

Muhammad Azeem, Ph.D.

Associate Professor (Tenured)
Department of Chemistry
COMSATS University Islamabad (CUI),
Abbottabad Campus, Abbottabad 22060, Pakistan
muhazeem@cuiatd.edu.pk; mazeemfsd@hotmail.com



Education

Ph.D. (2008–2013) Analytical, Organic and Bio Chemistry /Ecological Chemistry
KTH Royal Institute of Technology, Stockholm, Sweden
Dissertation title: “Microbes Associated with *Hylobius abietis*: A Chemical and Behavioral Study”
Advisor: Prof. Anna Karin Borg-Karlson

M.Sc. (2001–2003), Chemistry
University of the Punjab, Lahore, Pakistan
Dissertation Title: “Synthesis of Some Coumarin Based Fluorescent Brightening Agents and Their Application”
Advisor: Prof. Jamil Anwar

Professional Experience

Jul/2023–Continue

Tenured Associate Professor, Department of Chemistry, COMSATS University Islamabad, Abbottabad Campus, Abbottabad, Pakistan

Jul/2014–Jun/2023

Assistant Professor, Department of Chemistry, COMSATS University Islamabad, Abbottabad Campus, Abbottabad, Pakistan

Sep/2017–Jun/2018

Post-Doctoral Fellowship, Department of Botany, University of Wisconsin-Madison, WI, USA

Jun/2013–Mar/2014

Post-Doctoral Fellowship, Department of Dental Medicine, Karolinska Institute, Stockholm, Sweden

Aug/2005–Aug/2007

Production Supervisor, Nishat Dyeing & Finishing, Lahore, Pakistan

Jun/2004–Aug/2005

R&D Chemist, Sitara Chemical Industries Ltd., Faisalabad, Pakistan

Research Interests

My primary research interests: Development of chromatographic analytical methods for the analysis of small organic molecules. Developing the ecological way of controlling pest insects by using plants and microbes based natural products. Bio-degradation and bio-conversion of waste materials to valuable products. Biological activity guided isolation and structure elucidation of natural products from plants and microbes. Essential oils extraction from plants and microbes their chemical composition and biological activities such as insecticidal, insect repellents, anti-fungal, anti-bacterial and anti-feedants etc.

Research Experience

Jul/2014–Continue

Assistant and Associate Professor, Department of Chemistry, COMSATS University Islamabad, Abbottabad Campus, Abbottabad, KPK, Pakistan

- Extraction, chemical analysis and biological activities of essential oils from plants growing in lower Himalaya region of Pakistan

- Identification of bioactive compounds from plants against mosquitoes, human pathogens, plant pathogens and stored grains pests.
- Identification and quantification of small organic compounds in human body fluids, water and microbial broth.
- Method development for the analysis of small organic molecules using GC-MS and HPLC-UV.
- Production of aromatic compounds using soil borne microbiota.

Sep/2017-Jun/2018

Post-Doctoral Research, Department of Botany, University of Wisconsin-Madison, WI, USA

Mentor: Prof. Ken Keefover-ring

GC-MS and HPLC-PDA/-MS based method development for the identification and quantification of floral volatiles and phenolic glucosides from *Salix* and *Populus* species

Jun/2013–Mar/2014

Post-Doctoral Research, Department of Dental Medicine, Karolinska Institute, Stockholm, Sweden

Mentor: Prof. Anders Gustafsson and Prof. Anna Karin Borg-Karlson

Isolated, characterized and quantified bioactive molecules from plants used for oral health

Apr/2008–May/2013

Ph.D. Fellow, Group of Ecological Chemistry, Division of Organic Chemistry, Department of Chemistry, School of Chemical Science and Engineering, KTH Royal Institute of Technology, Stockholm, Sweden

Advisor: Prof. Anna Karin Borg-Karlson

- Discovered microbes associated with pine weevil (*Hylobius abietis*), and identified, quantified their metabolites. Studied the effect of microbial metabolites on the orientation behavior of pine weevils towards their host plant
- Studied the effect of bacterial metabolites on the growth of plant pathogenic fungi
- Isolated and identified anti-feedants and repellents for pine weevils and ticks
- Developed a new method for the production of styrene from forest waste

Mar/2003–Dec/2003

M.Sc. Student, Institute of Chemistry, University of the Punjab, Lahore, Pakistan

Advisor: Prof. Jamil Anwar

- Synthesized fluorescent brighteners and evaluated their application in textile

Publications (peer-reviewed)

Total impact factor: **167.83**

Total publications: 44

Google Scholar Total Citations: **1282**

Google Scholar h-index: 19

<https://scholar.google.com/citations?user=idtUIq0AAAAJ&hl=en&oi=ao>

ISI Total citations: 730

ISI h-index: 15

<https://www.webofscience.com/wos/author/record/AAX-9422-2020>

ORCID <https://orcid.org/0000-0003-3054-700X>

Publication Details	Impact Factor (HJRS Category)	Web-link
Chemical analysis, repellent, larvicidal, and oviposition deterrent activities of plant essential oils against <i>Aedes aegypti</i> , <i>Anopheles gambiae</i> , and <i>Culex quinquefasciatus</i> . Muhammad Ghazanfar Abbas, Muhammad Binyamee, Muhammad Azeem* , Shahid Majeed, Zahid Mehmood Sarwar, Abdul Nazir, Mahar Muhammad Imran Sharif,	2.4 (W)	https://www.frontiersin.org/journals/insect-science/articles/10.3389/finsc.2025.1582669/abstract (Accepted)

