كلية الآداب والعلوم
College of Arts and Sciences
QATAR UNIVERSITY جامعة قطر

Research Booklet 2020 - 2021

Department of Biological & Environmental Sciences

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Welcome Message from the Department Head

Welcome to the Department of Biological and Environmental Sciences (DBES) at Qatar University. We are committed to excellence in research and teaching and maintains that the two cannot be detached from each other. Our programs offer comprehensive teaching and learning in both the theoretical and practical aspects of biological and environmental sciences.

Our department houses one of the most diverse faculty bodies found in any department at Qa-tar University, coupled with our outstanding personnel of both faculty and staff, high research activity, networking with various institutions at both national and international levels, and multiple undergraduate and graduate programs lead to our department being a unique, desirable destination for both prospective students and faculty. The DBES offers two undergraduate programs: BSc in Biological Sciences, and BSc in Environmental Science. The Biology program is currently only offered to female students and is a general Biological Sciences program in which students complete the 120 credit hours (CH). The Environmental Science program is offered with two concentrations, namely Marine Sciences concentration (125 CH), Biotechnology concentration (126 CH), both of which are accredited by CHESS. The graduate programs offered by the DBES are of both Masters and Doctorate of Philosophy levels. The MSc in Environmental Science is a two-year program that is also accredited by CHESS and is offered as either full-time or part-time. The Ph.D. in Biological and Environmental Sciences is a full-time program offered in a choice of four concentrations: Cell & Molecular Biology, Environmental Science, Ecosystem & Marine Science, and Biotechnology.

The DBES is offered a Graduate Certificate in Environmental Sciences.

The DBES is always looking for bright, enthusiastic, hard-working students to join the team of pioneers who can be leaders in the scientific community and enrich their respective scientific fields, and most importantly, give back to Qatar and Qatar University. The research at the DBES is centered around four research themes built on identified strengths that are advanced by transdisciplinary teams made up of DBES faculty, undergraduate and post-graduate students. Themes are supported through investment in program initiatives to develop scholarly clusters/teams of research excellence. The DBES is integrating biological and environmental sciences to achieve a sustainable environment, understand “cell and molecular biology”, “environmental science”, “marine sciences”, and “biotechnology”. The DBES has experienced, motivated research-active staff with a unique research culture comprising a combination of biological and environmental sciences and this booklet describes those research interests. Our faculty and graduate students research the cutting edge of biological and environmental sciences inquiry. They investigate questions at the core of biological and environmental sciences in Qatar now and issues of universal importance. The booklet introduces the Department and helps identify research interests. Importantly, the outlines here are very brief and general, so please contact faculty-offering projects that are of interest to you. Members of the Enabling Research Committee are always available to assist students, postgraduates, and researchers in finding a suitable project amongst DBES research activities. This Fifth Edition of our Research Booklet documents the progress of this vibrant function at the DBES.

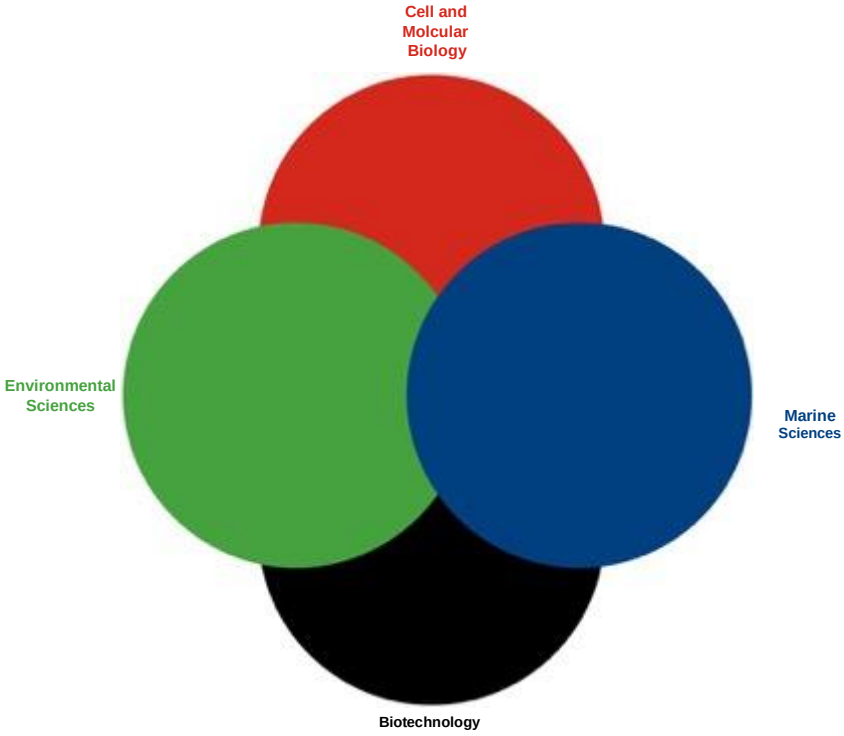
Head, Department of Biological and Environmental Sciences
Prof. Mohammed Abu-Dieyeh

Research in the Department

The faculty members within the Department of Biological and Environmental Sciences have international standing in both basic and applied research areas in biological and environmental sciences; in conjunction with the outstanding instrumentation that makes the Department at Qatar University a thrilling place to undertake scientific research.

The Department's research is focused on four scientific themes (Cell and Molecular Biology, Environmental Science, Marine Sciences, and Biotechnology) outlined throughout this book. There is a range of programs available in the Department which involve a scientific research element, such as a MSc in Environmental Science (accredited, CHES-UK) and a Ph.D. in Biological and Environmental Sciences. The research element includes the finishing of a research project under the supervision of one of the faculty members.

The BSc in Environmental Science is an accredited (CHES-UK). It is developed to address escalating issues and problems associated with the environment of Qatar, and the region, as well as imminent and consequential projected needs of stakeholders. Individual research interests and funded projects of the faculty members within the Department are described in this Book.



Themes: A, B, D

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Molecular and Microbial Biotechnology

Keywords:
Molecular and Microbial Biotechnology, phytophagous insects, plant pathogenic fungi

Research Interest:
My main interest is in the interactions between phytophagous insects, plant pathogenic fungi and their host-plants. I am investigating the role of these interactions in plant popula-tion dynamics, using broad bean (Vicia faba L.)". As a model system, and also the effect of environmental variables such as nitrogen fertilization and cutting on these biotic inter-actions. This field raises several important questions for the biological control of fungal diseases.

Interactions among Uromyces viciae-fabae, Botrytis cinerea and Aphis fabae on broad beans
The competitive interaction between Botrytis cinerea and Uromyces viciae-fabae is lim-ited and the mechanism through which they compete is not unequivocally established. Botrytis cinerea infection in groundsel (Senecio vulgaris) has been shown to increase in incidence and severity as a result of rupture the epidermal cells by previous infection with rust disease caused by Puccinia lagenophorae. The competition between the obligate biotroph Puccinia triticina and the facultative saprophyte Pyrenophora tritici-repentis. The facultative saprophyte Pyrenophora was generally a stronger competitor than the biotro-phic Puccinia, even experiencing facilitation from the presence of Puccinia when Pyre-nophora had the advantage of earlier inoculation.

Current Research:
Both pathogen species produced the most spores when they were introduced before the competing species and more spores when introduced simultaneously compared to after the competitor.

Direct/plant-mediated effects of fungus infection on herbivore performance
Direct effects occur when the fungus itself could have an immediate impact on herbivore, possibly through ingestion of the fungus itself, which may provide nutritional benefit. Some herbivores may be negatively affected when the fungal pathogen itself produces nutrients and secondary metabolites, such as fungal mycotoxins.

One of the most intensively studied tripartite systems consists of the leaf beetle Gastrophysa viridula, the biotrophic rust fungus Uromyces rumicis and their host plants Rumex obtusifolius and R. crispus. Laboratory experiments have focussed on reciprocal interactions between the phytopathogenic fungus and the herbivore. Adults of the chrysomelid G. viridula may be deterred by rust-infected dock plants. However, if females do oviposit on rust-infected leaves their progeny suffer greater larval mortality. Larvae feeding on infected leaves have lower relative growth rates (RGR) and convert ingested food less ef-ficiently, while the resulting adults show reduced fecundity.

Induced disease resistance

Plants are a tremendous resource of structurally diverse metabolites. Phytochemicals have important functions in influencing interactions between plants and other organisms. Antimicrobial compounds can be produced as part of normal plant growth and develop-ment. These preformed antimicrobial compounds (phytoalexins) can be synthesized de novo in response to microbial attack by transcriptional activation of genes for biosynthetic pathways. There is evidence that preformed antimicrobial chemicals play an important role against disease. For example, wyerone acid following infection with B.

Themes: A, B, D

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Professor Microbiology & Molecular & Microbial Biotechnology

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Molecular and Microbial Biotechnology

Keywords:
Microbial and Bioactive metabolites, Antibiotics, bacteriocins, Bio-fungicides, Bio-insecticides, mycotoxins, Biodegradation, cloning, heterologous gene expression.

Research Interest:

Exploration of Microbial strains producing bioactive molecules “BIO” for the control of pathogens and diseases:

- Gene bank of microorganisms
- Antibacterial, insecticidal, anti-fungal drugs for biological treatments and control
- *Bacillus thuringiensis* research and biopesticides
- Anticancer peptides for cancer treatment
- Mycosafe: Monitoring and biocontrol of mycotoxigenic fungi and mycotoxins in Food and Feed
- Identification and Purification of Biological active Compounds
- Cloning and study of the expression of the corresponding genes
- Heterologous gene expression

Current Research:

Set up of Qatari Microbial gene bank and applications in Microbial biotechnology:

- A gene bank of more than 700 *B. thuringiensis* strains: a source of many types of biopesecticides and antimicrobial agents useful in agriculture and for the control of disease vectors. These biopesticides are being explored and developed towards a sustainable Qatari and Gulf Environment free from chemical pesticides. This collection is being exploited in several projects and opportunities of multidisciplinary research for undergraduate and graduate students and post-docs gathering microbiological, Biochemical, molecular research skills.

- Qatari Hydrocarbon degrading bacteria: We have initiated and been conducting the exploration of hydrocarbon degrading bacteria potentialities and coding genes and pathways enzymes.

- Mycosafe: Investigation and Biocontrol of food-borne mycotoxins in Qatar: Evaluating the impact and distribution of mycotoxins and toxigenic fungi in food, animal feed and

baby food and developing environmentally-sound preventive strategies to assist in the implementation of proper decontamination and other forms of control.

-Yeast strains including the low-fermenting yeast *Lachancea thermotolerans* and local novel yeast *Kluyveromyces marxianus* having volatilome and binding potentialities for the biocontrol of toxigenic fungi and their mycotoxins

-Bacterial antifungal compounds and Volatile organic compounds, including local bacterial strains of *Bacillus pumilus* in the control of *Aspergillus carbonarius* and ochratoxin A contamination and *Bacillus licheniformis* volatile compounds for the biological control of toxigenic *Aspergillus* and *Penicillium* spp..

