



# KENYA MEDICAL RESEARCH INSTITUTE

DOCUMENT TITLE: **FACULTY PROFILE**


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**Dr. Festus Mururi TOLO** *Ph.D. (JKUAT), SLDP (KSG), NGA (KEMRI)*

## PERSONAL PROFILE

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	<b>CURRENT POSITION:</b>	Chief Research Scientist (Natural Products Research and Drug Development)
	<b>EMAIL ADDRESS:</b>	<a href="mailto:ftolo@kemri.go.ke">ftolo@kemri.go.ke</a> ; <a href="mailto:fmtolo1@gmail.com">fmtolo1@gmail.com</a>

## BIO

Dr. Festus M. Tolo is a Phyto-Medical biologist holding a Doctor of Philosophy Degree in Medicinal Phytochemistry of the Jomo Kenyatta University of Agriculture and Technology (JKUAT). He is an awardee of the **"The Nelon Gold Award (NGA)"** of the Kenya Medical Research Institute (KEMRI) and **the Inter-Academy Medical Panel (IAMP) "Distinguished Scientist Award in Natural Products Research" of the Chinese Medical Sciences (CACMS) and Chinese Academy of Engineering (CAE)**, Beijing, China. Dr. Tolo is a Chief Research Scientist at the Centre for Traditional Medicine and Drug Research (CTMDR), KEMRI. His engagements in natural products research spans over three decades where he has been involved in various research projects, notably, the JICA sponsored Infectious Diseases Research Programme of KEMRI where he played a key role in the "Plant Drug Research Group for Antiviral Agents" leading to the innovation of an anti-herpes herbal product, **"Zedupex"**. He has been a project manager of a WHO/TDR funded project on the "Investigation of Safety, Efficacy and Chemistry of Herbal Medicines used Traditionally for Treatment of Malaria" and a lead scientist in the National Council for Science Technology and Innovation (NACOSTI) funded project on the "Natural Products Innovation System: Establishing a National Nutraceuticals and Phytomedicines Development Pipeline". He is presently engaged in a project evaluating Zedupex for COVID-19 management funded by the Government of Kenya and others touching on identification of herbal products for management of Non-communicable Diseases (NCDs) and Neglected Tropical Diseases (NTDs). Dr. Tolo has published widely in the area of natural products research and published papers and presented abstracts (over 100) in various peer reviewed Journals and at various local and international scientific forums. He is a faculty member at the KEMRI Graduate School where he is the Programme coordinator for the Pharmacy. He has successfully supervised a number of postgraduate

students both at PhD and MSc. He is an appointed "Peer Reviewer" of Quality Standards (QS) by the Commission for University Education (CUE), Kenya. In May 2024, he was appointed as a member of the **Ethnomedicine Committee of the United Nations Development Programme (UNDP), Kenya.**

## EDUCATION QUALIFICATION

1. Doctor of Philosophy (Ph.D.) in Medicinal Phytochemistry, JKUA&T, Kenya.
2. Master of Science (MSc.) in Infection Diagnosis, K.U, Kenya.
3. Bachelor of Science (BSc.) (HND eq.) in Pharmacology and Toxicology, Medical Microbiology, Physiology and Laboratory Management, TUK, Kenya.
4. Certificate in Research and Control of Infectious Diseases, Toyama Medical and Pharmaceutical University, Toyama, Japan.
5. Radio-Immuno Assays Technology in Medicine, Institute of Izotopes Co. Ltd., Hungary.
6. Certificate in Strategic Leadership Development Programme (SLDP), KSG. Kenya.
7. Certificate in Peer Review, Commission for University Education (CUE), Kenya.

## FIELD OR AREA OF SPECIALIZATION

1. Natural Products Research and Drug Development.
2. Medicinal Phytochemistry/Phytobiology.
3. Pharmacology and Toxicology, Medical Microbiology, Physiology and Laboratory Management.
4. Peer Review for Medical Research and Educational Materials.