Amna Parveen, Raimondas Mozūraitis. <i>Frontiers in Insect Science</i> 15: 1582669, 2025 .		
Proline and Betaine enriched nano Zinc fertilizer for growth and seed quality enhancement in drought exposed coriander. Saad Hanif, Mehwish Nawaz, Muhammad Azeem , Raimondas Mozuratis, Jehangir Khan, Muhammad Zia <i>Industrial Crops and Products</i> 230: 121136, 2025 .	5.6 (W)	https://www.sciencedirect.com/science/article/pii/S092666902500682X?via%3Dihub
Antibacterial and Mosquito Repellent Potential of Eight Citrus Cultivars and Their Chemical Composition. Mehwish Nawaz, Bait Ullah, Muhammad Ghazanfar Abbas, Muhammad Binyameen, Violeta Apšegaite, Raimondas Mozuraitis, Muhammad Azeem* <i>Horticulturae</i> , 11, 9, 2025 .	3.1 (W)	https://www.mdpi.com/2311-7524/11/1/9
Phytochemical profile, antioxidant potential and expression of FLS, GGP genes in kiwifruit at different harvesting stages and durations of storage. Mariyam B, Khan N, Abbasi A M, Azeem M , Khan S A, Ismail A M, Elmenofy W, El-Beltagi H S, El-Mogy M M, Almaghasla M I. <i>Applied Ecology and Environmental Research</i> 23(1):1401-1418, 2024 .	0.6	http://dx.doi.org/10.15666/aeer/2301_14011418
Insecticidal and Repellent Activity of Essential Oils from Seven Different Plant Species against <i>Tribolium castaneum</i> (Coleoptera: Tenebrionidae). Misha Khalil, Mishal Khizar, Dalal Suleiman Alshaya, Asifa Hameed, Noor Muhammad, Muhammad Binyameen, Muhammad Azeem , Mussurat Hussain, Qaisar Abbas, Kotb A. Attia, Tawaf Ali Shah. <i>Insects</i> 15, 755, 2024	2.7 (W)	https://www.mdpi.com/2075-4450/15/10/755
Chemical Composition, Repellent, and Oviposition Deterrent Potential of Wild Plant Essential Oils against Three Mosquito Species. Muhammad Ghazanfar Abbas, Muhammad Azeem , Muhammad Umar Bashir, Fawad Ali, Raimondas Mozuratis, Muhammad Binyameen. <i>Molecules</i> 29, 2657, 2024	4.6 (W)	https://www.mdpi.com/1420-3049/29/11/2657
Chemical Composition of Essential Oils from Natural Populations of <i>Artemisia scoparia</i> Collected at Different Altitudes: Antibacterial, Mosquito Repellent, and Larvicidal Effects. Amna Parveen, Muhammad Ghazanfar Abbas, Ken Keefover-Ring, Muhammad Binyameen, Raimondas Mozuraitis, Muhammad Azeem* . <i>Molecules</i> 29, 1359, 2024 .	4.6 (W)	https://www.mdpi.com/1420-3049/29/6/1359
Essential Oil from <i>Tagetes minuta</i> Has Antiquorum Sensing and Antibiofilm Potential against <i>Pseudomonas aeruginosa</i> Strain PAO1. Palwasha Khan, Amara Waheed, Muhammad Azeem , Amna Parveen, Muhammad Arfat Yameen, Jamshed Iqbal, Muhammad Ali, Shiwei Wang, Sadaf	4.1 (W)	https://pubs.acs.org/doi/10.1021/acsomega.3c03507

Qayyum, Awal Noor, Tatheer Alam Naqvi. ACS Omega. 2023 , 8(39):35866-35873 ACS Publications, USA.		
Synthesis of Rumex hastatus-based silver nanoparticles induced the inhibition of human pathogenic bacterial strains. Saddaf Rashid, Rafiq Ahmad, Muhammad Azeem , Dunia A. Al Farraj, Sabaz Ali Khan, Mohamed Soliman Elshikh, Arshad Mehmood Abbasi. Arabian Journal of Chemistry, 16: 104710, 2023 .	6.212 (W)	https://doi.org/10.1016/j.arabjc.2023.104710
Prolonged Repellent Activity of Plant Essential Oils against Dengue Vector, Aedes aegypti. Abdullah Haris, Muhammad Azeem , Muhammad Ghazanfar Abbas, Muhammad Mumtaz, Raimondas Mozuratis, Muhammad Binyameen. Molecules, 28: 1351, 2023 .	4.927 (W)	https://doi.org/10.3390/molecules28031351
Chemical Composition, Larvicidal and Repellent Activities of Wild Plant Essential Oils against Aedes aegypti. Muhammad Ghazanfar Abbas, Abdullah Haris, Muhammad Binyameen, Abdul Nazir, Raimondas Mozūratis, Muhammad Azeem* . Biology 12 (1): 8, 2023 .	5.168 (X)	https://www.mdpi.com/2079-7737/12/1/8
Essential oils of four wild plants inhibit the blood seeking behaviour of female Aedes aegypti. Sajid Iqbal, Fawad Ahmed Khan, Abdullah Haris, Raimondas Mozuratis, Muhammad Binyameen, Muhammad Azeem* . Experimental Parasitology, 244: 108424, 2023 .	2.132 (X)	https://www.sciencedirect.com/science/article/pii/S0014489422002181
Antioxidant Effect of Ocimum basilicum Essential Oil and Its Effect on Cooking Qualities of Supplemented Chicken Nuggets. Hafiz Rehan Nadeem, Saeed Akhtar, Tariq Ismail, Muhammad Qamar , Piero Sestili , Wisha Saeed, Muhammad Azeem and Tuba Esatbeyoglu. Antioxidants, 11: 1882, 2022 .	7.675 (W)	https://www.mdpi.com/2076-3921/11/10/1882
Genetic mapping of sexually dimorphic volatile and nonvolatile floral secondary chemistry of a dioecious willow. Ken Keefover-Ring, Craig H. Carlson, Brennan Hyden, Muhammad Azeem and Lawrence B. Smart. Journal of Experimental Botany, Oxford University Press, 73: 6352-6366, 2022 .	7.298 (W)	https://doi.org/10.1093/jxb/erac260
Mosquito repellent potential of Carpesium abrotanoides essential oil and its main compositions against a dengue vector, Aedes aegypti. Abdullah Haris, Muhammad Azeem* , Muhammad Binyameen. Journal of Medical Entomology, 59: 801-809, 2022 .	2.435 (W)	https://academic.oup.com/jme/article/59/3/801/6528289
Chemical Composition of Fresh Leaves Headspace	6.627	https://www.frontiersin.