Current recent Publications:

https://scholar.google.com/citations?user=dH0g1coAAAAJ&hl=en&cstart=40&pagesize=20

1. Nayla Salah Higazy, Aya Ehab Saleh, Zahoor Ul Hassan, Roda Al Thani, Quirico Migheli and Samir Jaoua (**2021**) Investigation and application of *Bacillus pumilus* QBP344-3 in the control of *Aspergillus carbonarius* and ochratoxin A contamination
Food control, 119, 107464, https://doi.org/10.1016/j.foodcont.2020.107464-

2. Reem Alasmar, Zahoor Ul-Hassan, Randa Zeidan, Roda Al-Thani, Noora Al-Shamary, Hajer Alnaimi, Quirico Migheli and Samir Jaoua (2020) Isolation of a novel *Kluyveromyces marxianus* strain QKM-4 and evidence of its volatilome production and binding potentialities in the biocontrol of toxigenic fungi and their mycotoxins
ACS omega, 5 (28), 17637−17645

3. Nasser Al-kaabi, Mohammad Al-Ghouti, Samir Jaoua and Nabil Zouari (2020) Potential for native hydrocarbon-degrading bacteria to remediate highly weathered oil-polluted soils in Qatar through self-purification and bioaugmentation in biopiles
Biotechnology Reports, 28 e00543

4. Kavita Nair , Roda Al-Thani, Carole Ginibre, Fabrice Chandre, Mohammed Alsafran and Samir Jaoua (2020) *Bacillus thuringiensis* strains isolated from Qatari soil, synthesizing □-endotoxins highly active against the disease vector insect *Aedes aegypti* Bora Bora*Heliyon, 6 (10) 6 October 2020, e05003; https://authors.elsevier.com/sd/article/S2405-8440(20)31846-6*

6. Raida Zribi Zghal, Fakher Frikha, Jihen Elleuch, Frédéric Darriet, Fabrice Chandre, Samir Jaoua, Slim Tounsi (2019) The combinatory effect of Cyt1Aa flexibility and specificity against dipteran larvae improves the toxicity of *Bacillus thuringiensis kurstaki* toxins
International Journal of Biological Macromolecules 123 (2019) 42–49

7. Zahoor Ul Hassan, Roda Al-Thani, Virgilio Balmas, Quirico Migheli, Samir Jaoua (2019) Prevalence of *Fusarium* fungi and their toxins in marketed feed. *Food control, 104, 224-230*

8. Zulfa Ali Al Disia, Nabil Zouari, Maria Dittrich, Samir Jaoua, Hamad Al Saad Al-Kuwari, Tomaso R.R, Bontognali (2019)
Characterization of the extracellular polymeric substances (EPS) of *Virgibacillus* strains capable of mediating the formation of high Mg-calcite and protodolomite
Marine Chemistry 216, 103693

9. B Tilocca, Virgilio Balmas, Zahoor Ul Hassan, Samir Jaoua, Quirico Migheli (2019) A proteomic investigation of *Aspergillus carbonarius* exposed to yeast volatilome or to its major component 2-phenylethanol reveals major shifts in fungal metabolism
International journal of food microbiology 306, 108265

10. Zahoor Ul Hassan, Roda Al-Thani, Hajer Alnaimi, Quirico Migheli, Samir Jaoua (2019) Investigation and application of *Bacillus licheniformis* volatile compounds for the biological control of toxigenic *Aspergillus and Penicillium* spp. *ACS omega, 4, 17186−17193*
11. Randa Zeidan, Zahoor Ul-Hassan, Roda Al-Thani, Quirico Migheli and Samir Jaoua (2019) *In-vitro* Application of a Qatari *Burkholderia cepacia* strain (QBC03) in the Biocontrol of MycotoxigenicFungi and in the Reduction of Ochratoxin A biosynthesis by *Aspergillus carbonarius Toxins 2019, 11, 700*; doi:10.3390/toxins11120700
12. Zulfa AliAl Disi, Tomaso R. R. Bontognali, Samir Jaoua, EssamAttia, HamadAl SaadAl-Kuwari , & Nabil Zouari (2019) Infuence of temperature, salinity and Mg2+:Ca2+ ratio on microbially mediated formation of Mg rich carbonates by *Virgibacillus* strains isolated from a sabkha environment
13. Zahoor Ul Hassan, Roda Al-Thani, Quirico Migheli, Samir Jaoua (2018) Detection of toxigenic mycobiota and mycotoxins in cereal feed market" . *Food control, 84, 389-394*
14. Kavita Nair, Ahmad Iskandarani, Roda Al-Thani, Ramzi Mohammad and Samir Jaoua (2018) Replacement of five Consecutive Amino Acids in the Cyt1A Protein of *Bacillus thuringiensis* Enhances its Cytotoxic Activity against Lung Epithelial Cancer Cells. *Toxins, 10(3), 125; doi:10.3390/toxins10030125 (registering DOI)*
15. Zahoor Ul Hassan, Roda Al Thani, Fathy A. Atia, Saeed Al Meer, Quirico Migheli and Samir Jaoua (2018) Co-occurrence of mycotoxins in commercial formula milk and cereal-based baby Food on the Qatar Market . *Food Additivess & contaminants : PartB, 11 (3), 191-197*
16. Kavita Nair, Roda Al-Thani, Dhabia Al-Thani, Fatima Al-Yafei, Talaat Ahmed, and Samir Jaoua (2018) Diversity of *Bacillus thuringiensis* strains from Qatar as shown by crystal morphology, d-endotoxins and *cry* gene content. *Front. Microbiol. 9, | doi: 10.3389/fmicb.2018.00708*
17. Patrizia Monti, Gaia Rocchitta, Salvatore Marceddu, Maria A. Dettori, Davide Fabbri, Samir Jaoua, Quirico Migheli, Giovanna Delogu, Pier A. Serra (2018) Use of β-cyclodextrin as enhancer of ascorbic acid rejection in permselective films for amperometric biosensor applications. Talanta*, 186, 53-59 DOI information: 10.1016/j.talanta.2018.04.034*
18. Zahoor Ul Hassan, Roda Al-Thani, Fathy A. Atia, Saeed Al Meer, Quirico Migheli, Samir Jaoua (2018) Evidence of low levels of aflatoxin M1 in milk and dairy products marketed in Qatar. *Food control, 92, 25-29*
19. Randa Zeidan, Zahoor Ul-Hassan, Roda Al-Thani, Virgilio Balmas and Samir Jaoua (2018) Application of Low-Fermenting Yeast *Lachancea thermotolerans* for the Control of Toxigenic *Fungi Aspergillus parasiticus, Penicillium verrucosum* and *Fusarium graminearum* and Their Mycotoxins. *Toxins 2018, 10(6), 242; doi: 10.3390/toxins10060242-*
20. Maria Grazia Farbo, Pietro Paolo Urgeghe, Stefano Fiori, Angela Marcello, Stefania Oggiano, Virgilio Balmas, Zahoor Ul Hassan, Samir Jaoua, Quirico Migheli (2018) Effect of yeast volatile organic compounds on ochratoxin A-producing *Aspergillus carbonarius* and *A. ochraceus* . *International Journal of Food Microbiology, 284, 1-10*
Scientific *Reports, 9:19633 | https://doi.org/10.1038/s41598-019-56144-0*
21. Walid Hammami, Roda Al Thani, Stefano Fiori, Saeed Al-Meer, Fathy Atia Mohamed Atia, Duha Rabah, Quirico Migheli, Samir Jaoua (2017) Patulin and patulin producing *Penicillium* spp. occurrence in apples and apple-based products including baby food. *J Infect Dev Ctries 11(4), 343-349*
22. Raida Zribi Zghal, Jihen Elleuch, Mamdouh Ben Ali, Frédéric Darriet, Ahmed Rebaï,

Fabrice Chandre, Samir Jaoua, Slim Tounsi (2017)
Toward novel Cry toxins with enhanced toxicity/broader: a new chimeric Cry4Ba /Cry1Ac
Applied Microbiology and Biotechnology, 101, 113-122
23. Patrizia Monti, Giammario Calia, Salvatore Marceddu, Maria A. Dettori, Maria A. Dettori, Samir Jaoua, Robert D. O'Neill, Quirico Migheli, Giovanna Delogu, Giovanna Delogu, Pier A. Serra (2017). Low electro-synthesis potentials improve permselectivity of polymerized natural phenols in biosensor applications. *Talanta, 162, 151–158*
24. Zulfa Al Disi, Samir Jaoua, Dhabia Al-Thani, Saeed Al-Meer, and Nabil Zouari (2017) Considering the Specific Impact of Harsh Conditions and Oil Weathering on Diversity, Adaptation, and Activity of Hydrocarbon-Degrading Bacteria in Strategies of Bioremediation of Harsh Oily-Polluted Soils . *BioMed Research International https://doi.org/10.1155/2017/8649350*
25. Zulfa Al Disi, Samir Jaoua, Tomaso R.R. Bontognali, Hamad Al Kuwari , Essam Shabaan Attia and Nabil S. Zouari (2017) Evidence of a Role for Aerobic Bacteria in High Magnesium Carbonate Formation in the Evaporitic Environment of Dohat Faishakh Sabkha in Qatar *Front. Environ. Sci. | doi: 10.3389/fenvs.2017.00001*
26. Hanen Boukedi, Saoussen Ben Khedher, Rania Hadhri, Samir Jaoua, Slim Tounsi and Lobna Abdelkefi-Mesrati (2017). Vegetative insecticidal protein of *Bacillus thuringiensis* BLB459 and its efficiency against Lepidoptera *Toxicon, 129, 89-94*
27. Alzahraa Omar Attar, Samir Jaoua, Talaat Abdelfattah, Zulfa Ali Al-Disi and Nabil Zouari (2017) Evidencing diversity of Nutritional Requirements for Hydrocarbon-Degrading Activity of adapted *Pseudomonas aeruginosa* to harsh conditions using 2n full Factorial design. *RSC Advances 7, 45920–45931*
28. Maria Grazia Farbo, Pietro Paolo Urgeghe, Stefano Fiori, Salvadore Marceddu, Samir Jaoua and Quirico Mighelli (2016) Adsorption of ochratoxin A from grape juice by yeast cells immobilised in calcium alginate beads
International Journal of Food Microbiology, 217, 29-34
29. Elleuch, Jihen; JAOUA, Samir; Ginibre, Carole; Chandre, Fabrice; TOUNSI, SLIM; Zribi Zghal, Raida (2016) Toxin stability Improvement and toxicity increase against Dipteran and Lepidopteran larvae of *Bacillus thuringiensis* crystal protein Cry2Aa . *Pest Management Science, (wileyonlinelibrary.com) DOI 10.1002/ps.4261*
30. Anis Ben Hsouna, Saoudi Mongi, Gérald Culioli, Yves Blache, Zohra Ghlissi, Rim Chaabane, Abdelfattah El Feki, Samir Jaoua, Mohamed Trigui (2016)
Protective effects of ethyl acetate fraction of *Lawsonia inermis* fruits extract against carbon tetrachloride-induced oxidative damage in rat liver. *Toxicology and Industrial Health, 32, 694-706*
31. J Elleuch, S Jaoua, S Tounsi, RZ Zghal (2016) Cry1Ac toxicity enhancement towards lepidopteran pest *Ephestia kuehniella* through its protection against excessive proteolysis
Toxicon, 120, 42-48
32. Giammario Calia, Patrizia Monti, Salvatore Marceddu, Maria Antonietta Dettori, Davide Fabbri, Samir Jaoua, R D O'Neill, Pier Andrea Serra, Giovanna Delogu and Quirico Migheli (2015) Electropolymerized phenol derivatives as permselective polymers for biosensor applications. *Analyst, 140, 3607-3615*
33. Anis Ben Hsouna, Mohamed Trigui, Raoudha Mezghani Jarraya, Mohamed Dammak, Samir Jaoua (2015) Identification of phenolic compounds by HPLC/MS and in vitro evaluation of the antioxidant and antimicrobial activities of Ceratonia siliqua leaves extracts
Journal of Medicinal Plants Research 9, 479-485

34. Jihen Elleuch, Raida Zribi Zghal, Marie Noël Lacoix, Fabrice Chandre, Slim Tounsi, Samir Jaoua (2015) Evidence of two mechanisms involved in *Bacillus thuringiensis israelensis* decreased toxicity against mosquito larvae: Genomedynamic and toxins stability
Microbiological Research 176, 48–54
35. Jihen Elleuch, Samir Jaoua, Frédéric DARRIET, Fabrice Chandre, Slim Tounsi and Raida Zribi Zghal (2015) Cry4Ba and Cyt1Aa proteins from *Bacillus thuringiensis israelensis*: Interactions and Toxicity mechanism against *Aedes aegypti*
Toxicon, 104, 83-90
36. Jihen Elleuch, Raida Zribi Zghal, Ines Ben Fguira, Marie Noël Lacroix, Jihed Suissi, Fabrice Chandre, Slim Tounsi, Samir Jaoua (2015) Effects of the P20 protein from Bacillus thuringiensis israelensis on insecticidal crystal protein Cry4Ba
International Journal of Biological Macromolecules 79, 174-179

Themes: A, B, D

Dr. Hamda A. Al Naemi
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Cardiovascular Physiology and Immunology

Keywords:
Cardiovascular physiology, Inflammation, endothelial cell dysfunction, obesity, and heavy metal toxicity.

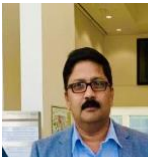
Research Interest:
My research activity focuses on cardiovascular physiology, pathophysiology, and immunology, with great emphasis on endothelium function in health and disease.

Current Research:
1- Vascular Endothelial cell biology.
2- In vivo research to investigate implication of obesity on biology and physiology of cardiovascular system.
3- Heavy metals as risk factors for cardiovascular disease.
4- Cross talking between immune system and microbiota.

Current Publications:

1. Al-Naemi, HA, Das, SC. Cadmium-induced endothelial dysfunction mediated by asymmetric dimethylarginine. Environmental Science and Pollution Research 27:16246–16253,2020.
2. Ajaz A. Bhat , Srijayaprakash Uppada , Iman W. Achkar, Sheema Hashem, Santosh K. Yadav, Muralitharan Shanmugakonar, Hamda A. Al-Naemi and Shahab Uddin Tight Junction Proteins and Signaling Pathways in Cancer and Inflammation: A Functional Crosstalk. Front. Physiol., 2019.
3. **Abdul Q.Khan ShilpaKuttikrishnan Kodappully S.Siveen Kirti S.Prabhu MuralitharanShanmugakonar Hamda A.Al- Naemi ,Mohammad, Haris Said Dermime ShahabUddin** . RAS-mediated oncogenic signaling pathways in human malignancies. Seminars in Cancer Biology.Volume 54: 1-13, 2019.
4. Das, SC, Al-Naemi, HA .Cadmium Toxicity: Oxidative Stress, Inflammation and Tissue Injury. Occupational Diseases and Environmental Medicine7:144-163, , 2019.
5. Reem Moath Alasmar, Kavitha Varadharajan, Muralitharan Shanmugakonar, Hamda A Al-Naemi. Gut Microbiota Dysbiosis and Their Impact on Biochemical and Inflammatory Profiles in Cafeteria Diet Fed Sprague Dawley Rats. Advances in Microbiology > Vol.9 No.9, September 2019.

