

## **Muthanna Abdulkarim Al-Baldawi**

**Contact Number:** 00966112158978

**E-mail:** [malbaldawi@alfaisal.edu](mailto:malbaldawi@alfaisal.edu)

**Current Status:** Assistant Professor at Alfaisal University

Dr Muthanna Al-Baldawi has high academic and industrial experience in the area of pharmaceutical sciences and drug delivery. His earlier career exposed him to the practice of pharmacy from clinical work in hospital through to formulation and pharmaceutical analysis in both industries as well as quality control. He actively participated in running different dosage forms manufacturing facilities for 6 years and four years' experience in drug audit and quality control. Following that, he did a master's degree in pharmaceutical technology where he worked on formulation and development of nano-cream to improve skin permeation of low molecular weight compounds. After the master degree, he was appointed to a research assistant position in Malaysia with responsibilities for development of skin creams and cosmetic products. To further his career, he moved to the UK to embark upon PhD studies where he was appointed to a PhD fellowship as part of an EC FP7 funded program (ALEXANDER). In his PhD, he designed a novel virus-like nanoparticles based on the synthesis of diblock copolymers using the RAFT polymerization technique with superior diffusion through the mucus barrier which got IP due diligence (patent, GB1807853.5). Also, he led the establishment of the MPT technique to characterize the diffusion of nanoparticles through the biopolymer barrier. This technique was utilized by a lot of European and global academic and industrial partners.

thereafter, he was appointed as a research associate at Cardiff university where he continued his research on designing nanoparticulate formulations for oral delivery of peptides and performing PK preclinical studies. He continued his research collaboration with academic and industrial partners with main focus on treatment of cystic fibrosis, and chronic wounds and bacterial biofilms. He had had 3 successful grant applications which led to high quality publications in nature and science publishers. Besides that, he was involved in tutoring practical in laboratories of undergraduate and master programs, co-supervising PhD students and teaching in the pharmaceuticals labs. In 2021, Dr Muthanna was appointed as technical director of a manufacturing company in the UK where he led the establishment of the quality management system and setting the manufacturing facility of tablet dosage form following the GMP regulations with daily responsibilities of documenting SOPs, protocols, risk assessments, formula master files and batch manufacturing records.

In September 2022, Dr Muthanna was appointed as assistant professor in pharmaceuticals at Alfaisal University. He is currently responsible for teaching different topics at the college of pharmacy.

## Employment

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**9/2012 – Current:** *Assistant professor at College of Pharmacy/ Alfaisal University:*

- **Teaching the following courses:** Industrial pharmacy, Basic pharmaceuticals, Advanced pharmaceuticals, Pharmaceutical Calculations, and pharmacokinetic.
- **Head of Mentorship Program**

**11/2020 – 05/2022:** *Technical manager at Bristol Health Ltd:*

- Successfully installing of the manufacturing facility including clean rooms, QC lab, stores etc. following the GMP regulations.
- Managing of the whole plant activities.
- Establishing the quality management system (QMS) including drafting, reviewing and issuing SOP, protocols such as:
  - Senior management and organizational procedures and structure.
  - Corrective and preventive actions, control of non-conformity, traceability and handling of complains.
  - Site management
  - Production, packing and labelling.
  - Personnel and hygiene.
- Setting the H&S system and risk assessment documents.
- Accomplish the production system including qualifying the machines (IQ/OQ/PQ), formulation of products, documentation of batch manufacturing record.
- Auditing and approving all vendors, suppliers and contractors of the business.

