

## CURRICULUM VITA

**JALAL AHMAD ZAHRA, Ph.D**



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Date of Birth: January 24, 1960

Place of Birth: Amman

Nationality: Jordanian

Marital Status: Married (4 children)

Languages: Arabic (mother tongue), English (fluent), German (good)

### Scientific Qualifications

**Ph.D., University of Leipzig (Germany), 2001.** Thesis adviser: **Prof. Dr. Peter Welzel**, Thesis Title: *Conversion of D-Tartaric Acid into Building Block for Phosphonate Analogues of the Antibiotic Moenomycin A12*

**M. Sc. in Chemistry, University of Jordan (Jordan), 1987.** Thesis adviser: **Prof. Dr. Musa Abu Zarga and Prof. Dr. Ayed Amr**, Thesis Title: *Chickpea Saponines and their Fate During Processing*

**B.Sc. in Chemistry, University of Jordan (Jordan), 1982**

## Field of Interest

Organic chemistry, Reactions and Synthesis of Heterocyclic Compounds.

New synthetic routes toward benzodiazepines, benzothiadiazepines, benzothiophenes, and thiadiazoles.

[a] Fused heterocyclic-pyrido[2,3-f]quinoxalines and their pyrido[3,2-g]analogs, a process for their preparation and their potential uses as anticancer, antiviral, and antibacterial agents.

## Experiences and Technical profile

3/2012-now	Prof. in organic chemistry. Department of Chemistry, University of Jordan
7/2006-3/2012	Associate Prof. in organic chemistry. Department of Chemistry, University of Jordan
07/2001-7/2006	Assistant Prof. in organic chemistry. Department of Chemistry, University of Jordan
10/1997-7/2001	Ph. D. work at University of Leipzig (Germany).
12/1991-10/1997	Lecturer, Department of Chemistry, University of Jordan Amman/ Jordan.
March 19- April 8/ 1994	COMSTECH-HEJREC Workshop on spectroscopy techniques, University of Karachi, Karachi / Pakistan
June 4 -October 4 1995	Practical course in using modern NMR techniques, University of Tübingen (Germany)
10/1995-9/1997	Running the NMR machine (BRUKER DPX-300). Department of Chemistry, University of Jordan

- 2/1988 -12/1991      Laboratory teaching instructor, Department of Chemistry, University of Jordan, Amman /Jordan.
- 3/1987-2/1988      Research assistance, University of Jordan, Amman/ Jordan.
- 9/1984- 3/1987      M. Sc. in Chemistry, University of Jordan.
- 9/1982-9/1984      Jordanian Military Army Forces
- 9/1978-6/1982      B. Sc. in Chemistry, University of Jordan.

**Teaching Experience:**

Undergraduate chemistry courses (University of Jordan):  
 General Chemistry I (101), General Chemistry II (102),  
 laboratory General Chemistry (109), Organic Chemistry I (231), Organic Chemistry II (331), Laboratory Organic Chemistry (239), Systematic identification of Organic Compounds (436). Special topics in organic chemistry (431), Chemistry of Biomolecules (331)

**Career-Related Activities:**

■ **Projects**

- 2003 -2004 Principal investigator in a research project entitled: Facile Synthesis of Some New Bicyclic Heterocycles (project No.142/2002-2003, Sponsor: Deanship of Academic Research, University of Jordan (Jordan).
- 2005-2006 Co-investigator in a research project entitled: *Pyrido [2,3-f]quinoxalines and Pyrido[2,3-g]quinoxalines, a process for their preparations and their use as antiviral and antibacterial Agents.* Sponsor: Hamdi Mango Center for Scientific Research, Jordan University (Jordan).
- 2005 - 2006, Principal investigator in a research project entitled: *Synthesis of 1,4-Benzothiazin-3-ones [h]Fused to Substituted 4-*

*Oxoquinoline-3-carboxylic Acid and Their Thiophene Bioisosteres* project No.77/2005-2006, Sponsor: Deanship of Academic Research, University of Jordan (Jordan).