Theme B



Dr. P. Balakrishnan
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Environmental Science

Keywords:
GIS; Remote Sensing; Spatial Data science; Spatial Modeling; Geo-visualization

Research Interests:

Main research interests include GIS, spatial analysis and modeling, geostatistical analysis, remote sensing & digital image processing, simulation of land-use/land-cover change, applications of geospatial technologies in solving groundwater quality, environmental modeling (air pollution) and coastal issues, and integration of geospatial technologies such as GIS, remote sensing, and GPS.

Current Publications:

1. Imane Ali Saleh and Perumal Balakrishnan (2019), GIS Based Hotspot and Cold-spot Analysis for Primary Education in India, Indian Journal of Science and Technology, Vol 12(45), pp.1-33. DOI: 10.17485/ijst/2019/v12i45/148448, ISSN: 0974-5645.
2. Balakrishnan. P, Mohammed Harish & Mohammed Khalifa M.Z. Al-Kuwari (2018), Urban Solid Waste Management using Geographic Information Systems (GIS): A Case Study in Doha, Qatar, International Journal of Advanced Remote Sensing & GIS, Vol.8(1), pp.2901-2918. Cloud Publications, (ISSN 2320 – 0243) DOI: https://doi.org/10.23953/cloud.ijarsg.397.
3. Noora Al-Naimi, Mohammad A Al-Ghouti & Perumal Balakrishnan (2016), Investigating chlorophyll and nitrogen levels of mangroves at Al-Khor, Qatar: an integrated chemical analysis and remote sensing approach, Environmental Monitoring and Assessment, 188 (5) 1-12. Springer International Publishing.
4. Mohamed A. Amr, Abdul-Fattah I. Helal, Athab T. Al-Kinani & Perumal Balakrishnan (2016), Ultra-trace determination of 90Sr, 137Cs, 238Pu, 239Pu, and 240Pu by triple quadruple collision/reaction cell-ICP-MS/MS: Establishing a baseline for global fallout in Qatar soil and sediments, Journal of Environmental Radioactivity 153,73–87, Elsevier, http://dx.doi.org/10.1016/j.jenvrad.2015.12.008.
5. Noora Al-Naimi, Perumal Balakrishnan & Ipek Goktepe (2015), Measurement and modelling of nitro-gen dioxide (NO2) emissions: a marker for traffic-related air pollution in Doha, Qatar, Annals of GIS, 21:3, 249-259, Taylor & Francis, DOI: 10.1080/19475683.2015.1057225.
6. Nadeem Hashem & Perumal Balakrishnan (2015), Change analysis of land use/land cover and modelling urban growth in Greater Doha, Qatar, Annals of GIS, 21:3, 233-247, Taylor & Francis, DOI: 10.1080/19475683.2014.992369.

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Professor

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Epigenetics, Chromatin Structure, Gene Regulation, and Cancer Cell Biology

Keywords:
Epigenetics, Chromatin Structure, Gene Regulation, and Cancer Cell Biology

Research Interest:

ATP-dependent chromatin remodeling complexes are molecular machines capable of al-tering the structure of genomic DNA in profound ways that can lead to both restricted as well as global changes in gene expression. My laboratory focuses on understanding how these molecular remodelers work in concert with DNA- and histone-modifying enzymes to regulate cell growth and proliferation. More specifically, my group investigates how aberrations in expression and recruitment of chromatin remodelers and epigenetic modifiers contribute to cancer etiology. Recent advances in the field of chromatin have shown that epigenetic modification of chromatin plays a central role in the way cells integrate signals and communicate with their environment. It has also become abundantly clear that various diseases exhibit changes in expression and/or targeting of chromatin-modifying enzymes. Thus, a major challenge in understanding and diagnosing various forms of cancers and diseases that affect metabolic pathways is to identify relevant chromatin changes and to devise tools to re-establish and maintain normal patterns of gene expres-sion in diseased cells.

Current Research:

Project 1: To address how altered expression of chromatin remodelers leads to aberrant gene expression, we establish stable human cell lines that express either sense or anti-sense cDNAs of various chromatin modifying enzymes, and use these reagents as tools to study key target gene expression expression. For example, we have determined that both the BRG1 ATPase chromatin remodeler and the PRMT5 histone-modifying enzyme work in concert to suppress expression of suppressor of tumorigenecity 7 (ST7) as well as retinoblastoma lilke 2 (RBL2) genes in a wide variety of cancer cells including mantle cell lymphoma (MCL), chronic lymphocytic leukemia (CLL), and Diffuse Large B Cell Lym-phoma (DLBCL). In addition, we have determined more recently that PRMT5 can promote cancer cell growth through suppression of antagonists of the WNT/β-Catenin signaling pathway in both highly aggressive lymphoma and triple negative breast cancer cells.

Project 2: To gain a better insight into how ATP-dependent chromatin remodelers and histone modifying enzymes impact genome-wide gene expression programs, we have es-tablished in the laboratory various high throughput platforms to answer questions relevant to human health. For instance, we have developed ChIP-Seqand RNa-Seq platforms to identify global signatures and gene expression programs using reagents designed to de-tect chromatin modifiers and epigenetic marks identified in the laboratory. Because most of our research efforts are directed toward finding better diagnostic tools that can be used to accurately characterize clinical outcome before and after treatment with drugs, and de-velopment of new therapeutic agents that can be used to treat diseases such as cancer, my group currently investigates how overexpression of PRMT5 is altered in MCL, CLL, and DLBCL, and how this imbalance affects histone arginine methylation and impacts other epigenetic marks such as histone lysine methylation and DNA methylation.

Project 2: To gain a better insight into how ATP-dependent chromatin remodelers and histone modifying enzymes impact genome-wide gene expression programs, we have established in the laboratory various high throughput platforms to answer questions relevant to human health. For instance, we conduct ChIP-Seq and RNA-Seq experiments to identify global signatures and gene expression programs using reagents designed to detect chromatin modifiers and epigenetic marks identified in the laboratory. Because most of our research efforts are directed toward finding better diagnostic tools that can be used to accurately characterize clinical outcome before and after treatment with drugs, and development of new therapeutic agents that can be used to treat cancer, my group currently investigates how overexpression of PRMT5 is altered in triple negative breast cancer cells, and how this imbalance affects histone arginine methylation and impacts other epigenetic marks such as histone lysine methylation and DNA methylation.

Current Publications:
https://scholar.google.com/citations?user=MEYQl_oAAAAJ&hl=en

https://pubmed.ncbi.nlm.nih.gov/?term=said%20sif

Theme A

Prof. Allal Ouhtit
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Epigenetics, Chromatin Structure, Gene Regulation, and Cancer Cell Biology

Keywords:
- Basic science of Breast Cancer
- OMICS and data analysis
- Signal Transduction
- Chemoprevention
- Phytochemicals

Research Interest:

New prognostic factors are needed to develop better early detection and targeted therapies for enhancing cancer patient's quality of life and chance for long-term survival. To achieve this goal, it is important to understand the unique processes associated with cancer development and metastasis. Metastasis is the worst aspect of cancer. Invasion, the hallmark of malignancy, is the recurring and the defining event in the metastatic pro-cess and elucidation of its mechanisms is critical for developing effective anti-metastatic therapies. Our current research is mainly focused on these two projects:

1- Identification and validation of novel signaling pathways, associated with CD44 and CD146 cell adhesion receptors mediating tumor cell invasion.
2- Mechanisms underlying the effects of combinations of natural phytochemicals and their corresponding synthetic compounds for cancer chemoprevention.

Current Research:

Functional Genomic Studies of Breast Cancer

The aim of our research is to understand the key molecular mechanisms underlying the initiating event of the process of invasion, which is associated with alteration in the transduction signaling mechanisms that underpin cell adhesion molecules function, in particular CD44 and CD146. The exact function of both, CD44 and CD146, are clearly controversial. Therefore, we have cloned these two genes, and established tetracycline-inducible systems both in vitro and in vivo, for each of these two receptors to determine their exact role in breast tumor cell invasion as well as the underlying mechanisms.

An overview of the literature related to complementary alternative medicine revealed the following key observations: 1) Only few studies have explored the effects of phytochemicals when used in synergistic, additive or antagonistic combinations, and each of the individual chemicals used in a combination can target multiple signaling pathways in the cancer cell; 2) A striking feature of low toxicity combined with effective absorption upon oral administration; and 3) Many of these compounds have effects on many different cancers; Therefore, the main objective of this study is to establish a 'Super-combination' of compounds (each individual compound is used at its bioavailable concentration in a synergistic/additive manner) that can potentially induce a maximal cell growth inhibition/ cell death in vitro, and further inhibit tumor growth in vivo.

Current Publications:
https://www.ncbi.nlm.nih.gov/pubmed/?term=Ouhtit

Theme A

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Molecular and Cell Biology

Keywords:
- Cardiovascular Diseases
- Pulmonary Arterial Hypertension
- Vascular Biology
- Platelets
- Metal-Organic Framework
- MIL-89

Research Interest:

My research interests focus on studying and understanding the role of vascular and blood cells in the maintenance of vascular homeostasis and how dysfunction of these elements triggers endothelial dysfunction, inflammatory reactions, thrombosis, and vascular remodeling. Other areas of interest include cardiac stem cells and biomarkers, endothelial progenitor cells, and nanomedicine for disease detection and therapy. My experimental approaches include molecular and pharmacological tools with freshly isolated and cultured cells and clinically relevant animal models of cardiovascular diseases

Current Research:

Pulmonary arterial hypertension (PAH) is a progressive and devastating disease in which pulmonary arteries constrict and remodel, resulting in elevated pulmonary artery pressure and increased workload on the right side of the heart. While there is no cure for PAH, there are different classes of vasodilator drugs currently used to help slow disease progression, including the prostacyclin analogs, endothelin-1 receptor antagonists, activators of soluble guanylate cyclase and phosphodiesterase type 5 inhibitors. However, these drugs are not capable of reversing the disease in humans and are limited by short-term pharmacokinetics, instability, and systemic effect. As such, we firmly believe that PAH is a disease that would benefit from the application of controlled drug release, with the possibility of introducing targeted drug delivery strategies, using nanomedicine approach. We have previously designed a new formulation of iron-based metal-organic framework (MOF) nanoparticle, namely nanoMIL-89, and characterized its physicochemical proprieties and stability. Besides, nanoMIL-89 has shown relative safety and tolerability.

Current Publications:

https://pubmed.ncbi.nlm.nih.gov/?term=Haissam+abou-saleh&sort=date&size=20

Activated platelets viewed under Electron Microscopy

Dr. Roda Fahad Al-Thani
Associate Professor,
Microbiology

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Microbial Ecology

Keywords:
Microbial Ecology

Research Interest:
Microbial Ecology and Biodiversity, As microbial ecology and biodiversity, microorganisms fitting with all of these groups.

Current Research:

Publications

-Al-Thani R. F., Yasseen B. T. 2020. Perspectives of future water sources in Qatar by phytoremediation: biodiversity at ponds and modern approach. International Journal of Phytoremediation. 6;1-24.

-Al-Thani R. F., Yasseen B. T. 2020. Phytoremediation of polluted soils and waters by native Qatari plants: Future perspectives. Environmental Pollution. 259, 113694.

-Al-Thani R. F., Yasseen B. T. 2018. Solutes in native plants in the Arabian Gulf region and the role of Solutes in native plants in the Arabian Gulf region and the role of microorganisms: future research. Journal of Plant Ecology.11 (5): 671–684.

-Saleh, E. and Al-Thani, R. F. 2019. Fungal food spoilage of supermarkets' displayed fruits. Veterinary World 12: 1877-1883.

-Al-Thani R. F., Yasseen B. T. 2018. Biological Soil Crusts and Extremophiles Adjacent to Native Plants at Sabkhas and Rawdahs, Qatar: The Possible Roles. Frontiers in Environmental Microbiology. 4 (2): 55-70.