Aroma and Essential Oils of Four Coriander Cultivars. Sunjeet Kumar, Raza Ahmad, Sidra Saeed, Muhammad Azeem* , Raimondas Mozūraitis, Anna-Karin Borg-Karlson and Guopeng Zhu. <i>Frontiers in Plant Science</i> , 13: 820644, 2022 .	(W)	org/articles/10.3389/fpls.2022.820644/full
Pesticidal potential of some wild plant essential oils against grain pests <i>Tribolium castaneum</i> (Herbst, 1797) and <i>Aspergillus flavus</i> (Link, 1809). Muhammad Azeem* , Tariq Zaman, Arshad Mehmood Abbasi, Muhammad Abid, Raimondas Mozuratis, Mona S. Alwahibi, Mohamed Soliman Elshikh. <i>Arabian Journal of Chemistry</i> , 15: 103482, 2022 .	6.212 (W)	https://www.sciencedirect.com/science/article/pii/S1878535221004974
Chemical composition, antibacterial and antioxidative activities of <i>Monotheca buxifolia</i> (Falc.) A. DC leaves essential oil. Joham Sarfraz Ali, Muhammad Azeem , Abdul Mannan & Muhammad Zia. <i>Natural Product Research</i> . 2021 .	2.861 (X)	https://doi.org/10.1080/14786419.2021.2018591
Comparative assessment of polyphenolics' content, free radicals' scavenging and cellular antioxidant potential in apricot fruit. Iqra Saeed, Xinbo Guo, Muhammad Azeem , Mohamed Soliman Elshikh, Bibi Zainab, Zainab Ayaz, Lijun You, Mona S. Alwahibi, Arshad Mehmood Abbasi. <i>Journal of King Saud University – Science</i> , 33: 101459, 2021 .	4.011 (W)	https://www.sciencedirect.com/science/article/pii/S1018364721001208
Role of fruit volatiles of different guava varieties in attraction and oviposition behaviors of peach fruit fly, <i>Bactrocera zonata</i> Saunders. Muhammad Binyameen*, Abdul Hamid, Imran Afzal, Muhammad Sajjad, Muhammad Azeem* , Syed Muhammad Zaka, Zahid Mehmood Sarwar, Sarfraz Ali Shad, Thomas C. Baker, Fredrik Schlyter, <i>Arthropod-Plant Interactions</i> , 15: 95-106, 2021 , Springer, USA.	1.466 (X)	https://link.springer.com/article/10.1007/s11829-020-09796-z
Characterization and Cellulolytic Enzyme Potential of P Solubilizers from Pine Forests of Lower Himalaya. Bilal Ahmad Zafar Amin, Farhan Hafeez, Hina Aman, Muhammad Azeem , Akhtar Iqbal, Usman Irshad, Rashid Nazir, <i>International Journal of Agriculture & Biology</i> , 24:1242–1250, 2020 , Friends Science Publishers, Pakistan.	0.822	http://www.fspublishers.org/published_papers/6941_doi%2015.1555%20IJAB-19-1442%20(9).pdf
Host plant genetic control of associated fungal and insect species in a <i>Populus</i> hybrid cross. Sandra J. Simon, Timothy J. Tschaplinski, Jared M. LeBoldus, Ken Keefover-Ring, Muhammad Azeem , Jin-Gui Chen, David Macaya-Sanz, William L. MacDonald, Wellington Muchero, Stephen P. DiFazio, <i>Ecology and Evolution</i> , 10: 5119-5134, 2020 , Wiley, USA.	2.392 (W)	https://onlinelibrary.wiley.com/doi/full/10.1002/ece3.6266

Chemical composition and antifeedant activity of some aromatic plants against pine weevil (<i>Hylobius abietis</i>). Muhammad. Azeem* , Zafar Iqbal, S. Noushin Emami, Göran Nordlander, Henrik Nordenhem, Raimondas Mozuratis, Hesham R. El-Seedi, Anna Karin Borg-Karlson, <i>Annals of Applied Biology</i> , 177: 121-131, 2020 , Wiley, USA.	2.037 (W)	https://onlinelibrary.wiley.com/doi/full/10.1111/aab.12586
Chemical composition and repellent activity of native plants essential oils against dengue mosquito, <i>Aedes aegypti</i> . Muhammad Azeem* , Tariq Zaman, Muhammad Tahir, Abdullah Haris, Zafar Iqbal, Muhammad Binyameen, Abdul Nazir, Sarfraz Ali Shad, Shahid Majeed, Raimondas Mozuraitis. <i>Industrial Crops and Products</i> , 140: 111609, 2019 , Elsevier, Netherlands.	4.244 (W)	https://www.sciencedirect.com/science/article/pii/S0926669019306193
Estimation of secondary metabolites of indigenous medicinal plant extracts and their <i>in vitro</i> and <i>in vivo</i> efficacy against tomato early blight disease in Pakistan. Sobia Chohan, Rashida Perveen, Muhammad Anees, Muhammad Azeem , Muhammad Abid. <i>Journal of Plant Diseases and Protection</i> , 126: 553-563, 2019 , Springer, USA.	1.526	https://link.springer.com/article/10.1007/s41348-019-00252-6
Heterobasidion-growth inhibiting <i>Bacillus subtilis</i> A18 exhibits medium- and age-dependent production of lipopeptides. Muhammad Azeem* , Marina Barba-Aliaga, Anna Karin Borg-Karlson, Olle Terenius, Anders Broberg, Gunaratna Kuttuva Rajarao, <i>Microbiological Research</i> , 223-225: 129-136, 2019 , Elsevier, Netherlands.	3.970	https://www.sciencedirect.com/science/article/pii/S0944501318313065
Characterization and synergistic antibacterial potential of green synthesized silver nanoparticles using aqueous root extracts of important medicinal plants of Pakistan. Saddaf Rashid, Muhammad Azeem , Sabaz Ali Khan, Mohammad Maroof Shah, Rafiq Ahmad. <i>Colloids and Surfaces B: Biointerfaces</i> , 179: 317-325, 2019 , Elsevier, Netherlands.	4.389	https://www.sciencedirect.com/science/article/pii/S0927776519302395
Diterpenoid fingerprints in pine foliage across an environmental and chemotypic matrix: Isoabienol content is a key trait differentiating chemotypes. Astrid Kannaste, Lauri Laanisto, Leila Pazouki, Lucian Copolovici, Marina Suhorutsenko, Muhammad Azeem , Lauri Toom, Anna-Karin Borg-Karlson, Ülo Niinemets, <i>Phytochemistry</i> , 147: 80-88, 2018 , Elsevier, Netherlands.	3.044	https://www.sciencedirect.com/science/article/abs/pii/S0031942217304016?via%3Dihub
Cystatin genes identification and antibacterial activity in medicinal plants used against clinical pathogens. Rafiah Rehman, Sadaf Rashid Rafiq	0.624	http://sylwan.ibles.org/syl/search.php?searchQuery=Rafiah%20Rehman