- 2007- Principal investigator in a research project entitled: *Synthesis and properties of Some New 1-cyclopropyl-6-fluoro-4-oxo-7-(2-thioxo-4-oxoimidazolidin-1-yl) quinoline-3-carboxylic Acids*. Sponsor: Deanship of Academic Research, University of Jordan (Jordan).
  - 2011- Co-investigator in a research project entitled: *Synthesis and antibacterial activity of some 2,6-dioxotetrahydro-1H-pyrrolo[3,2-h]quinoline-7-carboxylic acid 3-aryl hydrazones and related 3-oxime derivatives*. Sponsor: Deanship of Academic Research, University of Jordan (Jordan).
  - 2012- Co-investigator in a research project entitled: *New 4-pyridone annulated-oxindole derivatives as antitumor and antibacterial*. Scientific Research Support Fund / Ministry of Higher Education. mph/1/06/2011 (Jordan).
- 2015- Principal investigator in a research project entitled: *Salt preparation of pyridone-annulated spiro-oxindole pyrrolidines for testing as antitumor agents*. Sponsor: Deanship of Academic Research, University of Jordan (Jordan).
- 2018- Co-investigator in a research project entitled: *Synthesis and biological activities of novel sets of heterocycles incorporating imidazo[1,5-a]pyridine, oxazepinoindoles and their spiro-precursors* Scientific Research Support Fund / Ministry of Higher Education.

■ **Supervision of Ph.D. theses**

• **Salah Al-Trawneh**

Synthesis and antitumor Potency of some Novel Pyrido[2,3-a]carbazoles and their isosteric Pyrido[3',2':4,5]thieno[3,2-b]indoles (Graduated, 2009)

• **Mazen Abdelraoof Al Sulaibi**

Design and synthetic optimization of new isoindigo-based FLT3 inhibitors as potential treatments of acute myeloid leukemia (Graduated, 2018).

• **Ala'a Ahmad Omar Al-Akhras**

Synthesis and Antibacterial Activity of Tetracyclic Fluoroquinolones Encapsulating Thiophene, Furan and Related Congeners (Graduated, 2020).

• **Areej Majed Jaber**

Synthesis of model condensed 1,3-oxazepines incorporating quinolones, benzimidazoles, indazoles and related congeners (Graduated, 2020).

• **Ahmad Hasan. Abdullah**

Thiophene Ring-opening Reactions: Facile Syntheses of Novel Benzothiazolo[3,2-b]pyridazine-1,3,4-thiadiazole Hybrids and Related Congeners

■ **Supervision of M.Sc. theses**

• **Nisreen Ismail Hindawi**

Synthesis and Properties of some New 1,4-Dihydro-1,2,4-Benzotriazepin-5-ones and a Related Dibenzodiazocin-6,12-dione, Department of Chemistry, University of Jordan (Graduated,

8/2005).

- **Mohammed Hareb Hunaiti**  
Synthesis of Some Heterocycles -[g]Fused to Substituted 4-Oxoquinoline-3-carboxylic Acid . Department of Chemistry, University of Jordan ((Graduated, 8/2006)
- **Esra'a S. Abu-Sheaib**  
Formal Synthesis of Some New-7-oxo-7,10-dihydropyrido[2,3-f]quinoxaline-8-carboxylic acids and esters. Department of Chemistry, University of Jordan (Graduated, 5/2007).
- **Maram Al-dweak**  
Synthesis and properties of Some New (Substituted) Imidazo[4,5-h]quinoline-7-carboxylic Acids and Esters. Department of Chemistry, University of Jordan (Graduated, 5/2008).
- **Ayman Alawna**  
Synthesis and properties of Some New 1-cyclopropyl-6-fluoro-4-oxo-7-(2-thioxo-4-oxoimidazolidin-1-yl) quinoline-3-carboxylic Acids . Department of Chemistry, University of Jordan (Graduated, 2009).
- **Batol AlFaria**  
Synthesis and properties of Some novel 1-cyclopropyl-4-oxopyrido [2,3-a] phenoxazine-3-carboxylic acids. (Graduated, 2012).
- **Ahmad H. Abdullah**  
Synthesis and Characterization of some new N2-(carbazol-3-yl)amidrazone derivatives and related congress as a potentially biologically active agents (Graduated, 2015).
- **Ali M. Almansor**  
Synthesis and biological activity assays of some new N-2-thien-3-yl amidrazone derivatives and related congeners (Graduated,

2015).

- **Eslam S. Daloom**

Synthesis And characterization of new N-(indan-yl)amidrazones and the cyclopenta-cinnolines as potential bioactive agents (Graduated, 2016).

- **Hind M. A. Yahya**

Synthesis of Amidrazones derivatives of fluorinated Quinoline-3-Carboxylic Acid and evaluation of their antitumor activity (Graduated, 2017).