**03/2015 – 01/2021:** **Research Associate, School of Pharmacy, Cardiff University.**  
**Project title: Treatment of bacterial biofilms in chronic wound.**

**Responsible for:**

- Using MPT technique to study nanoparticles migration through bacterial biofilms and mucus barrier and studying micro- rheological and mechanical properties of bacterial biofilms. This involves collaboration with industries in the field of bacterial biofilms like Algipharma and Qbiotics.
- Co-advising student on her clinical studies to study the PK of sildenafil after given to volunteers under hypoxic condition.
- Managing the chromatography unit (maintenance of the HPLC and LCMS units) at the school and training PhD students.
- Managing the laboratories and ensuring that biological and chemical laboratories are complied with health and safety requirements of the university.
- Design of novel sulfobetaine nanoparticulate carrier based on virus-like nanoparticle technology to load GLP-1 using RAFT polymerization technique.
- Study of the *in vivo* PK/PD profile of the orally administered GLP-1 agent.
- Advising master and PhD students on their research through

designing their experimental work, helping to fill the gap within their work, thesis writing, publication and prepare them for viva.

- Teaching/tutoring students in different practical following the handouts and coursework handbook.
- Responsible for synthesis of different types of nanoparticles (NPs) (polymeric NP and SMEDDS).

**12/2009 - 04/2011: Research Assistant, School of Pharmacy, University Science Malaysia.**  
**Project title: Development of cosmetics from local extracts from phyllanthus niruri and hibiscus sabdariffa.**

- Responsible to formulate and characterize semisolid nano-creams using a range of newly synthesized palm oil esters for encapsulation of new chemical molecules to be used for cosmetics.
- Study of the permeation of new chemical molecules across skin barrier.
- Responsible for the *in vivo* pharmacodynamics studies.

**11/2001 - 10/2005: Analytical Chemist, National Centre of Drugs Quality Control.**

- Analysis of various imported and domestic medicines in different dosage forms such as tablets, suspensions, emulsions, suppositories, injections following different analytical methods (USP, BP or companies' protocols) by using different instruments such as HPLC, dissolution, UV, flame photometry, Karl Fischer etc..

- Responsible for the analysis of raw chemicals imported by the pharmaceutical industries in the country using different analytical technique.

**06/1998 -11/2005: Formulation development associate in Alrafidain pharmaceutical industry. (Evening part-time (3pm to 8 pm)).**

- Responsible for the development and formulation of newly liquid dosage forms and other tablet dosage forms and to deal with the troubleshooting associated with manufacturing process following the GMP requirements of MOH in Iraq.
- Developing new methods in formulation and production of syrup/suspensions including using of new ingredients to improve the stability and intestinal absorption of drugs.
- Modifying the machines and instruments to keep functioning during the embargo on Iraq.
- Sourcing raw materials
- Project Management
- Cost optimisation
- Analysing stability data and taking necessary actions
- Meeting clients and answering to technical queries on brief.

**11/2000 - 11/2001: Clinical pharmacist, Surgical Specialist Hospital, Iraq/Baghdad.**

## **Education**

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**PhD**, School of Pharmacy, Cardiff University, UK. Thesis: *Chemical and Physical strategies promoting nanoparticle permeation through biopolymers.*

**M.Sc.** (3 years research programme) **Pharmaceutics, School of Pharmacy, University Science Malaysia.** Thesis: *Formulation And Characterization Of Palm Oil Esters Based Nano-Cream For Topical Delivery of Piroxicam: Study Of In Vitro Release And In Vivo Anti-Inflammatory And Analgesic Effects.* (Language: English)

**B.Sc. in Pharmacy (5 years courses program), School of Pharmacy, University of Baghdad.** (Language: English).

## **Experience and Skills (Brief Description)**

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1. Chemical analysis of medicines/materials using a big range of instruments like Karl-fisher, HPLC, LCMS, dissolution and structural analysis of polymers/semisolid/nano-systems using IR, NMR, TEM and GPC.
2. Setting and managing of QMS including drafting and issuing of protocols, SOPs and records.
3. Pre-formulation, formulation and physicochemical characterisation of different dosage forms from traditional emulsion, semisolid, suspension and tablet to advanced drug delivery like SMEDDS, Nanoparticles, nano-emulsion.
4. Synthesis and physicochemical characterization of various polymeric nanoparticles using

- different techniques like RAFT polymerization of di-block copolymers and nano-gel.
5. Study of drug/nano delivery both in-vivo and in-vitro and performing of PK/PD studies.
  6. Multiple Particle Tracking (MPT) to study the kinetics of particle diffusion using Epifluorescence and confocal microscopy.
  7. Rheological assessment of biopolymers and semisolid pharmaceutical products including studying of microstructure (micro-viscosity) of biopolymer systems.
  8. Cell culture/ bacterial and biofilm growth.