Ahmad, Sabaz Ali Khan, Asim Ali, Abdul Nazir, Muhammad Azeem* , Abdul Manan, Arshad Mahmood Abbasi, Sylwan, 162 (2): 62-90, 2018 , Poland.		1,Saddaf%20Rashid1,%20Rafiq%20Ahmad1*,%20Sabaz%20Ali%20Khan1,%20Asim%20Ali1,%20Abdul%20Nazir1,%20Muhammad%20Azeem2*,%20Abdul%20Manan3,%20Arshad%20Mahmood%20Abbasi1*&search=search
Anti-tuberculosis potential, pharmacological and phytochemical studies of methanolic extracts from selected plant species. M. Gulfraz, Muntazir Shah, Hina gul, S. M. Bukhari, Kashif Ashraf, Muhammad Azeem , Farhan Khan. Acta Poloniae Pharmaceutica, 74: 1761-1766, 2017 , Poland.	0.456	https://www.ptfarm.pl/wydawnictwa/czasopisma/acta-poloniae-pharmaceutica/110/-/27126
Essential oils of aromatic Egyptian plants repel the common tick Ixodes ricinus L. (Acari: Ixodidae) Nymphs. Hesham El-Seedi, Muhammad Azeem , Nasr Khalil, Hanem Sakr, Shaden Khalifa, Khalijah Awang, Aamer Saeed, Katinka Pålsson, Anna-Karin Borg-Karlson. Experimental and Applied Acarology, 73: 139-157, 2017 , Springer, USA.	1.532	https://link.springer.com/article/10.1007/s10493-017-0165-3
Investigations of a possible chemical effect of <i>Salvadora persica</i> chewing sticks. Reham Albabtain, Muhammad Azeem , Zenebech Wondimu, Tulay Lindberg, Anna-Karin Borg-Karlson, Anders Gustafsson. Evidence-Based Complementary and Alternative Medicine, 2017: 2576548, 2017 , Hindawi, UK.	1.813	https://www.hindawi.com/journals/ecam/2017/2576548/
Production of biomass and useful compounds through elicitation in adventitious root cultures of <i>Fagonia indica</i> . Tariq Khan, Bilal Haider Abbasi, Mubarak Ali Khan, Muhammad Azeem . Industrial crops and products, 108: 451-457, 2017 , Elsevier, Netherlands.	4.244	https://www.sciencedirect.com/science/article/abs/pii/S0926669017304806
Analysis of Ecological attributes of Bacterial Phosphorus Solubilizers, Native to Pine Forests of Lower Himalaya. Waseem Hayat, Hina Aman, Usman Irshad, Muhammad Azeem , Akhtar Iqbal, Rashid Nazir. Applied Soil Ecology, 112: 51-59, 2017 , Elsevier, Netherlands.	3.187	https://www.sciencedirect.com/science/article/abs/pii/S0929139316305431
Effects of different animal manures on attraction and reproductive behaviors of common house fly, <i>Musca domestica</i> L. Rizwan Mustafa Shah, Faheem Azhar, Sarfraz Ali Shad, William B. Walker III,	1.641	https://link.springer.com/article/10.1007/s00436-016-5124-0

Muhammad Azeem , Muhammad Binyameen, Parasitology Research, 115(9): 3585–3598 , 2016 , Springer, USA.		
Essential oils from aromatic Ugandan medicinal plants: chemical composition and growth inhibitory effects on oral pathogens. Francis Ocheng, Freddie Bwanga, Moses Joloba, Abier Softrata, Muhammad Azeem , Katrin Pütsep, Anna-Karin Borg-Karlson, Celestino Obua, and Anders Gustafsson. Evidence-Based Complementary and Alternative Medicine, 2015: 230832, 2015 , Hinawai, UK.	1.813	https://www.hindawi.com/journals/ecam/2015/230832/
Chemodiversity and biodiversity of fungi associated with pine weevil (<i>Hylobius abietis</i>). Muhammad Azeem , Olle Terenius, Gunaratna Kuttuva Rajarao, Kazuhiro Nagahama, Henrik Nordenhem, Göran Nordlander, Anna-Karin Borg-Karlson, Fungal Biology, 119: 738-746, 2015 , Elsevier, Netherlands.	2.789	https://www.sciencedirect.com/science/article/pii/S1878614615000720?via%3Dihub
A fungal metabolite masks the host plant odor for the pine weevil (<i>Hylobius abietis</i>). Muhammad Azeem , Gunaratna Kuttuva Rajarao, Olle Terenius, Göran Nordlander, Henrik Nordenhem, Kazuhiro Nagahama, Emil Nori, Anna Karin Borg-Karlson, Fungal Ecology 13: 103-111, 2015 , Elsevier, Netherlands.	2.656	https://www.sciencedirect.com/science/article/pii/S1754504814001202
Chemical composition and toxicological evaluation of the aqueous leaf extracts of <i>Plectranthus amboinicus</i> Lour. Spreng. Savina Asiimwe, Anna-Karin Borg-Karlsson, Muhammad Azeem , Kamatenesi Maud Mugisha, Agnes Namutebi & Ndukui James Gakunga. International Journal of Pharmaceutical Science Invention, 3: 19-27, 2014.		
Sustainable bio-production of styrene from forest waste. Muhammad Azeem* , Anna Karin Borg-Karlson, Gunaratna Kuttuva Rajarao, Bioresource Technology, 144: 684-688, 2013 , Elsevier, Netherlands.	11.889	https://www.sciencedirect.com/science/article/pii/S0960852413010912
Penicillium expansum volatiles reduce pine weevil attraction to host plants. Muhammad Azeem , Gunaratna Kuttuva Rajarao, Henrik Nordenhem, Göran Nordlander, Anna Karin Borg-Karlson, Journal of Chemical Ecology, 39: 120-128, 2013 , Springer, USA.	2.793	https://link.springer.com/article/10.1007/s10886-012-0232-5