-Missoum A. and Al-Thani R. 2017. Production of antimicrobial agents by Bacillus spp. isolated from Al-Khor coast soils, Qatar African journal of microbiology 11(41):1510-1519 DOI: 10.5897/AJMR2017.8705

-Al-Thani R. F., Yasseen B. T. 2017. Halo-thermophilic bacteria and heterocyst cyanobacteria found adjacent to halophytes at Sabkhas, Qatar: Preliminary study and possible roles African Journal of Microbiology Research. 11(34):1346-1354, DOI: 10.5897/AJMR2017.8648

-Zahoor Ul Hassan, Roda Al-Thani, Virgilio Balmas, Quirico Migheli, Samir Jaoua. 2019. Prevalence of Fusarium fungi and their toxins in marketed feed. Food control, 104, 224-230.

-Zahoor Ul Hassan, Roda Al-Thani, Hajer Alnaimi, Quirico Migheli, Samir Jaoua. 2019. Investigation and application of *Bacillus licheniformis* volatile

compounds for the biological control of toxigenic Aspergillus and Penicillium spp. ACS omega, 4, 17186−17193.
-Randa Zeidan, Zahoor Ul-Hassan, Roda Al-Thani, Quirico Migheli and Samir Jaoua. 2019. In-vitro Application of a Qatari *Burkholderia cepacia* strain (QBC03) in the Biocontrol of Mycotoxigenic Fungi and in the Reduction of Ochratoxin A biosynthesis by *Aspergillus carbonarius*. Toxins 11, 700; doi:10.3390/toxins11120700.
-Zahoor Ul Hassan, Roda Al-Thani, Quirico Migheli, Samir Jaoua. 2018. Detection of toxigenic mycobiota and mycotoxins in cereal feed market". Food control, 84, 389-394.
-Kavita Nair, Ahmad Iskandarani, Roda Al-Thani, Ramzi Mohammad and Samir Jaoua. 2018. Replacement of five Consecutive Amino Acids in the Cyt1A Protein of Bacillus thuringiensis Enhances its Cytotoxic Activity against Lung Epithelial Cancer Cells. Toxins, 10(3), 125; doi:10.3390/toxins10030125.
-Kavita Nair, Roda Al-Thani, Dhabia Al-Thani, Fatima Al-Yafei, Talaat Ahmed, and Samir Jaoua. 2018. Diversity of *Bacillus thuringiensis* strains from Qatar as shown by crystal morphology, d-endotoxins and cry gene content. Front. Microbiol. 9, | doi: 10.3389/fmicb.2018.00708
-Zahoor Ul Hassan, Roda Al-Thani, Fathy A. Atia, Saeed Al Meer, Quirico Migheli, Samir Jaoua. 2018. Evidence of low levels of aflatoxin M1 in milk and dairy products marketed in Qatar. Food control, 92, 25-29.
-Randa Zeidan, Zahoor Ul-Hassan, Roda Al-Thani, Virgilio Balmas and Samir Jaoua. 2018. Application of Low-Fermenting Yeast Lachancea thermotolerans for the Control of Toxigenic Fungi Aspergillus parasiticus, Penicillium verrucosum and Fusarium graminearum and Their Mycotoxins. Toxins 2018, 10(6), 242; doi: 10.3390/toxins10060242-
-Al-Thani R. F. 2015. Cyanomatrix and Cyanofilm. J Res Development 3:123. doi:10.4172/ jrd.1000123
-Al-Thani, R.F., N.K. Patan and M.A. Al-Maadeed, 2014. Graphene oxide as antimi-crobial against two gram-positive and two gram-negative bacteria in addition to one fungus. Online J. Biol. Sci., 14: 230-239. DOI: 10.3844/ojbsci.2014.230.239

Cyanobacteria

Extremophiles bacteria isolated from soil

Theme D & B

Prof. Nabil ZOUARI
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Applied Microbiology and Biotechnology

Keywords:
- Environmental Microbiology
- Hydrocarbon-degrading bacteria
- Biopesticides
- Biomineralization
- Microbially-Induced precipitation
- Bioremediation
- Biofouling

Research Interests

Isolation and use of microorganisms or their metabolites as biological activities in industrial and environmental applications.

Study of the relationship between cell metabolism and biological activities (cell factory) at aerobic, anaerobic and micro aerobic conditions. Overproduction of low-cost biological activities in media and appropriate fermentation technologies. Development of bioprocesses based on enzymes or microorganisms in conversion of industrial interest. Development of industrial bioprocesses for bioremediation of wastewaters and polluted soil.

Role of biosurfactants in enhancement of bioremendiation and oil recovery

Role for Aerobic Bacteria in High Magnesium Carbonate Formation in the Evaporitic Environment of Dohat Faishakh Sabkha in Qatar.

Microbially induced calcium carbonate precipitation (MICP) for stabilization of soil in Qatari soil and biocementation.

Investigation and prevention of biofouling in membrane technology

Current Research:

Investigations in Environmental and Applied
Microbiology This theme is focused on:

- Isolation and screening of wild microorganisms for specific biological activities
- Overproduction of the biological activities through considering the microbial cell as a factory:

1. Media Formulation
2. Orientation of the Cell Metabolism
3. Appropriate bioremediation Technologies
4. Investigation of the role of bacteria in formation of minerals and incorporation of magnesium for the protodolomite formation
5. Combination of hydrocarbons degradation and heavy metals removal by specific bacteria

Bioremediation of polluted area with petroleum-hydrocarbons using local bacteria This research is being carried-out in order to understand the major concerns and reasons of failure of bioaugmentation in Qatar and the Arab Gulf region for oil hydrocarbons removal at harsh conditions which characterize the region. The originality of our research is that local isolates are able to adapt to each harsh situation by implementing an adapted metabolism and by having the ability of shifting the biological activity towards specific pol-lutants in the soil. The main conclusion is that the main reason of failure is that the capacity of bacteria to degrade pollutants is not a result of just adding any species to polluted sites, but, the capacity of individual microorganism to adapt its metabolism to the environment, leading to high diversity in hydro-carbon-degrading bacteria.

This research intends to isolate, screen and select bacterial strains from harsh Qatari soils, weather and weathering processes to understand how the extreme weather in Qatar, as good site for the study, leads to prolonged periods of adaptation of the metabolism in se-lected bacteria, as candidates for implementation of appropriate bioremediation strategies at similar conditions worldwide. This represents a key parameter in selecting appropriate isolates for bioremediation of a specific oily-polluted site, preventing frequent failure of bioaugmentation strategies at harsh conditions.

Role for Aerobic Bacteria in High Magnesium Carbonate Formation in the Evapo-ritic Environment of Dohat Faishakh Sabkha in Qatar

Dolomite ($MgCa(CO_3)_2$) is an important petroleum reservoir rock mineral common in ancient sedimentary rocks which is infrequently found in modern environments. The mechanism of dolomite formation remains poorly understood, although recent research has focused on the contribution of microbial processes. Sabkha is the Arabic term for saline mudflats occurring in regions characterized by extreme environmental conditions (high temperature, salinity, light intensity, and aridity), where diverse halophilic and extremophilic microorganisms are found. The dynamic evaporitic systems characteristic of sabkhas are crucial for the precipitation of minerals and a role for microorganisms in sabkhas in the process of mineralization has been proposed. In this study the Dohat Faishakh Sabkha in Qatar was investigated for evidence of the role of aerobic bacteria in mediating the forma-tion of high magnesium carbonates and dolomite, two minerals that commonly occur in the sabkha sediments. 29 strains of aerobic microbes were obtained through inoculation on agar plates from two different cores sampled from the sabkha and identified by 16S rDNA sequencing as belonging to the genera Bacillus, Salinivibrio, Staphylococcus and, primarily, Virgibacillus.

Theme B

Prof. Mohammad Al-Ghouti
Professor

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Applied Environmental Chemistry

Keywords:
Environmental remediation; water and wastewater treatment; adsorption; nano-remediation; and chemometric

Research Interest:

- Environmental Chemistry
- Membrane Coating
- Polymer And Membrane Modification
- Controlling CaSO4 Scaling And Biofouling On Reverse Osmosis Membrane
- Nanoparticles For Water Treatment
- Municipal And Industrial Wastewater
- Chemometric
- Environmental Remediation
- Cleaner Production, Extraction Processes
- Natural Adsorbent Chemistry
- Nano-Adsorbents
- Waste Treatment
- Waste Minimization
- Water And Wastewater Treatment
- Adsorption.

Current Research:

Mechanistic Study for Environmental Remediation

Before desalinated water reaches the customers, it is subjected to a number of quality control processes to ensure the highest drinking water quality. Disinfection is used to control the formation of bacteria and other pathogens in the water. Chlorination, ozonation, ultraviolet irradiation, chloramine-nation are some of the widely used disinfection processes. It has been reported that desalinated seawater contains around 650 µg/L Br-. Concerns about the formation of brominated toxic by-products, as a result of disinfection, have been highlighted and recently reported. Accordingly, the overarching aim of this work is to evaluate the results of remediation performances of locally abundant date pits as an efficient adsorbent for the remediation of Br- from desalinated seawater, (Fig. 1).

Date pits offered a potential effective adsorbent for the removal of Br- from desalinated drinking water which also has dual economic and environmental benefits presented in the low-cost associate with its activation and disposal issues.

Development of nano-materials for water, wastewater, and air purifications and applications

Application of nanomaterials [multi-walled carbon nanotubes] as a nano-solid extractant for removing various pollutants is presented. Here, the study was to investigate the applicability of the adsorption process for the removal of organophosphorus pesticide malathion from water by using multi-walled carbon nanotubes (MWCNTs), Fig. 2. The optimized conditions to achieve the maximum removal of malathion (100%) were determined to be a malathion concentration of 6 mg/L, an initial MWCNTs concentration of 0.5 g/L, and a contact time of 30 min.

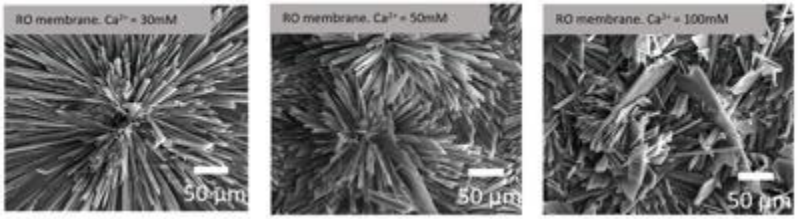
Application of Chemometrics in Environmental Science

Fourier transform infrared (FTIR) spectroscopy is among the most trusted analytical environmental techniques in monitoring the quality of various materials. FTIR spectroscopy rapidly provides chemical information on a very large number of compounds and the absorption bands are sensitive to the physical and chemical states of individual constituents. Recently, multivariate calibration (also known as chemometric) has found many applications in food, environment, water, and air, which extend from detecting impurities to multi-component determination. The ultimate aim of multivariate calibration is to find useful relationships between data from relatively low-cost procedures like FTIR and expensive, lengthy analyses, Fig. 3.

Membrane scaling and Biofouling

In seawater reverse osmosis (SWRO), membrane scaling is one of the major issues affecting its widespread application in the desalination industry. The information about the extent and mechanisms of membrane scaling in response to different concentrations of ions and temperature of feedwater can provide various insights into the membrane scaling. During our previous research, the influence of temperature on mineral scaling of RO and GO-coated RO membrane was investigated using the crossflow filtration setup. It was found that the increase in temperature enhanced the membrane scaling, which was evident by the severe flux decline over time, leading to an increase in the mass of crystals precipitated (Mt) and thickness of the scale layer. The morphology of crystals studied using scanning electron microscope (SEM)-energy dispersive X-ray (EDX) technique showed that it varied from rod-shaped to rosette structures under the influence of temperature. Furthermore, Fourier transform Infrared (FTIR) technique aided in understanding the mechanism of interaction between the scale layer and the membranes (Ashfaq et al., 2020). Moreover, the effect of different concentrations of calcium ions from 20 to 150 mM on the scaling of RO and GO-coated RO membranes was also investigated. It was noted that the permeate flux declined more than 90% when the concentration of calcium ions increased to 50 mM. The results of SEM showed that the

morphology of crystals varied with the concentration from rod-shaped to broad rosette structures. Furthermore, it was also found that the membrane surface was fully covered with precipitates, which resulted from both bulk and surface crystallization at higher concentrations of calcium ions in the feedwater. The contact angle analysis of the scaled membranes was also done to investigate the effect of scaling on hydrophilicity of membrane surface, thereby, affecting its inter/Intra foulant interactions.