- **Ne'meh Mohammad AL-Khalaileh**

Multi-target-directed ligands in alzheimer's disease treatment: design, synthesis and biological evaluation of potential (Graduated, 2021).

- **Dua'a Fathi Saleh**

Synthesis of novel 4-oxopyrido[3,2-c] phenothiazine derivatives as potential antibacterial agents(Graduated, 2022).

- **NMR spectrometer:**

2001-present: Responsible and running the NMR Machines (Bruker DPX-300, and Bruker DPX-500), Department of Chemistry, University of Jordan [ $^1\text{H}$ ,  $^{13}\text{C}$ , dept, 2D; COSY, HMQC, HMBC etc.]

- **Mass spectrometer**

2004-2008: Running the MASS Instrument (Varian MAT 212 spectrometer), Department of Chemistry, University of Jordan

2008-present: Running the MASS Instrument (Bruker Apex IV), Department of Chemistry, University of Jordan

## ■ Publications

### • Refereed International Journal

- 1) Abadleh, Mohammed M., Jalal A. Zahra, Salim S. Sabri, Rania R. Abuzaid, Dieter Schollmeyer, and Mustafa M. El-Abadelah. "Synthesis of Alkyl Thiochromano [2, 3-c] pyrrole-9-carboxylate Derivatives Utilizing Benzo [b] thiofuran-2, 3-dione, Maleimides, and Alkyl Alcohol/Water Mixtures." *Synthesis* (2024).
- 2) Hind M. A. Yahya, Jalal A. Zahra, Salim S. Sabri, Mustafa M. El-Abadelah and Sanaa Bardaweel, Synthesis and Antitumor Activity of Some New N1-(8-fluoro-4-oxoquinolin-5-yl) amidrazones, *Current organic synthesis* (2024)
- 3) El-Abadelah, Mustafa M., Ahmad H. Abdullah, Jalal A. Zahra, Salim S. Sabri, Sanaa K. Bardaweel, and Mutasem O. Taha. "Synthesis and antitumor activity of model cyclopentene-[g] annelated isoindigos." *Zeitschrift für Naturforschung C* (2024).
- 4) Al-Rifai, Nafisah M., Nemeh M. Al-Khalileh, Jalal A. Zahra, Musa I. El-Barghouthi, and Fouad H. Darras. "Synthesis, biological evaluation, and computational studies of N-benzyl pyridinium-curcumin derivatives as potent AChE inhibitors with antioxidant activity." *Journal of Enzyme Inhibition and Medicinal Chemistry* 38, no. 1 (2023): 2281264.
- 5) Abdullah K. Jarrar, Mustafa M. El-Abadelah, Salim S. Sabri, Jalal A. Zahra, Mohammad S. Hamdan, Thiophene ring-opining reaction V. expedient synthesis of 1,3,4-thiadizoline-sufanyl [1,3]thiazin-4-one hybrids. *Lett. Org. Chem.* 2023, 78(3-4), pp. 133–140



- 6) Ala'a A. Al-Akhras, Jalal A. Zahra, Mustafa M. El-Abadelah, Lubna F. Abu-Niaaj, Monther A. Khanfar. Synthesis and antimicrobial potency of model 8-amino-7-(aryl / hetaryl)-6-fluoroquinoline-3-carboxylic acids, *Zeitschrift fur Naturforschung - Section C Journal of Biosciences*, 2023, 78(3-4), pp. 157-168.
- 7) Ahmad H. Abdullah, Jalal A. Zahra, Salim S. Sabri, Firas F. Awwadi, Ahmad Q. Hussein, Mustafa M. El- Abadelah. Thiophene ring-opening reactions VI. Disfavoured cyclization to [fused]-tricyclic system involving a thiolate anion and suitably located electrophilic carbon. *Lett. Org. Chem.* 2023, 78(3-4), pp. 133-140.
- 8) Areej M. Jaber, Jalal A. Zahra, Mustafa M. El-Abadelah, Salim S. Sabri, Dua'a S. Sabbah. Thermodynamic control synthesis of spiro[oxindole-3,3'-pyrrolines] via 1,4- dipolar cycloaddition utilizing imidazo[1,5-a]quinolone. *Zeitschrift fur Naturforschung - Section C Journal of Biosciences*, 2023, 78(3-4), pp. 141-148.
- 9) Mohammed M. Abadleh, Ahmad H. Abdullah, Jalal A. Zahra, Salim S. Sabri, Firas F. Awwadi, Mustafa M. El-Abadelah Thiophene ring-opening reactions IV. Facile generation of novel ethyl 4-hydroxy-6-thioxonicotinate–1,3,4-thiadiazoline hybrids. *Lett. Org. Chem.* (2022), 19, 504-510.
- 10) Areej M. Jaber, Jalal A. Zahra, Salim S. Sabri, Monther A. Khanfar, Firas F. Awwadi, Mustafa M. El-Abadelah, New Trends in 1,4-Dipolar Cycloaddition Reactions. Thermodynamic Control Synthesis of Model 2'-(isoquinolin-1-yl)-spiro[oxindole-3,3'-pyrrolines]. *Curr. Org. Chem.* (2022), 26(5), 542-549.
- 11) Ahmad Abdullah, Jalal Zahra, Salim Sabri, Firas Awwadi , Mohammed