Chemical Composition and Repellency of Essential Oils From Four Medicinal Plants Against <i>Ixodes ricinus</i> Nymphs (Acari: Ixodidae). Hesham R. El-Seedi, Nasr S. Khalil, Muhammad Azeem , Eman A. Taher, Ulf Göransson, Katinka Pålsson, Anna Karin Borg-Karlson, Journal of Medical Entomology, 49 (5):1067-1075, 2012 , Oxford University Press, UK.	2.278	https://academic.oup.com/jme/article/49/5/1067/1044886
Anti-schistosomiasis triterpene glycoside from the Egyptian medicinal plant <i>Asparagus stipularis</i> . Hesham R. El-Seedi, Mervat Zayed, Asmaa M. A. El-Said, Khalid M. H. Helmy, Ahmed H. M. Gaara, Zaki Turki, Muhammad Azeem , Ahmed M. Ahmed, Loutfy Boulos, Anna Karin Borg-Karlson, Ulf Göransson, Revista Brasileira de Farmacognosia, 22: 314-318, 2012 , Brazil.	2.464	http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0102-695X2012000200010
Benzyl Isothiocyanate, a Major component from the roots of <i>Salvadora Persica</i> is highly active against gram-negative bacteria, Abier Sofrata, Ellen M. Santangelo, Muhammad Azeem , Anna Karin Borg-Karlson, Anders Gustafsson, Katrin Putsep, PLoS One, 6(8): e23045, 2011 , PLOS, USA.	2.740	https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0023045

Conference Publications

- I. **M. Azeem**, Muhammad Abid, Chohan "Essential Oils Of Hazara Division Plants Inhibit The Growth Of Post-Harvest Pathogenic Fungus, *Aspergillus Flavus*" 15th PAS-Forum Conference on Nourishing Pakistan in Changing Climate: Water and Food Security in Pakistan, University of Agriculture Faisalabad , 2019
- II. Muhammad Binyameen, Abdul Hamid, Imran Afzal, **M. Azeem**, Muhammad Sajjad, Syed Muhammad Zaka "Identification Of Guava Fruit Volatiles And Their Role In Attraction And Oviposition Behaviors Of Peach Fruit Fly, *Bactrocera Zonata* (Saunders)" , Nourishing Pakistan in Changing Climate: Water and Food Security in Pakistan, 2019, University of Agriculture Faisalabad , 2019
- III. Muhammad Binyameen, **M. Azeem**, Thomas C Baker "Evaluation Of Different Plant Essential Oils As Repellent Against Dengue Vector, *Aedes Aegypti*" , 15th PAS-Forum Conference on Nourishing Pakistan in Changing Climate: Water and Food Security in Pakistan, University of Agriculture Faisalabad , 2019
- IV. **M. Azeem**, Muhammad Tahir, A. Nazir, Muhammad Binyameen, Tariq Zaman "Chemical Composition Of Essential Oils Of Native Plants And Evaluation Of Their Potential Against *Aedes Aegypti*" , 15th PAS-Forum Conference on Nourishing Pakistan in Changing Climate: Water and Food Security in Pakistan, University of Agriculture Faisalabad , 2019
- V. Uzma Khan, Nabeela Daud, Muhammad Mumtaz, **M. Azeem**, A. Nazir "Chemical Analysis and Anti-bacterial Activity of Some *Mentha* Species from Lower Himalaya Region of Pakistan" , 1st International Conference on Agricultural and Biological Sciences Focusing on Food Security and Climate Change, 27-30 March 2019 at University of Haripur, Haripur, KPK, Pakistan , 2019
- VI. Nabeela Daud, **M. Azeem**, R.Nazir, Muhammad Binyameen "Production of Aroma Compounds by Using Soil Borne Microbiota of Abbottabad Region" , 1st International Conference on