Effect of concentration of calcium ions on RO membrane scaling

Current Publications:

Google Scholar: https://scholar.google.com/citations?user=TH7TGJ4AAAAJ
ResearchGate: https://www.researchgate.net/profile/Mohammad_Al-Ghouti
Academia.edu: https://qu.academia.edu/MohammadAlGhouti

Theme B

Prof. Mohammed H. Abu-Dieyeh
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Contact: 44036571

Environmental Sciences Microbiology and Biotechnology

Keywords:
Applied Ecology, Plant Biotic interactions, Plant bio-products, Phytoremediation, Botanical surveys;

Research Interest:
Weed Biology and Biocontrol: The misuse of chemical pesticides in agriculture to control plant diseases causes environmental pollution and leads to health problems. The pesticide-related hazards and the development of pesticide-resistant organisms are best to describe the dilemma of using these chemicals, hence public and environmental concerns have been recently raised to reduce or ban these chemicals. Screening of Qatari environment to search for bioherbicides is one of my major research goals toward the sustainability of the environment in Qatar.
Plant Growth Promoting Rhizobacteria (PGPR): Plant growth-promoting rhizobacteria (PGPR) are a heterogeneous group of bacteria that can be found in the rhizosphere in association with roots, and thus improve plant growth. screening, isolation, and identification of PGPR strains from rhizosphere environment is one of my research interest Aerobiology (air-borne fungal spores and pollen grains): Aeromycological knowledge is of primary importance to plant pathologist, allergists, and aerobiologists. Correlations between weather parameters and seasonal and intradiurnal variations with fungal and pollen populations and constructing pollen and spore colanders including both indoor and outdoor environments are part of my research interest.
Plant Allelopathy: Allelopathy, the release of phytotoxins by plants, has been proposed as an alternative theory for the success of some invasive plants. Recently these allelochemicals can be utilized as natural herbicides.
Halophytes and their applications: Plants which grow exclusively on salt soil and can tolerate salt concentrations over 0.5% at any stage of life called halophyte. Plantations of halophytes request no cost of good quality water and soil. Investigation of halophytes can contribute to maintaining food and water security, in addition, to provide bioenergy when they grow in mass production.

Current Research:
1. Development of a Framework for practical Science in alignment with the Curriculum Standards of grades 3-12 of Independent Schools in Qatar. NPRP 7 - 050 - 5 – 001. Pi/ Joined with North Atlantic College, Doha-Qatar.
2. Concentrations and dynamics of air-borne fungal spore population of Doha Area,

Qatar, using the volumetric method. L Pi/ Internal University grant/ Qatar University.

3. Allelopathic effects of the invasive Prosopis juliflora (Sw.) DC. on selected Qatari native plant species. L Pi/ / Qatar University
4. Evaluation of Salt Tolerance in Selected Qatari Halophytes at the Two Initial Growth Stages/ Qatar University.
5. Indoor mycoflora in class rooms and student service dwellings at Qatar University Campus Indoor mycoflora in class rooms and student service dwellings at Qatar University Campus.
6. Investigating Allelopathic Potential of Selected Qatari Plants with Bushy Growth Habit.
7. Antifungal activities of leaf extracts of Prosopis juliflora (Sw.) DC. on post-harvest fungal pathogens. Qatar University/ 2015-2016.
8. Screening and isolation of Endophytes from Qatari halophytic plants
9. Antifungal activities of Qatari halophytic plants
10. Evaluation of using produced water in irrigation of turfgrass agrosystems

Current Publications:

1. Alghouti, M. A. S., Abuqaoud, R. H. Abu-Dieyeh, M. H. (2016). Detoxification of mercury pollutant leached from spent fluorescent lamps using bacterial strains. Waste Management 49: 238-244.
2. Abu-Dieyeh, MH., Pernot, O., Simon, L., Al-Khayat, J. A. A., Alghouti, M. A. S. (2015). Ecosystem services and mangroves in Qatar: preservation issues (pp. 2). Q Sci-ence Proceedings: Qatar University Life Science Symposium 2015. http://dx.doi.org/10.5339/qproc.2015.qulss2015.37 .
3. Abu-Dieyeh, MH, Raghdah Barham (2014) Concentrations and dynamics of fungal spore populations in the atmosphere of Zarqa area, Jordan using the volumetric method. Grana, Accepted. DOI:10.1080/00173134.2014.896413
4. Abu-Dieyeh MH, Al-Abeid H and Qnais IY (2013) Does allelopathy increase invasion of Diplotaxis erucoides in a disturbed arid land habitat? Allelopathy Journal 31 (1): 91-104.
5. Abu-Dieyeh, MH, Ratrout Y. (2012) Seasonal variation of air-borne pollen grains in the atmosphere of Zarqa area, Jordan. Aerobiologia 28 (4): 527 – 539.
6. Abu-Dieyeh, MH, Shaheen, I., Watson, A.K. (2010) Effect of plant age and turfgrass competition on the efficacy of the Sclerotinia minor granular bioherbicide on broad-leaf plantain and prostrate knotweed. Biocontrol Science and Technology 20 (2): 213 – 226.
7. Abu-Dieyeh, MH, Raghdah Barham, Khaled Abu-Elteen, Radhi Al- Rashidi and Inaam Shaheen (2010) Seasonal Variation of Fungal Spore Populations in the Atmosphere of Zarqa Area, Jordan. Aerobiologia 26(4): 263-276.
8. Shaheen I. , Abu-Dieyeh MH, Ash, GJ and Watson A.K. (2010) Physiological characterization of the dandelion bioherbicide, Sclerotinia minor IMI 344141.Biocontrol Science and Technology 20 (1): 57 – 76.
9. Abu-Dieyeh MH and Watson AK (2009) Increasing the Efficacy and Extending the Effective Application Period of a Granular Turf Bioherbicide by Covering with Jute Fabric. Weed Technology 23(4): 524-530.
10. Abu-Dieyeh MH and Watson AK. 2007. Efficacy of Sclerotinia minor for dandelion control: Effect of dandelion accession, age, and grass competition. Weed Research 4(7): 63-72.

Theme B

Dr. P. Balakrishnan
Lecturer in GIS

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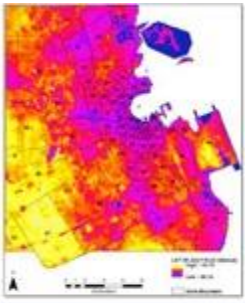
Environmental Science

Keywords:
Geographic Information systems(GIS) and Remote Sensing

Research Interests:
Main research interests include GIS, spatial analysis and modeling, geostatistical analysis, remote sensing, digital image processing and analysis, simulation of land-use and land-cover change, GPS, applications of geospatial technologies in solving groundwater quality, environmental modeling (air pollution) and coastal issues, and integration of geospatial technologies such as GIS, remote sens-ing, and GPS.

Current Research:
Analysis of urban heat islands by using multi-sensor and multi-temporal remote sensing im-ages in Doha city

This study compared Landsat (TM, ETM+ and OLI) surface temperature data with onsite measurements to validate the use of Landsat data for studying heat islands in urban settings with complex spatial characteristics. 16 different sites including 2 control points are filed as data collection sites in greater Doha, Qatar, for analysis. Surface temperature data were extracted from the thermal infrared (TIR) band of different satellite images during the winter and summer of 1995, 2000, 2005, 2010, 2015 and April 2016. Corresponding onsite surface temperature data were collected from January to April
2016. Comparisons showed that Landsat 8 OLI derived temperature was 0.54◦C higher than the temperatures collected onsite on 26thApril, 2016 at the same time as satellite passing during the day time. Differences between Landsat 8 derived temperatures and onsite measurements are caused by a variety of factors including the application of emissivity values that do not consider the complex spatial characteristics of urban areas. Therefore, to improve the accuracy of surface temperatures extracted from infrared satellite imagery, we propose a revised model where temperature data is ob-tained from Landsat and, emissivity values for various land covers are extracted by onsite measure-ments. To further validate satellite derived temperature with onsite measurements the r value 0.88 shows that they are highly correlated.

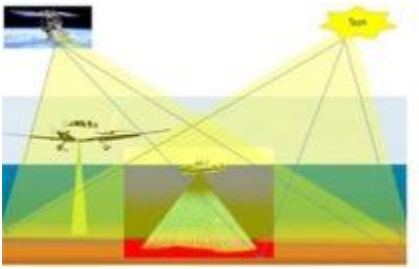


Remotely Sensed Empirical Modeling of Bathymetry in the East Coast of Qatar

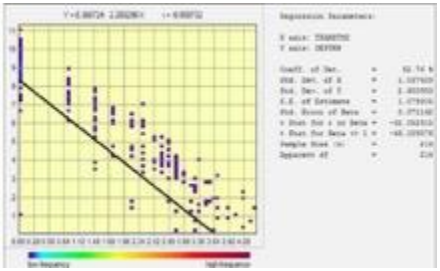
Remote sensing imagery has become more common in the studying underwater features and as such is playing an increasingly important role in bathymetric applications. There are two main types of remote sensing: passive and active. The passive technique uses sensors to measure the electromagnetic radiation reflected by the object and produces thermal, multispectral and hyperspectral imagery. In contrast, the active technique requires energy to be emitted so that the reflection produced can subsequently be measured. LiDAR, radar and sonar all belong to the active sensors family. Mapping shallow coastal waters (shoreline) with echo sounding techniques and hydrographic survey techniques is costly, slow and has certain limitations. Fortunately, remote sensing offers an alternative solution by evaluating the optical bands' reflectance, which has a high correlation to water depth.

The main objective of this research is to assess the use of three different satellites for sea bed mapping of shallow water against ground truth and to test the penetration range of different band-ratios. To meet the overall objective of the thesis, the following sub-objectives will be addressed:

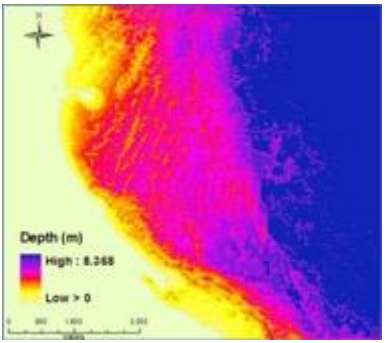
1. Extract and produce bathymetric maps from multi-sensors imagery using single band algorithm and principal components analysis (PCA).
2. Compare bathymetric output from each sensor.
3. Carry out an accuracy assessment of the extracted bathymetric maps against a reference bathymetry dataset.



The difference between SONAR, LiDAR, and Satellite imagery



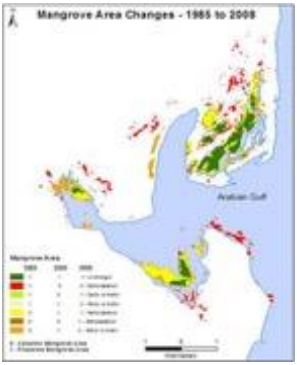
Landsat ETM+:Regression of transformed green band against known depths



Landsat ETM+: The bathymetric map derived by the green single band algorithm

Remote Sensing Application for Mangrove mapping

In recent years, the pressure of increasing coastal industries and tourism activities have, in some areas led to the clearing of many coastal habitats along the Qatar's shorelines for the construction of tourist resorts, tourism-related development and industrial facilities. Such threats are leading to the increasing demand for detailed mangrove maps for the purpose of measuring the extent of decline in mangrove ecosystems. Detailed mangrove maps at the community or species level are, however, not easy to produce, mainly because mangrove forests are very difficult to access. Without doubt, remote sensing is a serious alternative to traditional field-based methods for mangrove mapping, as it allows information to be gathered from the forbidding environment of mangrove forests, which oth-erwise, logistically and practically speaking would be extremely difficult to survey. Remote sensing applications for mangrove mapping at the fundamental level are already well established but, surpris-ingly, a number of advanced remote sensing applications have remained unexplored for the purpose of mangrove mapping at a finer level. Consequently, the aim of this paper is to unveil the potential of some of the unexplored remote sensing techniques for mangrove studies. Temporal Landsat TM image of 1986, Landsat ETM image of 2000 and Resourcesat-1 LISS 3 image of 2008 are used to calculate percentage change in mangrove cover at Al Dhakira site using geometrically registered and radiometrically corrected historical Landsat and Resourcesat-1 images. Region masks are employed to isolate the unwanted area from the images. Normalized Vegetation Difference Index (NDVI) is used to detect mangroves using near-infrared and red bands which are computed from the satellite im-ages. The ground-truthing visit to Al Dhakira site is conducted to confirm the results of the analysis. Change detection is applied and mangrove in the study area is found to have decreased by about 8.79% from 2000 to 2008.



Current Publications:

Noora Al-Naimi, Mohammad A Al-Ghouti & Perumal Balakrishnan (2016), Investigating chlorophyll and nitrogen levels of mangroves at Al-Khor, Qatar: an integrated chemical analysis and remote sensing approach, Environmental Monitoring and Assessment, 188 (5) 1-12. Springer International Publishing.

Mohamed A. Amr, Abdul-Fattah I. Helal , Athab T. Al-Kinani & Perumal Balakrishnan (2016), Ultra-trace determination of 90Sr, 137Cs, 238Pu, 239Pu, and 240Pu by triple quadruple collision/reac-tion cell-ICP-MS/MS: Establishing a baseline for global fallout in Qatar soil and sediments, Journal of Environmental Radioactivity 153,73–87, Elsevier, http://dx.doi.org/10.1016/j.jenvrad.2015.12.008. Noora Al-Naimi, Perumal Balakrishnan & Ipek Goktepe (2015), Measurement and modelling of nitro-gen dioxide (NO2) emissions: a marker for traffic-related air pollution in Doha, Qatar, Annals of GIS, 21:3, 249-259, Taylor & Francis, DOI: 10.1080/19475683.2015.1057225.