- Abadleh, Qasem , Abdallah , Mustafa El-Abadelah "Thiophene Ring-opening Reactions III: One-pot Synthesis and Antitumor Activity of 1,3,4-thiadiazoline-benzothiazolo[3,2-b]pyridazine Hybrids" *Current Organic Synthesis*, (2022), 19, 279-290.
- 12) Ahmad Abdullah, Jalal Zahra, Salim Sabri, Firas Awwadi, Mohammed Abadleh, Qasem Abdallah, Mustafa El-Abadelah, Thiophene ring-opening reactions III. One-pot synthesis and antitumor activity of 1,3,4-thiadiazoline-benzothiazolo[3,2-b]pyridazine hybrids. *Curr. Org. Synth.* (2021), 19, 279-290.
- 13) Abdullah, Ahmad H.; El-Abadelah, Mustafa M.; Zahra, Jalal A.; Sabri, Salim S.; Awwadi, Firas F. **Thiophene ring-opening reactions II. Easy synthesis of 1,3,4-thiadiazoline-sulfanylpyridazine hybrids.** *Monatshefte fuer Chemie* (2021), 152(7), 853-862
- 14) Amr, Ayed S.; Ahmad, Mousa N.; Zahra, Jalal A.; Abdullah, Mai A. **HPLC/MS-MS identification of oak *Quercus aegilops* root tannins.** *Journal of Chemistry* (2021), 8882050
- 15) Daldoom, Eslam S.; Qadri, Malak I.; Zahra, Jalal A.; Sabri, Salim S.; El-Abadelah, Mustafa M.; Khanfar, Monther A.; Bardaweel, Sanaa; Voelter, Wolfgang. **Synthesis and properties of N1-(indan-5-yl)amidrazones incorporating piperazines and related congeners.** *Letters in Organic Chemistry* (2021), 18(1), 41-48.

- 16) Jaber, Areej M.; Zahra, Jalal A.; El-Abadelah, Mustafa M.; Sabri, Salim S.; Khanfar, Monther A.; Voelter, Wolfgang. **Utilization of 1-phenylimidazo[1,5-a]quinoline as partner in 1,4-dipolar cycloaddition reactions.** *Zeitschrift fuer Naturforschung, B: A Journal of Chemical Sciences* (2020), 75(3), 259-267.
- 17) Daldoom, Eslam S.; Sabri, Salim S.; El-Abadelah, Mustafa M.; Khanfar, Monther A.; Al-Akhras, Ala'a A.; Zahra, Jalal A. **Synthesis and properties of N1-(indan-4-yl)amidrazones incorporating piperazines and related congeners.** *Jordan Journal of Chemistry* (2019), 14(3), 121-130
- 18) Ali M. Almansour, Jalal A. Zahra, Salim S. Sabri, Mustafa M. El-Abadelah, Malik A, Zihlif and Mutasem O. Taha. **"Synthesis and Anticancer Properties of Methyl N1-(thien-4-yl)amidrazone-3-carboxylates"** *Letters in Drug Design & Discovery* (2018), accepted
- 19) Abdullah, Ahmad H.; Zahra, Jalal A.; El-Abadelah, Mustafa M.; Sabri, Salim S.; Khanfar, Monther A.; Matar, Suzan A.; Voelter, Wolfgang. **"Synthesis and antibacterial activity of N1-(carbazol-3-yl) amidrazones incorporating piperazines and related congeners"** *Zeitschrift fuer Naturforschung, B: A Journal of Chemical Sciences* (2016), 71(8) 857-867
- 20) Musameh, Salma A.; Sabri, Salim S.; El-Abadelah, Mustafa M.; Zahra, Jalal A.; Abadleh, Mohammed M.; Voelter, Wolfgang, **"Synthesis and Biological Activity of Some New N1-(4-oxoquinolin-6-yl)amidrazones"** *Letters in Organic Chemistry* (2016), 13(2), 120-126.