### **External contribution, responsibilities and recognition**

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#### **Editing and Revision**

Editorial Board Journal of Recent Patents on Nanomedicine.

#### **Awards**

Silver medal (applied research category). HPLC and Anti-Inflammatory Studies of the Flavonoid Rich Chloroform Extract Fraction of Orthosiphon stamineus Leaves. Pameran Rekacipta Penyelidikan & Inovasi 2010 Upm.

#### **Patents**

Di-block BMA-sulfobetaine copolymer to produce zwitterionic NPs having muco-inert properties (withdrawn).

#### **Grants at Cardiff University**

1. £66000 Bridging fund life science (Welsh Government).
2. £48000 Life science fund (Welsh government).
3. £25000 MRC (P2D) fund in collaboration with Algipharma (Norway).

## **Publication**

For full publications record, please visit Scopus at <https://www.scopus.com/authid/detail.uri?authorId=36157604500>.

Below, are my last 5 publications:

1. K.A. Mahmoud, Mazen Binmujlli, Fawzy H. Sallam, M.I. Sayyed, Mohammad Marashdeh, **Muthanna Abdulkarim** (2023) Microstructure investigation, Electrical properties, and  $\gamma$ -rays' protection. (Applied Radiation and Isotopes). 206 (111195).
2. capacity for ZnO doped clay ceramic
3. Mohammad Marashdeh, **Muthanna Abdulkarim** (2023) Determination of the Attenuation Coefficients of Epoxy Resin with Carbopol Polymer as a Breast Phantom Material at Low Photon Energy Range. (Polymers) 15 (2645).
4. Lydia C Powell, Jason Cullen, Manon Pritchard, Georgina Menzies, **Muthanna Abdulkarim**, Jennifer Adams, Joana Stokniene, Lewis Francis, Mark Gumbleton, Katja Hill, Adam Jones, David W Thomas (2022) Topical, immunomodulatory epoxy-tiglicanols induce biofilm disruption and healing in acute and chronic skin wounds. (Science translational medicine). 14 (662).
5. Lydia C. Powell, **Muthanna Abdulkarim\***, Joana Stokniene, Qiu E. Yang, Timothy R. Walsh, Katja E. Hill, Mark Gumbleton, David W. Thomas (2021) Quantifying the effects of antibiotic treatment on the extracellular polymer network of antimicrobial resistant and sensitive biofilms using multiple particle tracking. Nature Publisher Journal (Biofilms and Microbiomes) 7 (13).
6. Arnau Biosca, Pol Cabanach, **Muthanna Abdulkarim**, Mark Gumbleton, Cristian Gómez-Canela, Miriam Ramírez, Inés Bouzón-Arnáiz, Yunuen Avalos-Padilla, Salvador Borros, Xavier Fernández-Busquets (2021) Zwitterionic self-assembled nanoparticles as carriers for Plasmodium targeting in malaria oral treatment. (Journal of Controlled Release) 331 (364-375).
7. Matías J, Brotons A, Cenoz S, Pérez I, **Abdulkarim M**, Gumbleton M, Irache J, Gamazo C (2020) Oral immunogenicity in mice and sows of enterotoxigenic escherichia coli outer-membrane vesicles incorporated into zein-based nanoparticles. Vaccines. 8 (1): 11.
8. **Abdulkarim, M**, Sharma, P.K, Gumbleton, M (2019) Self-emulsifying drug delivery system: Mucus permeation and innovative quantification technologies. Advanced Drug Delivery Reviews 142: 62-74