Nadeem Hashem & Perumal Balakrishnan (2015), Change analysis of land use/land cover and mod-elling urban growth in Greater Doha, Qatar, Annals of GIS, 21:3, 233-247, Taylor & Francis, DOI: 10.1080/19475683.2014.992369.

Theme C

Dr. Radhouane Ben Hamadou
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Marine Sciences

Keywords:
Marine ecology and biodiversity, Climate change, Marine biotechnology, management of the marine and coastal environment

Research Interest

- Environmental management and sustainability
- Marine ecology and biodiversity
- Coral natural and artificial reefs
- Climate change
- Coastal ecohydrology
- Marine biotechnology

Current Research:

- Coral reef and seagrass meadows ecology and management
- Ecology and climate change driven impacts on marine vertebrates and invertebrates
- Impacts of ocean acidification on calcifying marine organisms, coastal biodiversity and fisheries.
- Marine biotechnology (renewable energy for green feedstock: micro-algae)
- Plankton ecology and productivity in a changing marine environment
- Integrated Coastal Zone Management – ICZM development in relation to Integrated Water Resources Management – IWRM and Ecohydrology tools.
- Environmental Sustainability: Innovation by integrating social, economic and environ-mental research.
- Environmental Impact Assessment, mitigation and compensation measures (Artificial reef)
- Rigs to Reefs approach for the decommissioning of oil platforms

Research Interests:

Research focus on functioning and connectivity between natural and artificial reefs. I am leading two ongoing NPRP projects aiming to understand the functional diversity and ecosystem services provided by coastal and offshore reefs for a better development of management practices. Integrated and multidisciplinary molecular, ecological and modelling methodologies are used to understand and simulate the complexity of the functioning of targeted ecosystems. Oil platforms are playing a significant role in sustaining biodiversity and productivity in offshore waters, we are collaborating with major Oil companies in Qatar to better assess their ecological and socio-economic roles.

Other research interests are related to anthropogenic driven impact on marine ecosys-

tems, including ecotoxicological studies (using mainly marine invertebrates) and climate change (ocean acidification and warming) impact on key marine communities.
I am also actively engaged in developing Standard Operating Procedures (SOPs) for the production of algae based feedstock and other aquaculture products to alleviate National/ Regional dependency over imported food and feed commodities.
My research team including 2 postdocs, 3 research associates and 11 students (undergraduate and graduate) are engaged into collaborative and highly multidisciplinary research activities, fundamental for the generation of meaningful research in collaboration with key local stakeholders and internationally renowned research players.
We were able to secure during the last 6 years 5 NPRP, 6 UREP, 2 MME, 5 Industrial and several QU internal projects and have published more than 90 peer-reviewed articles and book chapters. We are recipient of the College of Arts and Sciences Research Excellence Award 2015-16.

Current Publications:

https://scholar.google.com/citations?user=WE0JflcAAAAJ&hl
www.researchgate.net/profile/Radhouan_Ben-Hamadou
www.qu.academia.edu/RadhouanBenHamadou

Theme C & B

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Marine Sciences

Keywords:
- Environmental Impact Assessment.
- Marine Restoration or Rehabilitation
- Colonization of Marine Benthic

Research Interest

The theme is focused on planation of mangrove, or relocation of seagrass or coral reef. Another aspect is colonization of marine benthic on artificial habitats.

Research Interests:

1. Al-Modfa H., Abdel-Moati M. A. R., Al-Jamali F. Pinctada radiata (pearl oyster): A Bioindicator for Metal Pollution Monitoring in the Qatari Water (Arabian Gulf) . Bull. Environ. Contam. Toxicol. 1998, 60, 245-251.
2. Al-Jamali, F., Bishop, J. M., Osment, J., Jones, A. and LeVay, L. A review of the impact of aquaculture and artificial waterways upon coastal ecosystems in the Gulf (Arabian/Persian) including a case study demonstrating how future management may resolve these impacts. Aquatic Ecosystem Health & Management. 2005, 8(1), 1-14.
3. Jones, D.A., Ealey, T., Baca, B., Livesey, S. and Al-Jamali, F. (2007). Gulf desert developments encompassing a marine environment, a compensatory solution to the loss of coastal habitats by infill and reclamation: The case of the Pearl City Al-Khiran, Kuwait. Aquatic Ecosystem Health & Management. 2007, 10 (3), 268-276.
4. Sheppard C., Al-Husiani M., Al-Jamali F., Al-Yamani F., Baldwin R., Bishop J., Benzoni F., Du-trieux E., Dulvy N.K., Durvasula S.R.V., Jones D.A., Loughland R., Medio D., Nithyanandan M., Pillingm G.M., Polikarpov I., Price A.R.G., Purkis S., Riegl B., Saburova M., Namin K.S., Taylor O., Wilson S., Zainal K.. The gulf, A young sea in decline. A review in Marine Pollution Bulletin 2010, 60, 13–38.
5. Impact of accelerated coastal developments on the Eastern coast of Qatar, Case study: Umm Saeed Coastal Area. Fahad H. Aljamali, Elham M. Ali, Mahmoud H. Ahmed. International Journal of environmental science and engineering. 2014, 5. 127-137.

Theme C & D

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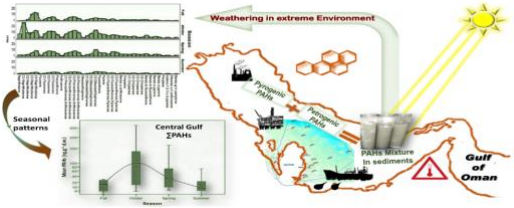
Marine Sciences



Keywords:
Ecotoxicology
Marine biodiversity
Deep sea benthic ecology

Research Interest

- Benthic community impacts on carbon and contaminant fluxes.
- Ecotoxicology of organic contaminants in sediments.
- Deep sea benthic ecology.
- Ecology and biology of marine benthic invertebrates.
- Marine biodiversity.
- Biotic/abiotic interactions in marine environments.

Research Interests:

1. Carbon flux and carbon sequestration in the coastal zone.
2. Fluxes of nutrient at water sediment interface.
3. Sources, concentrations, sedimentary records and bioavailability of polycyclic aromatic hydrocarbons PAHs in fine-grained sediments of the Qatari coastal water
4. A Mark-Recapture Program to Investigate Environmental and Ecological Pressures Impacting Qatari Sea Turtle Populations.
5. Impacts of extreme environments on the structure and function of benthic communities.

Theme C & D

Dr. Abdulrahman Al-Muftah
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Marine Sciences

Keywords:
Phytoplankton, taxonomy, ecology
Harmful algae, toxins
Macroalgae

Research Interest

- Temporal and spatial distribution of phytoplankton
- Study of HABs in Qatari waters and their distribution
- Effect of eutrophication on phytoplankton
- Macroalgae taxonomy and distribution

Publicatuions:

Dorgham,M.M., &.**Muftah A**. (1986): Plankton studies in the Arabian Gulf . I- preliminary list of phytoplankton species in Qatari waters. Arab J. Scient. Res.4(2):421-436.

Dorgham, M.M., **Muftah A.** & K.Z. Al-Deeb (1987): Plankton studies in the Arabian Gulf . II-The autumn phytoplankton in the North-western Area. Arab Gulf J. Scient.. Res., Agric. Biol. Sci. B5(2): 215-235.

El-samra, M. I.,**Muftah A**. & Dorgham M. .M. (1988):Algal nitrogen fixation in the North Western part of the Arabian Gulf. Qatar Univ. Sci. Bull.,8: 321-328.

Dorgham, M. M. & **Muftah A**. (1989): Environmental conditions and phytoplankton distribution in Arabian Gulf and Gulf of Oman, September 1986. J. Mar. Biol. Ass. India, 31 (1&2): 36-53.

Novarino, G. & Muftah, A. R. (1991): A description of Mastogloia biocellata stat. Nov. from Qatari coastal waters. Diatom Research,6:337-344.

Novarino, G.& **Muftah, A. R** (1992): Observations on the variability of the number of partecta in five species of Mastogloia. Diatom Researh, vol.7(1), 103-108.

Novarino, G.& **Muftah, A. R**. (1992): Observations sur les filaments mucilagineux chez quelques especes de Mastogloia (French). Cryptogamia, Algol. 13(2); 169-179.

Kureishy, T.W.,Abdel-Moati & **Almuftah A.R**. (1995):Marine algae as bioindicators of pollution levels in the Arabian Gulf . Qatar Univ.Sci.J.,15(1):215-221.

Al-Jedati, J. , **Al-muftah, A**., Ali, M. and R. K. Robinson (1999): The Potential Dangers to Human Health Posed by Toxigenic Microalgae, Science, January/February

Kureishy, T. W. &**Almuftah, A.R**.(1999): Total mercury levels in the coastal environment of Qatar(Arabain Gulf) . Qatar Univ.Sci.J., 19, pp. 274 – 284.

Friedhelm Krupp, **Abdulrahman Al-Muftah**, David A. Jones and John Hoolihan (2006): Marine and Coastal Ecosystem Management Requirenments in the Arabian Peninsula with special Regard to Water Resources.Unesco and United Nations University , pp. 63-87. Policy Perspectives for Ecosystem and water Management in the Arabian Peninsula

Abdulrahman Almuftah (2008): Harmful Algae Species of Qatari Water . Qatar Biodiversity Newsletter. Vol. 2, No. 3, March 2008 , PP.1-4.

Kenneth Mertents, Jennifer Wolny, Consuelo Carbonell-Moore, KARA Bogus, Marianna Ellegaard, Audrey Limoges, Anne de Vernal, Pieter Gurdebeke, Takuo Omura, **Abdulrahman Al-Muftah**, Kazumi Matsuoka (2015): Corrigendum to " Taxonimic reexamination of toxic armoured dinoflagellate Pyrodinium bahamense Plate 1960: Can morphology or LSU sequencing separate P. Bahamense var. compessum from from var. bahamense ?". Harmful Algae 41 (2015) 1-24 .

Abdulrahman Al-Muftah, Andrew I. Selwwod, Amanda J. Foss, Harb Mohammed S.J. AlJabri, Malcolm Potts, Mete Yilmas (2016) : Algal toxins and producers in the marine waters of Qatar,Arabian Gulf. Toxicon 122,54-66

Kardousha MM, **Al-Muftah A** ,Al-Khayat JA (2016): Exploring Sheraoh Island at Southern-Eastern Qatar. First Distributional Record of some inland and offshore Biota with Annotated checklist .J Marine Sci Res Dev6:191.doi:10.41 72/2155-9910.1000191

Kenneth Neil Mertensa,*, M. Consuelo Carbonell-Mooreb, Vera Pospelovac, Martin J. Headd, Andrea Highfielde, Declan Schroedere,f, Haifeng Gug, Karl B. Andreeh, Margarita Fernandezh, Aika Yamaguchii, Yoshihito Takanoj, Kazumi Matsuokaj, Elisabeth Nézank, Gwenael Bilienk, Yuri Okolodkovl, Kazuhiko Koikem, Mona Hoppenrathn, Maya Pfaffo, Grant Pitcherp, **Abdulrahman Al-Muftah**, André Rochonr, Po Teen Lims, Chui Pin Leaws, Zhen Fei Lims, Marianne Ellegaardt (2018): Pentaplacodinium saltonense gen. et sp. nov. (Dinophyceae) and its relationship to the cyst-defined genus Operculodinium and yessotoxin-producing Protoceratium reticulatum.Harmful Algae 71(2018) 57-77

Dr. Fatima Abdulla Alkhayat
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Biology Sciences

Keywords: Entomology, Biodiversity, Medical Entomology, Aquatic Insects

Research Interest

- Taxonomy of mosquitoes and other aquatic insects
- Distribution and biodiversity of insects
- Terrestrial invertebrate biodiversity.

Research Interests:

1. Temporal and spatial distribution of mosquitoes
2. Distribution of aquatic insects
3. Biodiversity of terrestrial invertebrates

Current Research:

1. Risk Assessment of existing and exotic disease vectors in Qatar and its impacts on public health. NPRP12S-0310-190284.
2. Profiling Mosquito population and species diversity in Qatar University.

Current Publications:

Alkhayat F. A a,b, Abu H. Ahmad a, Junaid Rahim c, Hamady Dieng d, Bashir Adam Ismail e, Muhammad Imran c, Umer Ayyaz Aslam Sheikh c, Muhmmad Sohail Shahzad f, Allah Ditta Abid f, Kashif Munawar g. 2020. Characterization of mosquito larval habitats in Qatar. Saudi Journal of Biological Sciences. 27: 2358-2365.