## SELECTED PUBLICATIONS

1. *Ndacyayisenga J, Tolo F, Wamunyokoli F, Maina EN.* Effects of tea catechin extracts from BB35 and purple (TRFK 306) tea clones on the gene expression of EGFR, app, Bcl2, DNMT, Casp3, Hif1a, Gadd45b and Psmb5 genes involved in triple negative breast cancer diseases: *In silico* and *in vitro* study, *Informatics in Medicine Unlocked* (2024), doi: <https://doi.org/10.1016/j.imu.2024.101469>. **Published by Elsevier Ltd. Informatics in Medicine Unlocked (ScienceDirect).** <https://doi.org/10.1016/j.imu.2024.101469>
2. *Ndacyayisenga J, Maina EN, Ngeny LC, Wamunyokoli F, Tolo FM.* Purple tea catechins exhibit high antiproliferative activity and synergism with cisplatin against the triple-negative breast cancer cell line 4T1. **Arch Biol Sci.2023;75(4):475-88.**
3. *Hadil S. Hussein, Caroline Ngugi, Esther N. Maina, Festus M. Tolo.* Anticancer potential of silver nanoparticles biosynthesized using *Catharanthus roseus* leaves extract on cervical (HeLa229) cancer cell line. **Published by Elsevier B.V. Scientific African. Contents lists available at ScienceDirect.** <https://doi.org/10.1016/j.sciaf.2024.e02268>.
4. *Caroline J. Kosgei, Festus Tolo, Josphat C. Matasyoh, Meshack Obonyo, Peter Mwitari, Lucia Keter, Richard Korir and Beatrice Irungu.* Anti-bacterial activity of secondary metabolites from *Chrysanthemum cinerariaefolium*. **Journal of Medicinal Plants Research. Vol. 15(6), pp. 241-251, June, 2021. DOI: 10.5897/JMPR2019.6888. Article Number: 66054E866943**



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5. *Nkirote N. Judith, Francis K. Njonge, Gideon Mutie Kikuvi and Festus M. Tolo.* Determinants of *Moringa oleifera* utilization among HIV positive patients attending comprehensive care clinic at Migori County referral hospital, Kenya. **Journal of Health, Medicine and Nursing. ISSN 2520-4025 (Online).** Vol.4, Issue 6. No.1, pp 1- 16, 2019. [www.iprjb.org](http://www.iprjb.org)
6. **F. M. Tolo, G. M. Rukunga, F. W. Muli, J. M. Ochora, B. N. Irungu, C. N. Muthaura, C. K. Wanjiku, G. M. Mungai, Quang Ngoc, K. Hashimoto and Y. Asakawa.** The antiviral activity of compounds isolated from Kenyan *Carissa edulis* (Forssk.) Vahl. **Journal of Medicinal Plants Research** Vol. 4(15), pp. 1517-1522, 4 August, 2010
7. **Festus M. Tolo, Geoffrey M. Rukunga, Faith W. Muli, Eliud N.M. Njagi, Wilson Njue, Kazuko Kumon, Geoffrey M. Mungai, Charles N. Muthaura, Joseph M. Muli, Lucia K. Keter, Esau Oishi, Mawuli W. Kofi-Tsekpo.** Anti-viral activity of the extracts of a Kenyan medicinal plant *Carissa edulis* against herpes simplex virus. **Journal of Ethnopharmacology. 2006: 104: 92-99**
8. **Tolo, F.M., Rukunga, G.M., Muli, F.W., Ochora, J., Eizuru, Y., Ukon, T., Muthaura, C. N, Cicilia, K., and Mungai, G.M.** The anti-viral activities of Kenyan *Carissa edulis*, *Prunus africana* and *Melia azedarach* total aqueous extracts against Human Cytomegalovirus infection *in vitro*. **Africa Journal of Health Sciences. 2007: 14(3-4):143-148**
9. *Grace Odongo, Festus Tolo, Fred Wamunyokoli, Joseph Mwatha.* Effects of methanol and aqueous extracts of *Acacia xanthophloea*, *Strychnos heninningsii* and *Microglossa pyrifolia* on Immunoglobulin E using asthma induced mice model. **The Journal of Natural Sciences Research. ISSN 2222-1719 (Paper) ISSN 2222-2863 (Online) Vol X, No.X, 2015 Pages 1-16.**
10. *L. W. Karani, F. M. Tolo, S. M. Karanja and C. W. Khayeka.* Safety and Efficacy of *Prunus africana* and *Warburgia ugandensis* Against Induced Asthma in BALB/c Mice. **European Journal of Medicinal Plants. 3(3): 345-368, 2013.**