- Agricultural and Biological Sciences Focusing on Food Security and Climate Change, 27-30 March 2019 at University of Haripur, Haripur, KPK, Pakistan , 2019
- VII. Iqra Saeed, **M. Azeem**, Abbasi AM "Phytochemical Screening and Antioxidant Activity of *Citrus sinensis* L. Fruit" , 1st International Conference on Agricultural and Biological Sciences Focusing on Food Security and Climate Change, 27-30 March 2019 at University of Haripur, Haripur, KPK, Pakistan , 2019
 - VIII. Muhammad Mumtaz, Abdullah Haris, Muhammad Binyameen, Fawad Ali, **M. Azeem**, Abbasi AM "Chemical Composition and Larvicidal Activity of two Lamiaceae Plants of Northern Pakistan against Dengue Vector (*Aedes aegypti*)" , International Entomological Congress: Conversing Emerging Entomological Challenges and their Solution. April 8-10, 2019, University of Agriculture Faisalabad, Pakistan, 2019
 - IX. **M. Azeem**, Muhammad Mumtaz, Abdullah Haris, A.Nazir, Muhammad Binyameen "Repellent Activity of Plants Essential Oils against Dengue Vector Mosquito (*Aedes aegypti*) from Lower Himalaya Region of Pakistan " , International Entomological Congress: Conversing Emerging Entomological Challenges and their Solution. April 8-10, 2019, University of Agriculture Faisalabad, Pakistan , 2019
 - X. **M. Azeem**, Muhammad Mumtaz, Abdullah Haris, A.Nazir, Muhammad Binyameen "Essential Oils of Himalaya Region Plants Repel Dengue Vector Mosquito (*Aedes aegypti*) " , 1st National Conference on Current Updates in Pharmacy Profession and Research. 29-30 July 2019 at CUI Abbottabad Campus, Abbottabad , 2019
 - XI. R.Ahmad, M.Shah, Arshad Mehmood Abbasi, **M. Azeem** "Evaluation of Antibacterial Activity of *Bergenia ciliata*" , International Conference on Environmentally Sustainable Development VII , 2017
 - XII. Tariq Zaman, **M. Azeem**, Arshad Mehmood Abbasi, Muhammad Binyameen "Insecticidal activity and chemical composition of essential oils of plants collected from Hazara division against red flour beetle, *Tribolium castaneum*" , Conference on "Sustainable Crop and Animal Production Systems" held at University of haripur, Haripur, Pakistan , 2016
 - XIII. Faizan Ali Khan, **M. Azeem**, M.Shah,R.Ahmad "Molecular and phytochemical characterization of *Justicia adhatoda* and *Dodonaea viscosa* and their bioactivities" , Recent Advances & Challenges in Molecular Biology, Biochemistry and Biotechnology , 2016
 - XIV. **M. Azeem**, Anna Karin Borg-Karlson, Olle Terenius, Anders Broberg, Gunaratna Kuttuva Rajarao "Antagonistic activity of *Bacillus subtilis* A18–A19 strains against *Heterobasidion* species" , Annual Meeting of International Society of Chemical Ecology, Stockholm, Sweden , 2015
 - XV. Kazuhiro Nagahama, Miwa Tanaka, Masayoshi Matsuoka, **M. Azeem**, Gunaratna Kuttuva Rajarao, Olle Terenius, Göran Nordlander, Henrik Nordenhem, Anna Karin Borg-Karlson "Ecological role of *Ewingella* sp. KTH G3-2 with pine weevil" , Annual Meeting of International Society of Chemical Ecology, Stockholm, Sweden , 2015
 - XVI. Muhammad Binyameen, Rizwan Mustafa Shah, Sarfraz A Shad, Faheem Azhar, William B Walker III, **M. Azeem** "Effect of different animal manures on attraction and reproductive behaviors of common house fly, *Musca domestica* L" , Annual Meeting of International Society of Chemical Ecology, Stockholm, Sweden , 2015.
 - XVII. **Muhammad Azeem**, Gunaratna Kuttuva Rajarao, Emil Norin, Kazuhiro Nagahama, Henrik Nordenhem, Göran Nordlander and Anna-Karin Borg-Karlson. Methyl salicylate producing microbes from *Hylobius abietis* frass. (28th annual meeting of ISCE 22-26 July 2012 Vilnius, Lithuania).
 - XVIII. **Muhammad Azeem**, Gunaranta Kuttuva Rajarao, Kazuhiro Nagahama, Henrik Nordenhem, Göran Nordlander and Anna Karin Borg Karlson. Sustainable green styrene from forest waste (Organikerdagarna 2012 Göteborg, Sweden).
 - XIX. **Muhammad Azeem**, Gunaratna Kuttuva Rajarao, Henrik Nordenhem, Göran Nordlander, Anna-Karin Borg Karlson. Pine weevil (*Hylobius abietis*) repelled by 3-octanol, a volatile secondary metabolite of *Penicillium* species isolated from frass. (6th Annual Meeting of APACE Oct. 2011, Beijing, China).

- XX. **Muhammad Azeem**, Kazuhiro Nagahama, Gunaratna Kuttuva Rajarao, Anna-Karin Borg Karlson. Microbes associated with pine weevil (*Hylobius abietis*). (27th annual meeting of ISCE July 2011 Vancouver, B.C. Canada).

Courses Taught at CUI

Course Title		Credit Hours	PhD / MS / Undergrad	Students Feedback in %age
CHM325 Analytical Techniques	Sp-2015	03	Undergrad	85.6
CHM 121 Environmental Chemistry	Sp-2015	03	Undergrad	92.6
BTY110 Biochemistry	Fa-2015	03	Undergrad	79.2
CHM744 Natural Products Chemistry	Sp-2016	03	PhD	100
CHM 121 Environmental Chemistry	Fa-2016	03	Undergrad	54.0
BTY110 Biochemistry	Sp-2017	03	Undergrad	77.6
CHM325 Analytical Techniques	Fa-2018	03	Undergrad	80.8
CHM644 Chromatographic Techniques	Sp-2019	03	MS	90.4
CHM644 Chromatographic Techniques	Sp-2019	03	MS	90
BTY110 Fundamentals of Biochemistry	Fa-2019	03	Undergrad	88.6
BTY110 Fundamentals of Biochemistry	Fa-2019	03	Undergrad	88.2
CHM747 Bioorganic Chemistry	Sp-2020	03	MS	86.4
BTY110 Fundamentals of Biochemistry	Fa-2020	03	Undergrad	92
BTY110 Fundamentals of Biochemistry	Fa-2020	03	Undergrad	84
CHM644 Chromatographic Techniques	Sp-2021	03	MS	88
CHM644 Chromatographic Technique	Sp-2021	03	PhD	100
CHM325 Analytical Techniques	Fa-2021	03	Undergrad	88
CHM522 Advanced Analytical Technique	Sp-2022	03	MS	93
CHM644 Chromatographic Techniques	Fa-2022	03	MS	96
CHM325 Analytical Techniques	Fa-2022	03	Undergrad	77
CHM644 Chromatographic Techniques	Sp-2023	03	MS & PhD	99.5
CHM723 SPE & MSPE	Sp-2023	03	PhD	100
CHM644 Chromatographic Techniques	Fa-2023	03	MS	88.2
CHM325 Analytical Techniques	Fa-2023	03	Undergrad	82.6
CHM644 Chromatographic Techniques	Sp-2024	03	MS	88.4
CHM723 SPE & MSPE	Sp-2024	03	PhD	97.1
CHM600 Research Methodology and Chemical		03	MS	90.2