Theme B

Dr. Lama Soubra
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Toxicology and Risk Assessment

Keywords:
Toxicology, risk assessment, effects of toxicants on living organisms, biomonitoring, clinical toxicology, epidemiology, analytical determination of toxicants in environmental samples.

Research Interest:

My research interests focus on determining and assessing the risk that certain environmental toxicants would pose on public health, namely food additives, pesticides, drugs, and endocrine disruptors. They also focus on determining the mechanism by which certain environmental toxicant and drugs would be able to cause toxicity to a variety of living organisms, and to determine association between exposure to toxicants and adverse health effects.

Current Publications:

1. "Dietary exposure of children and teenagers to benzoates, sulphites, butyl hydroxyanisol (BHA) and butylhydroxytoluen (BHT) in Beirut (Lebanon)". **L. Soubra**, D. Sarkis, C. Hilan, Ph. Verger. **Regulatory Toxicology and Pharmacology**, Volume 47, Issue 1, **2007;** 47(1):68-77.
2. "Occurrence of total aflatoxins, ochratoxin A and deoxynivalenol in foodstuffs available on the Lebanese market and their impact on dietary exposure of children and teenagers in Beirut." **L. Soubra**, D. Sarkis, C. Hilan, Ph. Verger. **Food Addit Contam Part a Chem Anal Control Expo Risk Assess**, **2009;** 26(2):189-20.
3. "Variables associated with stress ulcer prophylaxis misuse." I. Issa, O. Soubra, H. Nakkash, **L. Soubra**. **Digestive diseases and sciences**, **2012;** 57(10):2633-41. DOI:10.1007/s10620-012-2104-9.
4. "Drug interaction between Azithromycin and Diltiazem may cause a QTc interval prolongation: a case report." **L. Soubra**, A. Mroueh, S. Kabbani. **International Journal of Basic and Clinical Pharmacology, 2014;** 3(1):242-6. DOI:10.5455/23192003.ijbcp20140244.
5. “Spectrum and patterns of antimicrobial resistance of uropathogens isolated from a sample of hospitalized Lebanese patients with urinary tract infections.” **L. Soubra**, S. Kabbani, M.F. Anwar, R. Dbouk. **Journal of Global Antimicrobial Resistance, 2014;** 2:173–178. DOI: 10.1016/j.jgar.2014.01.007.

6. “Level of A1C control and its predictors among Lebanese type 2 diabetic patients”. H. Nuruddin, N. Nakhoul, A. Galal, **L. Soubra**, M. Saleh. **Ther Adv Endocrinol Metab**, **2014**; 1:1–10. DOI: 10.1177/2042018814544890.
7. “The Economic Impact of Patients with Heart Failure on the Lebanese Healthcare System.” S. Tatari**, L. Soubra**, H. Tamim, K. Akhras, S. Kabbani. **European Society of Cardiology, Heart Failure Journal**, **2015;** DOI: 10.1002/ehf2.12038.
8. “Factors associated with hypertension prevalence and control among Lebanese type 2 diabetic patients”. **Lama Soubra,** Hanan Nureddin, Amal Galal Omar, Mounzer Saleh. **International Journal of Pharmacy and Pharmaceutical Sciences**, **2016**; 8(10):153-159.
9. “Heart Failure Disease Management Program and the Six Months Readmission Rate.” S. Tatari, A. Mourad, N. Shasha, A. Adhami, R. Osman, A. El-Sayed, **L. Soubra**, H. Tamim, S. Kabbani. **JOJ Nurse Health Care, 2017;** 2(1):555579.
10. “Statin prescription strategies and atherogenic cholesterol goals attainment in Lebanese coronary artery disease patients.” **Lama Soubra**, Thouraya Doumiaty, Youssef Fattouh. **Int J Clin Pharm, 2017;** 39:919–926.
11. “Effect of Interprofessional Education on Role Clarification and Patient Care Planning by Health Professions Students.” **Soubra L**, Badr S, Zahran I, Aboul Seoud M. **Health Professions Education, 2018;** 4(4):317-328.
12. “Current practices of community pharmacists in counseling patients on smoking cessation in Beirut: a questionnaire-based study.” M. Issa, M. El Solh, **L. Soubra**. **BAU Journal of Health and Well-Being, 2018;** 1(1):55-67.
13. “Prescribing of Proton Pump Inhibitors for Gastrointestinal Bleeding Prophylaxis in the Lebanese outpatient setting: patterns, compliance with guidelines, and risks.” **L. Soubra**, M. Isaa. **International Journal of Pharmacy Practice, 2019;** 27:386–392.
14. "Factors affecting metformin and clomiphene’s reproductive efficacy in pcos women”. J. Poushuju, Rita; I. El-Mallah, Ahmed; T. **Soubra, Lama**; and N. Jarrah, Lina. **BAU Journal - Health and Wellbeing,** Elsevier, **2020;** Vol. 2 : Iss. 2 , Article 3.
15. "In vitro equivalence study of generic metformin hydrochloride tablets under biowaiver conditions," H. AL Arwadi, Ruaa; A. K. Gazy, Azza; **Soubra, Lama**; and D. Ajami, Rola. **BAU Journal - Health and Wellbeing,** Elsevier, **2020;** Vol. 2 : Iss. 2 , Article 1

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Biological Sciences

Keywords:
Animal biology, Fungal biology, Mycotoxins, Food safety, Biological control

Research Interest

- Toxigenic fungi and their metabolites in food and feed
- Toxicities of mycotoxins in animal models
- Biological control of food and feed fungi
- Food safety

Current Research:

Dr Hassan's research interests are focused on the prevalence of toxigenic fungi and their metabolites in food and feed. He is interested to explore the effects of mycotoxins, at the cellular and tissue levels, on the various mammalian and avian models. In these regards, he loves to work on the effects of mycotoxins on humoral and cell mediated immunity. Moreover, he is also interested to investigate the effect of climatic changes on molecular toxigenic profiles and *in vitro* mycotoxins synthesis potential of the fungi. More recently, he is working on developing biocontrol strategies against toxigenic fungi and their mycotoxins using eco-friendly bacteria and yeast strains.

Recent Publications:

1. Nayla Salah Higazy, Aya Ehab Saleh, Zahoor Ul Hassan, Roda Al Thani, Quirico Migheli, Samir Jaoua, (2021). Investigation and application of Bacillus pumilus QBP344-3 in the control of Aspergillus carbonarius and ochratoxin A contamination. Food Control 119, 107464
2. Reem Alasmar, Zahoor Ul-Hassan, Randa Zeidan, Roda Al-Thani, Noora Al-Shamary, Hajer Alnaimi, Quirico Migheli, Samir Jaoua (2020). Isolation of a novel Kluyveromyces marxianus strain QKM-4 and evidence of tts volatilome production and binding potentialities in the biocontrol of toxigenic fungi and their mycotoxins. ACS Omega, 5, 17637-1645 doi.org/10.1021/acsomega.0c02124
3. Randa Zeidan, Zahoor Ul-Hassan, Roda Al-Thani, Quirico Migheli, Samir Jaoua (2019). In-vitro application of a Qatari Burkholderia cepacia strain (QBC03) in the

biocontrol of mycotoxigenic fungi and in the reduction of ochratoxin A biosynthesis by Aspergillus carbonarius. Toxins 2019, 11, 700; doi:10.3390/toxins11120700
4. Zahoor Ul Hassan, Roda Al Thani, Hajer Alnaimi, Quirico Migheli, Samir Jaoua (2019). Investigation and application of Bacillus licheniformis volatile compounds for the biological control of toxigenic Aspergillus and Penicillium spp. ACS Omega DOI: 10.1021/acsomega.9b01638
5. Sheraz Ahmed Bhatti, Muhammad Zargham Khan, Muhammad Kashif Saleemi, Zahoor Ul Hassan, (2019). Impact of dietary Trichosporon mycotoxinivorans on ochratoxin A induced immunotoxicity; In vivo study. Food and Chemical Toxicology, 132, 110696, https://doi.org/10.1016/j.fct.2019.110696
6. Bruno Tilocca, Virgilio Balmas, Zahoor Ul Hassan, Samir Jaoua, Quirico Migheli (2019). A proteomic investigation of Aspergillus carbonarius exposed to yeast volatilome or to its major component 2-phenylethanol reveals major shifts in fungal metabolism. Int. J. Food Microbiol. https://doi.org/10.1016/j.ijfoodmicro.2019.108265
7. Muhammad Kashif Saleemi, Muhammad Waseem Tahir, Rao Zahid Abbas, Masood Akhtar, Amir Ali, Muhammad Tariq Javed, Zahida Fatima, Muhammad Zubair, Sheraz Ahmed Bhatti, Zahoor Ul Hassan (2019).
8. Amelioration of toxicopathological effects of cadmium with silymarin and milk thistle in male Japanese quail (Coturnix japonica). Environ. Sci. Poll. Res. DOI 10.1007/s11356-019-05385-7.
9. Zahoor Ul Hassan, Roda Fahad Al-Thani, Virgilio Balmas, Quirico Migheli, Samir Jaoua (2019). Prevalence of Fusarium fungi and their toxins in marketed feed. Food Control, 104, 224-230
10. Zahoor Ul Hassan, Roda Fahad Al-Thani, Quirico Migheli, Samir Jaoua (2018). Detection of toxigenic mycobiota and mycotoxins in cereal feed market. Food Control 84, 389-394.
11. Zahoor Ul Hassan, Roda Al-Thani, Fathy A. Atia, Saeed Al Almeer, Virgilio Balmas, Quirico Migheli, Samir Jaoua (2018). Evidence of low levels of aflatoxin M1 in milk and dairy products marketed in Qatar. Food Control 92, 25-29.
12. Zahoor Ul Hassan, Roda Fahad Al-Thani, Fathy A. Atia, Saeed Al Meer, Quirico Migheli, Samir Jaoua (2018). Co-occurrence of mycotoxins in commercial formula milk and cereal-based baby food. Food addit. Contam. Part B, 11, 191-197.
13. Maria Grazia Farbo, Pietro Paolo Urgeghe, Angela Marcello, Stefania Oggiano, Virgilio Balmas, Zahoor Ul Hassan, Samir Jaoua, Quirico Migheli (2018). Effect of yeast volatile organic compounds on ochratoxin A-producing Aspergillus carbonarius and A. ochraceus. Int. J. Food Microbiology, 284, 1-10.
14. Randa Zeidan, Zahoor Ul-Hassan, Roda Al-Thani, Virgilio Balmas and Samir Jaoua (2018). Application of low-fermenting yeast Lachancea thermotolerans for the control of toxigenic fungi Aspergillus parasiticus, Penicillium verrucosum and Fusarium graminearum and their mycotoxins. Toxins 10, 242; doi:10.3390/toxins10060242.
15. Sheraz Ahmed Bhatti, Muhammad Zargham Khan, Zahoor Ul Hassan, Muhammad Kashif Saleemi, Aisha Khatoon, Zain ul Abidin, Muhammad Raza Hameed (2018). Dietary L-carnitine and vitamin-E; a strategy to combat ochratoxin-A induced immunosuppression. Toxicon 153. 62–71.

Theme B

Dr. Muhammad Ali Nawaz
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Wildlife Ecology and Conservation Genetics

Keywords:
Applied Ecology, Wildlife Management, Global Climate Change, Biodiversity Conservation, Terrestrial Ecology, Environmental Monitoring, Protected Areas Management.

Research Interests:

Humanity relies on services provided by Earth's diverse ecosystems. Balancing increasing human development and environmental protection to preserve valuable ecosystem functions is of great importance. Economic losses due to natural calamities aggravated by environmental destruction and climate change necessitate the mainstreaming of ecological and environmental concerns into development models.

Recent UN assessments acknowledge that Asia-Pacific is one of the most diverse regions in the world in terms of biological, cultural, social, climatic and geomorphological dimensions. Home to several global biodiversity hotspots and megadiverse countries, the region hosts a large number of endemic species and unique ecosystems. The Asia-Pacific region has the world's largest number of people living below the poverty line and high dependence on natural resources. However, it is experiencing rapid economic growth and land use change. These factors have high associated environmental costs, contributing to significant biodiversity loss and increasing threats to ecosystem services in the region.