### RESEARCH PROJECTS AND INTERESTS

#### Selected Research Projects

1. Pre-Clinical Evaluation of the Antiviral Herbal Product "Zedupex" in combination with Kenyan Green Tea for management of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Infection and its Resulting Disease (COVID-19). **(The ZEDUPEX-TEA COVID-19 Study). P.I: Dr. Festus M. Tolo. Approval Date: 4.6.2020. SSC Number: KEMRI/SERU/CTMDR/088/4015. Status: Ongoing**
2. Evaluation of some Kenyan medicinal plants for anti-sickling activity in induced mammalian sickle cells *in vitro* and formulation of a herbal product as a management therapy: The herb

- for sickle cell anemia (**The THESCA study**). **P.I: Dr. Festus M. Tolo. Approval Date:** 1.12.2019. **SSC Number:** 2423 REV. **Status:** Ongoing.
3. Biomedical research on *Chrysanthemum cinerariaefolium* (pyrethrum) grown in Kenya for its safety and new insecticidal and antimicrobial applications. **P.I: Dr. Festus M. Tolo. Approval Date:** 8.02.2015. **SSC Number:** 2669. **Status:** Closed, June 2019.
  4. The anti-asthmatic activity of extracts from two Kenyan medicinal plants *Synadenium grantii* Hook.f. and *Microglossa pyrifolia* (Lam.) Kuntze and their combined synergetic efficacy. **P.I: Dr. Festus M. Tolo. Approval Date:** 7.10.2010. **SSC Number:** 1922. **Status:** Closed, 2015.
  5. The KEMRI/JICA Infectious Diseases Project. The Plant Drug Research Group for antiviral agents. **P.I: Group team leader: Dr. Festus M. Tolo. Approval Date:** 1998. **SSC Number:** KEMRI/JICA IDP Project **Status:** Closed, 2006.
  6. The WHO/TDR-KEMRI Project ID A30707: An Investigation of Safety, Efficacy and Chemistry of Herbal Medicines used Traditionally for Treatment of Malaria. **P.I:** Dr. G.M. Rukunga (Deceased). **Project Manager: Dr. Festus M. Tolo. Approval Date:** 2004. **SSC Number:** 1205. **WHO ID Number:** TD A30707A. **Status:** Closed, 2014

## Research Interests

1. Evaluation of biological activity/efficacy of plant extracts/compounds for different microorganisms (antiviral and antibacterial/fungal activity etc., etc.).
2. Safety studies of plant extracts/compounds in both *in vitro* and *in vivo* environments (cytotoxicity and acute toxicity).
3. Evaluation of herbal medicines for management of Non-Communicable Diseases (NCDs) and Neglected Tropical Diseases (NTDs).
4. Conservation of medicinal plants.
5. Development of a medicinal plants database.
6. Identification of management therapies for COVID-19 disease from natural products.

## RELEVANT LINKS

### Selected Links to my Video Presentations

1. KEMRI Explores Herbal Cure for COVID-19 Pandemic.mp4. <https://youtu.be/yQQldIVL5Pw>
2. WHICH DOCTORS, A look at Traditional and Alternative Medicine in Kenya.Mp4. <https://youtu.be/9IMM-l1hDtE>
3. HARNESSING The Healing Power of Traditional Medicine & Herbal Remedies.mp4. [https://youtu.be/nUm\\_gXuw9rM](https://youtu.be/nUm_gXuw9rM)



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## Other Important Links Associated with Me

1. Updated CV. <https://www.kemri.go.ke/ctmdr-staff-profiles/>
2. Centre for Traditional Medicine and Drug Research. <https://www.kemri.go.ke/centre-for-traditional-medicine-and-drug-research-ctmdr-nairobi/>
3. Kenya Medical Research Institute. <https://www.kemri.go.ke/>
4. The KEMRI Documentary 2024. <https://youtu.be/J3FPXcu2Cl0>
5. The KEMRI Graduate School. <https://www.kemri.go.ke/graduate-school/>
6. Commission for University Education. <https://www.cue.or.ke/>
7. The Ministry of Health, Kenya. <https://www.health.go.ke/>