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## Editorial The 1st International Conference on Applied Chemistry and Biotechnology ICACB-2022



Applied chemistry and biotechnology are dynamic and rapidly evolving research fields. Their intersection has led to many exciting developments and innovations, such as the development of new pharmaceuticals and bioremediation technologies. Researchers in these fields continue to work together to develop new solutions to the world's most pressing problems, from improving food security to developing new cancer treatments. Therefore, the potential for these fields to drive positive change in our world is immense.

The International Conference on Applied Chemistry and Biotechnology (ICACB-2022) is a biannual scientific event focused on the latest advances in the application of chemistry and biotechnology in various fields. It is hosted by Al-Balqa Applied University, Al-Salt, Jordan. The conference brings together researchers, scientists, academicians, and industry professionals from around the world to present and discuss their research findings, share knowledge, and network with peers. The conference aims to provide a platform for participants to exchange ideas and collaborate on cutting-edge research projects, and to foster new collaborations between academia and industry. Topics covered in the conference include organic chemistry, phytochemistry, pharmaceutical chemistry and drug design, environmental chemistry, biochemistry, biomaterials, biocatalysis, bioprocessing, bioreactor design, biosensors, and many others. The conference is an excellent opportunity for professionals and students to keep up-to-date with the latest developments in these rapidly evolving fields. In addition to the scientific program, the conference also offers social events

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and networking opportunities, including a welcome reception, a gala dinner, and city tours.

The International Advisory Board included Prof. Hala I. Al-Jaber (Jordan), Prof. Atta-Ur-Rhaman (Pakistan), Prof. Muhammad Iqbal Choudhary (Pakistan), Prof. Reda Al-Khawaldeh (Jordan), Prof. Abdulrahman Alwarthan (Kingdom of Saudi Arabia), Prof. Ammar Almaaytah (Jordan), Prof. Ashok K. Shakya (Jordan), Prof. Athina Geronikaki (Greece), Prof. Fatma U. Afifi (Jordan), Prof. Heinrich Lang (Germany), Prof. Jose Cavaleiro (Portugal), Prof. Mathias Winterhalter (Germany), Prof. Mohammad Shatnawi (Jordan), Prof. Musa H. Abu Zarga (Jordan), Prof. Ram K. Agrawal (India), Prof. Saeid Abu Romman (Jordan), Prof. Salim Bani Hani (Jordan), Prof. Sultan T. Abu-Orabi (Jordan), Prof. Wilbert Bitter (Netherlands) and Prof. Werner M. Nau (Germany).

**Al-Salt** (Latin: *Saltus* means wooded valley) is a historic town located in northwestern Jordan, about 20 km northwest of the capital city of Amman, built on three main mountains (the Al-Qal'a, Jad'ah and Assalalem). The town has a long history dating back to the Roman and Byzantine periods, and it played an important role during the Ottoman era as a commercial center and a transit point. Today, Al-Salt is a popular tourist destination known for its well-preserved historic architecture, charming streets, and vibrant cultural scene. The town has a diverse community of Muslims and Christians. One of the main attractions in Al-Salt is its historic old town, which features narrow alleys, traditional homes, and a number of historic landmarks such as the Al Khader Church, the Abu Jaber Mansion, and the Al Husseini Mosque. Visitors can also explore the town's lively souks (markets), where they can find a variety of handicrafts, textiles, spices, and other local products.

**Al-Balqa Applied University (BAU)**, the formal host of ICACB-2022, is a public university located in Al-Salt, Jordan. It was founded by royal decree on the 22nd of August 1996. Teaching at the university was commenced in the academic year 1997/1998. The university is known for its strong focus on applied education and research, with a wide range of programs in fields such as engineering, information technology, natural sciences, business, artificial intelligence, medicine, and more. The university offers 11 master and 52 bachelor's degree programs in addition to 117 associate degree programs (diploma degree). BAU comprises of 11 faculties on its main campus in Al-Salt city, and 12 university colleges as satellite campuses across the Hashemite Kingdom of Jordan. The university also oversees the 51 private and public community colleges in Jordan. BAU offers undergraduate and graduate programs, as well as continuing education courses and professional training

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programs. The university has a diverse student body, with students from Jordan and other countries around the world. BAU also has a strong commitment to community service and outreach, with a number of programs and initiatives designed to serve the local community.