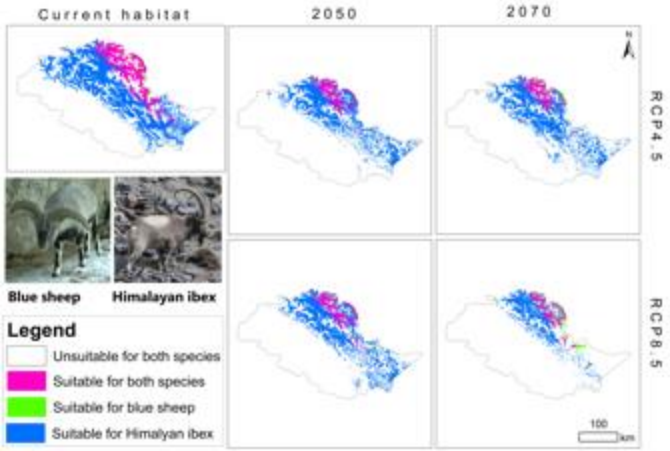
Safeguarding biodiversity and ecosystem integrity in the region requires comprehensive conservation strategies. Developing such strategies presents a suite of challenges, most notably a lack of knowledge about ecosystem functions and biodiversity, and the interactions between species and with people. Overcoming these challenges can provide important insights into species biology and enable the development of socially and ecologically sensitive conservation strategies.

Emphasizing on threatened and lesser-known species, my research maintains a holistic approach, where wildlife is not studied in isolation. Rather, we pursue questions that could help promote human and wildlife co-existence and contribute to the sustainable development.

Focal areas of research are as under:

- Assessment of wildlife populations, distribution patterns, and resource selection
- Methodological developments in monitoring wildlife
- Development of molecular tools for understanding species ecology
- Understanding interactions among species
- Understanding and evaluating human-carnivore conflicts
- Species responses to global climate change
- Evaluation of ecosystem services to humanity

Current Publications:
https://scholar.google.com/citations?user=KdAEYBoAAAAJ&hl=en
https://www.researchgate.net/profile/Muhammad_Nawaz11



Theme A

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Physiology and Cell & Molecular Biology

Keywords:
- Healthy Aging
- Musculoskeletal Health
- Natural Bioactive Compounds
- Anti-inflammatory Signaling Pathways
- Breast and Prostate Cancer
- Drug Resistance and chemoprevention of breast cancer
- Microbiology and Public Health.

Research Interest:

Musculoskeletal physiology and healthy aging: Aging is associated with enhanced tissue inflammation, which is the key to all sorts of pathological conditions including osteoporosis, sarcopenia, obesity, diabetes, and cancers. My research focuses on identifying the molecular mechanisms of aging targeting inflammation. My lab also searches for anti-inflammatory bioactive natural compounds to prevent osteoporosis, sarcopenia, obesity, diabetes and breast, prostate and colon cancer to ensure healthy aging. My lab also actively works on the impact of calorie restriction and moderate exercise to reduce aging associated pathological conditions including neurodegenerative diseases and underlying molecular mechanisms. The following are the key topics of interest.

- Omega-3 fatty acids specially docosahexaenoic acid (DHA) and its specialized proresolving metabolites and its receptor GPR120 on musculoskeletal health, obesity, diabetes and healthy aging.
- DHA and its specialized proresolving metabolites against breast cancer progression and bone metastasis.
- Cross talk between muscle and bone.
- Lipoxygenase in aging associated pathologies.
- 15-Lipoxygenase (LOX): a single target to resolve age-associated sarcopenia and osteopenia during aging.
- Lipid metabolites (omega-6 vs. omega-3 fatty acids) and aging.
- Combination of DHA and aspirin in healthy aging.
- Neuroprotectin, a DHA metabolite on alzheimer's disease, traumatic brain injury and cognitive health.
- Conjugated linoleic acid, HDAC inhibitors and 15 lipoxygenase inhibitors against osteoporosis and obesity and diabetes.

 Anti-inflammatory mechanisms of DHA.
 Omega-3 fatty acids on pneumonia infection.
 Natural compounds against drug resistance and chemosensitization
 Nutrition immunology and aging
 Complementary and alternative medicine in aging associated pathologies and cancer.

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Current Research:

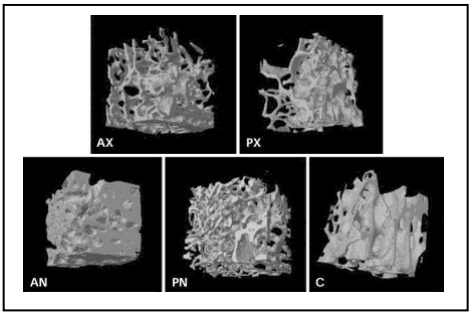
Conjugated linoleic acid (CLA), a remedy for antidiabetic thiazolidinediones-associated deterioration of bone remodeling. The identification of strategies enabling the attenuation of side effects associated with thiazolidinediones (TDZs) would allow their increased and safer use in T2D. The conjugated linoleic acid (CLA), which is an FDA approved natural compound provided with anti-inflammatory, anti-carcinogenic, and anti-osteoporotic properties, would be an ideal candidate for this purpose. The main focus of this study is to determine whether CLA can alleviate the TZDs-associated deterioration in bone remodeling as adjuvant therapy. We previously showed that CLA could positively modulate the key bone remodeling elements like osteoclastogenesis, osteoblastogenesis, and adipogenesis leading to a reduction in osteoporotic bone loss. We hypothesize that CLA will alleviate TDZs-mediated alteration in osteoclastogenesis, osteoblastogenesis, and adipogenesis. Effects on osteoclastogenesis, osteoblastogenesis, and adipogenesis will be tested using RAW264.7, MC3T3-E1, and 3T3-L1 murine cell model, and using Mesenchymal Stromal Cells (MSCs) derived from human adipose tissue and human PoieticsTM Osteoclast Precursor cells, which will provide a human model closer to potential clinical translation. Cells will be treated with pioglitazone/rosiglitazone in the presence and absence of CLA to determine its effect on restoring the alterations in differentiation and gene modulation caused by TZDs in these cell lineages. Our research project aims to address the unmet need for safer use of insulin sensitizer drugs. This study could pave the way to the clinical use of CLA as an adjuvant therapy along with TZDs in T2D patients, aiming at a significant reduction of documented side effects.

Mechanisms of anti-inflammatory effect of omega-3 fatty acids. Due to advancement of medical sciences, life expectancy increased all over the world including Qatar. One of the biggest challenge due to extended lifespan now, is to ensure healthy aging. There will be no meaning of longer lifespan if we cannot insure active healthy elderly life. Tissue inflammation goes up with the progression of age. Age-associated inflammatory pathophysiological conditions are the major cause of morbidity and mortality during aging. The proposed project will identify the mechanisms how a natural product, docosahexaenoic acid (DHA) ensures healthy aging by preventing tissue/organ inflammation during aging. We and others have shown that omega-3 fatty acid, docosahexaenoic acid, a natural compound which is found mainly in marine fish, has strong anti-inflammatory property. This promising natural compound may have the potential to reduce the tissue inflammation during aging. Omega-3 fatty acid supplement is one of the most popular supplements all over the world. We hypothesize that DHA supplementation will attenuate tissue inflammation of major aging-affected organs. However, it is unclear how DHA modulates inflammation in these tissues. Recent evidences suggest that DHA may modulate inflammatory signaling pathways through its receptor, G protein-coupled receptor (GPR)120. Activation of GPR120 signaling pathway has been shown to be anti-inflammatory. Therefore, we further hypothesize that DHA acts

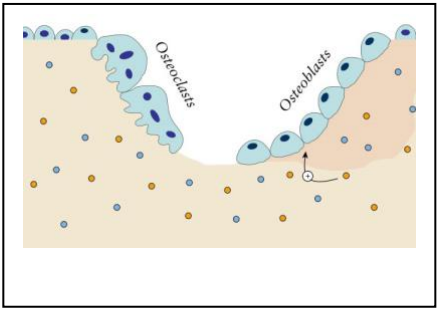
as a ligand for GPR120 and activates this anti-inflammatory signaling pathway to reduce tissue inflammation in aging-affected organs, thereby reducing pathophysiological conditions during aging. This preclinical study is an important step in establishing a cost-effective dietary supplement to find out a safe remedy against age-associated chronic tissue inflammation, thereby reducing the pathophysiological conditions.

Current recent Publications:

https://scholar.google.com/citations?user=KJY94nEAAAAJ&hl=en



mCT of bone



Bone remodeling

Theme B and C

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Professor

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Marine Sciences

Keywords:
Marine Ecology, Biodiversity, Taxonomy, Zooplankton, Ecotoxicology, Climate Change.

Research Interest

- Zooplankton Taxonomy and Diversity
- Plankton Numerical Ecology
- Copepod Reproductive Traits
- Jellyfish diversity, distribution and trophic ecology
- Zooplankton Ecotoxicology
- Integrated Coastal Zone Management
- Climate change
- Coral Reefs Zooxanthellae

Current Research:

Professor Mohamed Najib's research has centered on marine plankton diversity, numerical ecology as well as interactions with environmental factors and climate changes.
He has been able to show through his applied research how jellyfish abundance patterns and phenology have been changed in the South Western Mediterranean Sea and how it affected trophic food webs, zooplankton stocks (Copepods) and small pelagic fishes recruitment.
Recently his main topic was his research on zooplankton ecotoxicology using zooplankton models such as the Calanoid Copepod *Centropages ponticus* and the Scyphomedusae *Aurelia solida*. Between 2014 and 2018, he was appointed as co-director of a Joint Tunisia-French International Laboratory (LMI COSYS-MED) targeting contaminants impacts on planktonic food webs in the South Mediterranean Sea. Supported by his team, he was the principal investigator of several bilateral and European projects such as EUR-OCEANS (2005-2008), JEAI-ECOBIZ (2012-2014), MED-JELLYRISK (2013-2015) and MEDCOT (2013-2016).
Actually, he is developing new applied research at Qatar University on plankton taxonomy, numerical ecology, ecotoxicology and biochemical characterization of Copepods and Jellyfishes, in particular handling, processing and valorization of zooplankton biomass extracts as high benefit bioproducts.

He developed a novel index based on planktonic copepod reproductive traits as a tool for marine ecotoxicology studies.
He also masteries Zooxanthellae culture, after extracting and using Corals Endosymbionts such as *Symbiodinium* clades as an ecotoxicological model to test the effect of some ecological factors and contaminants such as Temperature, Salinity and Polycyclic Aromatic Hydrocarbons (PAHs) on growth rate and photosynthesis efficiency.
In the framework of 2 QNRF-UREP24 projects (2019-2021) and his young team, the Oceanography and Plankton Ecology Research Group (OPERG) he contributes to the development of the plankton diversity of Qatar marine waters with several new records for the region and for Qatar. He also developed specific techniques for *Symbiodinium* cryopreservation and the use of this endosymbiont for restoration of Coral Reefs bleaching in the Arabian Gulf.
During his career he produced more than 70 peer-reviewed scientific papers including one paper in the Proceeding of the National Academy of Sciences published in 2020 and supervised 7 PhD, 25 Research and Professional Masters and tens of Graduate Senior Projects including recently 5 at Qatar University in Marine Environmental Sciences.

Current Publications:
Scopus: https://www.scopus.com/authid/detail.uri?authorId=6506282294
Research gate: https://www.researchgate.net/profile/Mohamed_Daly_Yahia
Google Scholar:
https://scholar.google.com/citations?hl=fr&user=kj5ipGYAAAAJ&view_op=list_works&sortby=pubdate

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Human Molecular Genetics, General and Molecular Pathology, Phylogenesis and Evolution

Key Words:

- Autoimmune and autoinflammatory diseases
- Host response to Infectious diseases
- Innate Immunity
- Immunogenetics
- Antimicrobial peptides
- OMICs analyses and big data integration

Research Interest:

Research and diagnostics of hereditary (Mendelian and multifactorial) diseases.
In the context of complex diseases, I focus my attention on the host genetic background and the relationships with the susceptibility to viral infection, concentrating on HIV, HCV, HPV, HTLV and now SARS-Cov2. I'm also contributing to the development of a dendritic cell based immune therapy to treat HIV infected patients, aimed at reinforcing their immune response against the virus.
I am also performing basic research on the molecular evolution of non-human primates defensins genes aimed at discovering novel bioactive molecules. I'm developing research on antimicrobial peptides derived from native plants aimed at discovering new potential drugs or compound useful in drugs design and agronomy; I have patented three novel antimicrobial compounds.
Currently I am the lead PI of international research projects on autoimmune and skin autoinflammatory diseases as well as on the role of host OMICs in the context of infectious diseases.

Current Research:

Identification of markers for personal phenotyping and treatment of Acne Inversa.
Acne Inversa (AI), or Hidradenitis suppurativa, is a chronic inflammatory disease involving hair follicles that presents with painful nodules that release pus. Establishing a diagnosis of AI often takes about 3 years after disease onset. AI patients have an increased risk of developing associated diseases, such as inflammatory bowel diseases,

thereby suggesting a common pathophysiological mechanism. Familial cases (40% of AI patients) have allowed to identify susceptibility genes.
The expected outcomes are as follows:

- identify genetic variants associated with AI susceptibility, severity and treatment
- design in vivo and in vitro models to investigate the impact of genetic variants on immune and cutaneous cell biology

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DBES Research Booklet