
2021–2023	Full MSc Scholarship Sponsorship, Ethiopian Institute of Agricultural Research (EIAR), Ethiopia.

SELECTED PEER-REVIEWED PUBLICATIONS

1. Awulachew, M. T. (2026). Biotechnological innovations for water-efficient and high-quality food systems. Frontiers in Food Science and Technology, 6, 1922934. https://doi.org/10.3389/frfst.2026.1922934
2. Awulachew, M. T. (2025). Effect of partial replacement of wheat with fava bean and black cumin flours on nutritional properties and sensory attributes of bread. Engineering Proceedings, 87, 8. https://doi.org/10.3390/engproc2025087008
3. Jemal, N. D., & Awulachew, M. T. (2025). Impact of wheat tempering conditions on flour particle size and thermo-mechanical properties. Asian Journal of Biological Sciences, 18, 669–678. https://doi.org/10.3923/ajbs.2025.669.678
4. Awulachew, M. T. (2024). Bread deterioration and a way to use healthful methods. CyTA – Journal of Food, 22(1), 2424848. https://doi.org/10.1080/19476337.2024.2424848
5. Awulachew, M. T., & Kuffi, K. D. (2024). Improving the quality of injera by optimizing the mixing proportion of fenugreek, sorghum and teff flour. Asian Science Bulletin, 2(4), 321–340.
6. Awulachew, M. T. (2024). Engineering principles and business model innovation in food systems to achieve Sustainable Development Goals. Asian Science Bulletin, 2(3), 229–241.
7. Awulachew, M. T., Weldehawaria, A. G., et al. (2024). Food security and safety in light of global megatrends: A review. Asian Journal of Biological Sciences, 17(4), 666–677.
8. Awulachew, M. T., Raya, S. S., & Kuffi, K. D. (2023). Effect of teff-sorghum-fenugreek flour blending ratios on nutritional and sensory quality of injera. Journal of Agroalimentary Processes and Technologies, 29(4), 319–332.
9. Awulachew, M. T. (2022). Application of biotechnology in human food processing and animal feed. International Journal of Food Science, Nutrition and Diet, 11(2), 575–580. https://doi.org/10.19070/2326-3350-2200099
10. Awulachew, M. T. (2022). A review of food packaging materials and active packaging system. International Journal of Health Policy and Planning, 1(1), 28–35.
11. Awulachew, M. T. (2021). A systematic review of encapsulation and controlled-release technology in food applications. International Journal of Agricultural Science and Food Technology. https://doi.org/10.17352/2455-815x.000122
12. Awulachew, M. T. (2021). Food product shelf stability overview of sourdough-risen flatbread. Journal of Food Technology & Nutrition Sciences. https://doi.org/10.47363/jftns/2021(3)123
13. Awulachew, M. T. (2021). Black cumin (Nigella sativa L.): A review on effects and scientific developments in animal and human ailments. International Journal of Medical Biotechnology and Genetics, 8(11), 64–72.
14. Gebremichael, H., Awulachew, M. T., Zegeye, H., Gebregiorgis, A., Gerenfess, D., Demsis, N., Kassahu, C., & Agza, B. (2020). Identifying bread wheat lines for high zinc, iron and low phytate concentration. International Journal of Agriculture and Nutrition, 2(1), 8–12.

SELECTED BOOK CHAPTERS

1. Awulachew, M. T. (2024). The possible use of herbs and spices in food processing and food safety. In Herbs and Spices – New Perspectives in Human Health and Food Industry. IntechOpen. https://doi.org/10.5772/intechopen.1004028
2. Awulachew, M. T. (2024). Functional ingredients, sources and classification, health claims, food intolerance, and allergy. In Functional Food – Upgrading Natural and Synthetic Sources. IntechOpen. https://doi.org/10.5772/intechopen.114157
3. Awulachew, M. T. (2022). Pharmacological, biopesticide, and post-harvest loss management application of jimsonweed (Datura stramonium). In Medicinal Plants. IntechOpen. https://doi.org/10.5772/intechopen.102789

ACADEMIC LEADERSHIP AND PROFESSIONAL SERVICE

- Head, Food Science and Nutrition Research Sector, Kulumsa Agricultural Research Center, EIAR.

- Member, Research and Dissemination Committee, EIAR.
- Member, Management Committee, Kulumsa Agricultural Research Center, EIAR.
- Member, Food Science and Nutrition Research Strategic Plan Revision Committee, EIAR.
- Committee member, EIAR Annual Research Review Conference.
- **Peer reviewer,** Cogent Food & Agriculture, Wiley, CyTA: journal of food, Folia Medica, Journal of Food Science and Technology, Pharmacia, Sugar Tech., etc.

LANGUAGES AND DIGITAL SKILLS

Languages	English (fluent); Mandarin Chinese (beginner).
Digital tools	Microsoft Office, Design-Expert, SPSS, OriginPro, WordPress and Google Analytics.

REFERENCES

Prof. Kumsa D. Kuffi (PhD)	Assistant Professor and Chairman, Food Engineering, School of Chemical and BioEngineering (SCBE), Addis Ababa Institute of Technology (AAiT), Addis Ababa University (AAU), Addis Ababa, Ethiopia Email: kumsa.delessa@aait.edu.et / kumsa2008@gmail.com Tel: +251 915 402 525
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