The 1st Edition of the Conference started on Tuesday morning, May 10th under the patronage of her Royal Highness Princess Sumaya bint Al-Hassan. The program included 10 plenary lectures, 42 short talks and 26 poster presentations. More than 150 participants came from 18 countries, including Jordan, Palestine, Kingdom of Saudi Arabia, United Arab Emirates, Kuwait, Iraq, Egypt, Morocco, Algeria, Turkey, Greece, Pakistan, India, Portugal, France, Malaysia, The Netherland, and Germany. Almost all of them presented their work in the event.

## ICACB-2022 Special Issue in Arabian Journal of Chemistry

In this special issue, El-Barghouthi et al. reported on supramolecular host-guest complexation between cucurbit[*n*] urils, a class of water soluble macrocyclic receptors, with several forms of glucosamine in water (El-Barghouthi et al., 2023). Applying molecular dynamics simulations, cucurbit[6]uril (CB6) and cucurbit[8]uril (CB8) were found to form stable inclusion complexes with both  $\alpha$ - and  $\beta$ -anomers of glucosamine. Abuhasan et al. applied molecular dynamics (MD) simulations and timedependent density functional theory (TD-DFT) calculations to investigate the formation of binary and ternary complexes between cucurbit[8]uril (CB8) and three different tryptophan (W)-containing tripeptides (Abuhasan et al., 2023). In addition, the formation of heteroternary complexes of the tripeptides in the presence of methyl viologen (MV) as an auxiliary ligand was studied. Results indicated that W has a high affinity to CB8 through the encapsulation of the indole moiety. Ternary complexes were found to be stabilized by  $\pi$ - $\pi$  stacking inside the CB8 cavity between the indole rings and/or indole/auxiliary guest. Transition metal complexes of D-luciferin and metal(II) were synthesized and characterized using a 2:1 ligand to metal ratio (Alshaikh et al., 2023). The results indicated that luciferin is complexed to the metal center through two sulfur atoms of the thiazole ring. Furthermore, based on UV-Visible, fluorescence, and viscosity measurements, sizable interaction between the metal complexes with DNA and human serum albumin was reported, which was supported by molecular docking study (Alshaikh et al., 2023).

N-(4-nitrophenyl)-N'-(4-substituted phenyl)-oxamate zincate (II) complexes were synthesized and characterized by Ishtaiwi et al. (2022). The electronic effects (electron donating and withdrawing groups) on the physical and chemical properties of zincate(II) complexes were investigated in terms of UV-Visible, fluorescence spectroscopy and further supported by density functional theory (DFT) calculations. The structure of the complexes was confirmed by single-crystal XRD, which revealed that the zinc(II) ion is four-coordinate with two ethanediamide-nitrogen atoms from two bidentate N,N-disubstituted oxamate ligands at each metal center (Ishtaiwi et al., 2022). Alsafadi and coworkers reported on a novel method for the production of biodegradable polyhydroxyalkanoate (PHA) from sesame wastewater using extreme Haloferax mediterranei (Alsafadi et al., 2023). High content of PHA (0.53 g/L) was produced when the sesame wastewater extract media was supplemented with 100 g/L NaCl and 6.0 g/L yeast extract. Al-Fa'ouri et al. studied the optical and electrical properties of copper oxide-polyvinyl alcohol nanocomposites for solar cell applications (Al-Fa'ouri et al., 2023). In this study, the copper oxide nanoparticles were synthesized utilizing an ecofriendly green method, using the aqueous extract of Bougainvillea leaves as a reducing and capping agent. Results indicated the potential employment of the prepared particles in the development of good candidate material for photoactive layers in solar cell applications (Al-Fa'ouri et al., 2023). A palm tree-originated activated carbon with high surface area was prepared applying several metal carbonates as activators (Bumajdad and Hasila, 2023). The best result was obtained when  $Cs_2CO_3$  was used at a temperature of 600 °C, providing an excellent surface area ( $S_{BET}$  of 2700 m<sup>2</sup>/g) and high content of bi-modal porosities. Surface modification of the activated carbon was performed using different nitrogen transporting agents. The activated material showed high capability for  $CO_2$  adsorption as well as heavy metals (such as Cr(VI) and Pb (II)) removal from an aqueous medium (Bumajdad and Hasila, 2023).