- 21) Zahra, Jalal A.; Al-Qawasmeh, Raed A.; El-Abadelah, Mustafa M.; Abadleh, Mohammed M.; Zani, Franca; Incerti, Matteo; Vicini, Paola; Voelter, Wolfgang "Heterocycles [h]-fused to 4-oxoquinoline-3-carboxylic acid. Part XI: Synthesis and antibacterial activity of 4-fluoro-6-oxoimidazo[4,5-h]quinoline-7-carboxylic acids" Zeitschrift fuer Naturforschung, B: A Journal of Chemical Sciences (2016), 71(1), 37-44.
- 22) Saleh, Ayman M.; Aljada, Ahmad; El-Abadelah, Mustafa M.; Sabri, Salim S.; Zahra, Jalal A.; Nasr, Amre; Aziz, Mohammad A. "The Pyridone-Annulated Isoindigo (5'-Cl) Induces Apoptosis, Dysregulation of Mitochondria and Formation of ROS in Leukemic HL-60 Cells" Cellular Physiology and Biochemistry (2015), 35(5), 1958-1974.
- 23) Saleh, Ayman M.; Aljada, Ahmad; El-Abadelah, Mustafa M.; Taha, Mutasem O.; Sabri, Salim S.; Zahra, Jalal A.; Aziz, Mohammad Azhar "The Anticancer Activity of the Substituted Pyridone-Annulated Isoindigo (5'-Cl) Involves G0/G1 Cell Cycle Arrest and Inactivation of CDKs in the Promyelocytic Leukemia Cell Line HL-60" Cellular Physiology and Biochemistry (2015), 35(5), 1943-1957.
- 24) Al-As'ad, Randa M.; El-Abadelah, Mustafa M.; Sabri, Salim S.; Zahra, Jalal A.; Awwadi, Firas F.; Voelter, Wolfgang "A facile synthesis of novel pyridone-annulated spirooxindolepyrrolidines via 1,3-dipolar cycloaddition" Monatshefte fuer Chemie (2015), 146(4), 621-629.
- 25) Al-Qawasmeh, Raed A.; Abadleh, Mohammed M.; Zahra, Jalal A.; El-Abadelah, Mustafa M.; Albashiti, Rabab; Zani, Franca; Incerti, Matteo; Vicini, Paola "Design, synthesis and antibacterial activity studies of new

- thiadiazoloquinolone compounds"** *Journal of Enzyme Inhibition and Medicinal Chemistry* (2014), 29(6), 777-785.
- 26) Saleh, Ayman M.; Al-As'ad, Randa M.; El-Abadelah, Mustafa M.; Sabri, Salim S.; Zahra, Jalal A.; Alaskar, Ahmed S.; Aljada, Ahmad "Synthesis and biological evaluation of new pyridone-annulated isoindigos as anti-proliferative agents" *Molecules* (2014), 19(9), 13076-13092.
- 27) Al-As'ad, Randa M.; El-abadelah, Mustafa M.; Sabri, Salim S.; **Zahra, Jalal A.**; Voelter, Wolfgang. "Synthesis of 6-ethyl-1,2,9-trioxopyrrolo[3,2-f]quinoline-8-carboxylic acid" *Zeitschrift fuer Naturforschung, B: A Journal of Chemical Sciences* (2013), 68(5/6), 700-706.
- 28) Farrayeh, Batool A.; El-Abadelah, Mustafa M.; **Zahra, Jalal A.**; Haddad, Salim F.; Voelter, Wolfgang. "Heterocycles [h]-fused onto 4-oxoquinoline-3-carboxylic acid. Part X. Synthesis and X-ray structure of a model 4-oxo[1,4]benzoxazepino[2,3-h]quinoline-3-carboxylic ester" *Zeitschrift fuer Naturforschung, B: A Journal of Chemical Sciences* (2013), 68(2), 187-194.
- 29) **Zahra, Jalal A.**, Al-Jaber, Hala I., El-Abadelah, Mustafa M., Al-Abadleh, Mohammad M. "Heterocycles [h]-Fused to 4-Oxoquinoline-3-carboxylic Acid. Part IX. Synthesis of 2,6-Dioxotetrahydro-1H-pyrrolo[3,2-h]quinoline-7-carboxylic Acid" *Heterocycles*, (2011), 83(9), 2165-2175.
- 30) Al-Trawneh, Salah A.; El-Abadelah, Mustafa M.; **Zahra, Jalal A.**; Al-Taweel, Samir A.; Zani, Franca; Incerti, Matteo; Cavazzoni, Andrea; Vicini, Paola " **Synthesis and biological evaluation of tetracyclic**