Data Handling	Fa-2024			
CHM121 Environmental Chemistry	Fa-2024	03 (2,1)	Undergrad	93.4
CHM600 Research Methodology and Chemical Data Handling	Sp-2025	03 (3,0)	MS	
CHM614 Chromatographic Techniques	Sp-2025	03 (3,0)	MS	
CHM121 Environmental Chemistry	Sp-2024	03 (2,1)	Undergrad	

MS and PhD Theses Supervision

#	Student Name	Thesis Title	MS/PhD	Supervisor / Co-Supervisor	Status with date: Registered/Completed
1	Faizan Ali Khan	Molecular, Antibacterial and Phytochemical characterization of <i>Justicia adhatoda</i> and <i>Dodonaea viscosa</i>	MS	Co-supervisor	Completed Sp-2016
2	Tariq Zaman	Chemical Composition and Mosquito Repelling Potential of Essential Oils of Selected Plants	MS	Supervisor	Completed Sp-2017
3	Syed Zain Ul Abideen Ali	Production of biodiesel using different seeds oil	MS	Co-supervisor	Completed Sp-2018
4	Nabeela Daud	Production of Aroma Compounds by using Soil Borne Microbiota of Abbottabad Region	MS	Supervisor	Completed SP-2019
5	Fawad Ali	Identification of Insecticidal Compounds from Selected <i>Artemisia</i> Species Growing in Hazara Division	MS	Supervisor	Completed SP-2019
6	Muhammad Mumtaz	Chemical Composition and Larvicidal Activity of <i>Isodon rugosus</i> and <i>Perovskia atriplicifolia</i> against Dengue Vector (<i>Aedes aegypti</i>)	MS	Supervisor	Completed SP-2019
7	Iqra Saeed	Phenolics Profiling and Anti-oxidant Potential of Apricot Fruit	MS	Co-supervisor	Completed Sp-2019
8	Muhammad Ali	Chemical Composition, Mineral Contents and Biological Activities of <i>Aegle marmelos</i> Leaves	MS	Co-supervisor	Completed Sp-2019
9	Sania Bibi	Chemical Variability in Volatile Constituents of <i>Dodonaea viscosa</i> and its Antimicrobial Activity	MS	Supervisor	Completed Fa-2019
10	Abu Sufyan	Mosquito Repellent, Larvicidal and Anti-Microbial Activities of <i>Salvia</i> Species	MS	Supervisor	Completed Sp-2020
11	Mahnoor	Investigation of <i>Mentha spicata</i>	MS	Supervisor	Completed

	Rafaqat	Chemo-types and their Biological Activities			Fa-2020
12	Fawad Ahmed Khan	Chemical Composition and Larvicidal Activity of Selected Asteraceae Plants against <i>Aedes aegypti</i>	MS	Supervisor	Completed Sp-2021
13	Sidra Saeed	Chemical Composition and Biological Activities of Selected Lamiaceae Plants	MS	Supervisor	Completed Sp-2021
14	Noor-ul-ain	Phytochemical Analysis and Antimicrobial Activity of Camphor Tree, <i>Cinnamomum camphora</i> L	MS	Co-supervisor	Completed Sp-2021
15	Khadeeja Anwar Abbasi	Chemical Analysis and Exploring the Antimicrobial Potential of <i>Helichrysum odoratissimum</i> and <i>Cymbopogon nardus</i>	MS	Supervisor	Completed Fa-2021
16	Baitullah	Chemo-types Investigation and Anti-microbial Activity of <i>Origanum Vulgare</i> Growing in Pakistan	MS	Supervisor	Completed Fa-2021
17	Amna Parveen	Chemical Variation in Artemisia scoparia Samples and their Biological Activities	MS	Supervisor	Completed Sp-2022
18	Komal Abbasi	Biological Activities of Selected Aromatic Plants Essential Oils and their Major Constituents	MS	Supervisor	Completed Fa-2022
19	Maryam Qureshi	Biological Activities of Selected Asteraceae Plants Essential Oils and their Major Constituents	MS	Supervisor	Completed Fa-2022
20	Alyia Sajjad	Optimizing the Organic Loading Rate for Enhanced Biogas Production during Anaerobic Digestion of Food Waste	MS	Co-supervisor	Completed Sp-2023
21	Aqsa Rashid	Phytochemical Analyses and Antibacterial Activities of <i>Helichrysum odoratissimum</i>	MS	Supervisor	Completed Sp-2023
22	Sabeel Munawar	Green Synthesis, Characterization and Antibacterial Activities of Justicia adhatoda Mediated Nanoparticles	MS	Supervisor	Completed Sp-2023
23	Aleena Safeer	Development, characterization, and biological activities of plants essential oil based nanoemulsions	MS	Supervisor	Completed Fa-2023
24	Mehwish Nawaz	Investigating the chemical composition of citrus varieties growing in Hazara region and	MS	Supervisor	Completed Fa-2023