Phytochemical investigations of medicinal plants had led to the discovery of many secondary metabolites with interesting bioactivities, which have extensively been documented in this special issue. Al-Jaber and coworkers reported for the first time the isolation and characterization of ceratoluteoline. a new flavonoid, isolated from Salvia ceratophylla growing wild in Jordan along with other 14 known compounds (Al-Jaber et al., 2023). Barhoumi et al. reported also on the isolation of a new iridoid that was identified as the methyl acetal of nepetalic acid from Nepeta curviflora from Jordan (Barhoumi et al., 2023). Additionally, Odeh et al. studied the volatile and nonvolatile chemistry of Sedum rubens from the flora of Jordan, a succulent plant (Crassulaceae family), in aim to identify its chemical constituents and bioactivity potentials (Odeh et al., 2023). The plant was found to possess interesting antioxidant activity due to its high phenolic and flavonoids content. The main components detected in this plant included gallic and caffeic acids in addition to  $\alpha$ - and  $\beta$ -amyrines (Odeh et al., 2023). Al-Momani and coworkers investigated the essential oil composition and different extracts obtained from the leaves and flowers of Anthemis cotula from Jordan, and studied their antioxidant activities. Quercetine, apigenin, and chlorogenic acids were detected in appreciably high concentration levels, and exhibited high antioxidant activity as detected by DDPH, ABTS and FIC assay methods (Al-Momani et al., 2023). Ferdosi et al. investigated the antimicrobial potential of the methanolic extract obtained from Plumeria alba flowers from Pakistan (Ferdosi et al., 2023). The extract was highly effective against several fungal species including Trichoderma reesii, T. viride, T. harzianum, T. hamatum, and T. koningii in addition to some other bacterial species such as Bacillus sp., Staphylococcus sp., E. coli, Pseudomonas sp., and Salmonella sp. (Ferdosi et al., 2023). Similarly, the herbicidal activity of Digera muricata from Pakistan was investigated by Akbar et al. (2023). In this work, the chloroform extract was subjected to bioactivity guided fractionation that resulted in identification of both guercetin and  $\beta$ -caryophyllene as the active components against the tested weeds Avena fatua and Melilotus indicus (Akbar et al., 2023). In a review article, Gerothanassis listed the most recent nuclear magnetic resonance (NMR) methods (i.e. in-tube NMR monitoring) in order to study natural product-protein interactions and the associated biotransformation in solution as well as in cell (Gerothanassis, 2023).

Obeidat et al. reported a highly sensitive and specific biomarker for early stage detection of Colorectal cancer (CRC) by the production of monoclonal antibodies to membrane components of human colorectal cancer HCT-116 cell line for diagnostic purposes (Obeidat et al., 2023). Al-Daghestani et al. studied the interindividual variability in vascular endothelial growth Factor (VEGF) by determining the allele frequency for certain genetic polymorphisms of VEGF-936 and VEGF-634 genes in two subpopulations in Jordan: Circassians and Chechens, as well as comparing the allele frequencies with other populations, including Jordanian Arabs (Al-Daghastani et al., 2023). These findings provided genetic information that may serve as a basis for larger studies designed to assess variability associated with VEGF polymorphisms. They also provide important data for the implementation of personalized medicine in Circassians and Chechens populations living in Jordan (Al-Daghastani et al., 2023).

**Final message**, we would like to take a moment to express our gratitude to each and every one of the participants for their contributions. Their presence and engagement have made this event a truly meaningful and enriching experience.

We would like to extend sincere thanks to our keynote speakers, session chairs, and presenters for sharing their insights, research, and expertise with us. Your presentations have sparked important discussions and have shed light on some of the most pressing issues and challenges facing our fields.

We would also like to thank the organizing committee and volunteers who worked tirelessly behind the scenes to ensure that this conference ran smoothly and successfully. Your hard work and dedication have not gone unnoticed, and we are grateful for all that you have done. We are grateful to our sponsors and partners for their generous support, which made this event possible. Your contributions have helped to advance our fields and have created opportunities for collaboration and networking.

Finally, the Guest Editors would like to thank the Arabian Journal of Chemistry for hosting the special issue on "The 1st International Conference on Applied Chemistry and Biotechnology, ICACB-2022" in your esteemed journal and all the authors and contributors of this collection. We sincerely appreciate all the reviewers' efforts for their precious time, patience, and valuable comments to appraise and improve the quality of submitted manuscripts. Specially, we are grateful to the Editor-in-Chief Prof. Abdulrahman Abdullah Alwarthan and the entire Editorial Board of the Arabian Journal of Chemistry for their worthy guidance and offering us the valuable opportunity to compile this Special Issue.

We hope that this conference has provided you with new ideas, insights, and connections, and that you leave feeling inspired and energized. Thank you once again for your participation and for making this conference a success. We look forward to seeing you at future events.

## **Declaration of Competing Interest**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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