		their biological activities			
25	Abdullah Haris	Repellent potential and toxicity effects of plant essential oils against <i>Aedes aegypti</i> and understanding the resistance mechanisms induced by an organophosphate insecticide, Temephos	PhD	Supervisor-2	Completed Fa-2023
26	Areej Arshad	Investigating the Chemical Composition and Antibacterial Activity of <i>Nasturtium officinale</i> Growing at Different Altitudes in Hazara Region	MS	Supervisor	Completed Sp-2024
27	Jahangir Khan	Investigation of Phytochemicals and Synthesis of Silver Nanoparticles of <i>Dysphania ambrosioides</i> and their Anti-Bacterial Potential against Human Pathogenic Bacteria	MS	Supervisor	Completed Sp-2024
28	Hira Umer	Characterization of Phytochemicals and Silver Nanoparticles of <i>Carpesium abrotanoides</i> and their Anti-Bacterial Activity	MS	Supervisor	Completed Sp-2024
29	Manail Lal Khan	Characterization of <i>Thalictrum foliolosum</i> Essential Oils and Ag-NPs and their Biological Activities	MS	Supervisor	Completed Fa-2024
30	Yasir	Chemical Variations in <i>Zanthoxylum armatum</i> Essential Oils and their Biological Activities	MS	Supervisor	Completed Fa-2024
31	Zonaira	Chemical Variation in <i>Vitex negundo</i> Essential Oils and their Biological Activities	MS	Supervisor	Registered
32	Esha Jadoon	Characterization and Biological Activities of <i>Lepidium pinnatifidum</i> Essential Oil Based Nanoemulsion and Plant Extract Mediated Synthesis of Ag-Nanoparticles	MS	Supervisor	Registered
32	Sana Badar	Chemical Variations in <i>Abies pindrow</i> Essential Oils and their Biological Activities	MS	Supervisor	Registered
33	Muhammad Ghazanfar Abbas	Chemical analyses, repellent and insecticidal potential of plant essential oils and their major compounds against three mosquito species	PhD	Supervisor-2	Registered

34	Hafiz Muhammad Usama Khan	Pest Management Techniques for Control of Ectoparasitic Mites, <i>Varroa destructor</i> and <i>Tropilaelaps clareae</i> in Honey Bee, <i>Apis mellifera</i> Colonies in Pakistan	PhD	Supervisor-2	Registered
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Research Projects

Project Title	PI/Co-PI	Amount	Agency	Grant #	Status
Isolation and identification of insect repelling compounds from indigenous plants	PI	0.4 M PKR	HEC, Pakistan	21-18/SRGP/R&D/HEC	Completed Fa-2017
Bioactive molecules from Pakistani flora for the ecological control of <i>Aedes</i> mosquitoes	PI	11,300 US \$	IFS, Sweden	I-1-F-6041-1	Completed Sp-2023
<i>Helichrysum Odoratissimum</i> : Isolation and Identification of Bioactive Compounds and their Effects on Oral Bacteria	Co-PI	23,715 US \$	Makerere University, Uganda.	RIF-2019	Approved in Sp-2020 Continue
Synthesis of 1,3-Disubstituted Thioureas as Potential Pesticides to Deal with the Hurdles in Sustainable Wheat Growth in Pakistan	Co-PI	3.56 M PKR	PSF-NSLP	NSLP-2022	Approved SP-2023
Study of Flavoring Compounds/Polyphenolics in Aromatic Plants of Himalayan Region-Pakistan	Co-PI	7000 US \$	Guangzhou Kaihong Flavour & Fragrance		Approve SP-2023
Production of Flavor and Fragrance Compounds using Indigenous Soil Borne Microbiota	PI		HEC-NRPU-2025		Submitted

Fellowships, Awards and Distinctions

- HEC approved supervisor since 2018
- Research productivity award 2016, 2017, 2019 & 2020 from CUI, Abbottabad
- Student travel grant from International Society of Chemical Ecology (ISCE) to attend an annual meeting (2012).
- Travel grant from Hugo och Emma Björkmans minnesfond Royal Swedish Academy of Agriculture and Forestry (2010 & 2012)
- Travel grants from Linders Foundation and Aulin–Erdtman Foundation KTH (2010 & 2011)

- Ph.D. Research Fellowship from the Higher Education Commission (HEC), Government of Pakistan (2007–2011).
- Merit scholarship from the Ministry of Education, Government of the Punjab, Pakistan (1997–1998)

Professional Affiliations

- Member of International Society of Chemical Ecology
- Member of Chemical Society of Pakistan
- Member of Pakistan Agricultural Scientists Forum
- Executive Member of Himalaya Chapter of American Society for Microbiology.

Experiences and Skills

- Expert of Gas & liquid chromatography-mass spectroscopy (GC-MS, LC-MS, UHPLC-MS)
- Sample preparation and extraction methods i.e. SPE, SPME, static and dynamic collection methods
- Essential oil extraction on semi pilot scale and pilot scale
- Preparative liquid chromatography (Flash & MPLC) and spectroscopic techniques
- Isolation and culturing of bacteria and fungi
- Development of bioassay
- Bio-transformation and bio-conversions using microbes
- Anti-bacterial and anti-fungal bioassays
- Insect repellent, insecticidal and anti-feedant bioassays
- MS office, Adobe illustrator, Statistica 12, SPSS, Endnote, Sci-finder, Chem-draw
- Statistical methods and data analysis; *t*-test, ANOVA, Probit analysis etc.

References

Prof. Anna Karin Borg-Karlson (PhD Supervisor)

Division of Organic Chemistry, Department of Chemistry, School of Engineering Sciences in Chemistry, Biotechnology and Health, KTH Royal Institute of Technology, Teknikringen 30, SE-100 44 Stockholm, Sweden
+46-704804702

akbk@kth.se

Prof. Anders Gustaffson

Department of Dental Medicine, Karolinska Institute, Stockholm, Sweden
0046-852488331

anders.gustafsson@ki.se

Prof. Raimondas Mozuraitis

Department of Ecology, Environment and Plant Sciences
Svante Arrhenius väg 20A Stockholm University
SE-10691, Stockholm, Sweden
+46735729581

raimondas.mozuraitis@su.se

Prof. Ken Keefover-ring

Department of Botany and Geography
University of Wisconsin-Madison
221 Birge Hall, 430 Lincoln Drive
Madison, WI 53706 U.S.A.

ken.keefoverring@wisc.edu