- thienopyridones as antibacterial and antitumor agents". *Bioorganic & Medicinal Chemistry* (2011), 19(8), 2541-2548.
- 31) Al-Trawneh, Salah A.; **Zahra, Jalal A.**; Kamal, Marwan R.; El-Abadelah, Mustafa M.; Zani, Franca; Incerti, Matteo; Cavazzoni, Andrea; Alfieri, Roberta R.; Petronini, Pier G.; Vicini, Paola "Synthesis and biological evaluation of tetracyclic fluoroquinolones as antibacterial and anticancer agents". *Bioorganic & Medicinal Chemistry* (2010), 18(16), 5873-5884.
- 32) Al-Qawasmeh, Raed A.; **Zahra, Jalal A.**; Zani, Franca; Vicini, Paola; Boese, Roland; El-Abadelah, Mustafa M. "Synthesis and antibacterial activity of 9-cyclopropyl-4-fluoro-6-oxo-6,9-dihydro-[1,2,5]thiadiazolo[3,4-h]quinoline-7-carboxylic acid and its ethyl ester" *ARKIVOC* (Gainesville, FL, United States) (2009), (12), 322-336.
- 33) Al-Qawasmeh, Raed A.; **Zahra, Jalal A.**; Khanfar, Monther A.; Al-Hiari, Yusuf M.; El-Abadelah, Mustafa M.; Voelter, Wolfgang. "A convenient synthesis of 1-alkyl-7-chloro-6-fluoro-3-nitro-4-quinolones" *Letters in Organic Chemistry* (2009), 6, 511-514.
- 34) Al-Dweik, Maram R.; **Zahra, Jalal A.**; Khanfar, Monther A.; El-Abadelah, Mustafa M.; Zeller, Klaus-Peter; Voelter, Wolfgang. "Heterocycles [h]-fused to 4-oxoquinoline-3-carboxylic acid. Part VII: synthesis of some 6-oxoimidazo[4,5-h]quinoline-7-carboxylic acids and esters." *Monatshefte fuer Chemie* (2009), 140, 221-228.
- 35) **Zahra, Jalal A.**; El-Abadelah, Mustafa M.; Thaher, Bassam A.; Abu Laufer, Stefan; Boese, Roland "Facile synthesis of model indazolo[2,1-

- c][1,3,4]benzotriazepine-5,13-diones" *Heterocycles* (2008), 75(12), 2989-3004.
- 36) Khanfar, Monther A.; Abu Thaher, Bassam A.; **Zahra, Jalal A.**; Al-Qawasmeh, Raed A.; El-Abadelah, Mustafa M.; Voelter, Wolfgang "Metal-assisted oxidative cyclization of arylamidrazones II [1]. Novel synthesis of 1,4-diaryl[1,2,4]triazino[6,5-h]quinolines". *Zeitschrift fuer Naturforschung, B: Chemical Sciences* (2008), 63, 1107-1111.
- 37) Abu-Sheaib, Esraa S.; Zahra, Jalal A.; El-Abadelah, Mustafa M.; Boese, Roland " Heterocycles [h]-fused onto 4-oxo-quinoline-3-carboxylic acid. Part VI. Synthesis and X-ray structure of model indolo[3,2-b]- and [2,3-b]pyrido[2,3-f]quinoxaline-3-carboxylic esters" *Monatshefte fuer Chemie* (2008), 139(9), 1061-1066
- 38) Abu-Sheaib, Esra'a S.; **Zahra, Jalal A.**; El-Abadelah, Mustafa M.; Voelter, Wolfgang "Heterocycles [h]-fused onto 4-oxoquinoline-3-carboxylic acid, V [1]. Synthesis and antibacterial activity of some new 2,3- disubstituted 7-oxo-7,10-dihydropyrido[2,3-f] quinoxaline-8-carboxylic acids and esters" *Zeitschrift fuer Naturforschung, B: Chemical Sciences* (2008), 63(5), 555-563.
- 39) Abu-El-Halawah, Rajab; Ali, Basem Fares; Ibrahim, Mohammad M.; **Zahra, Jalal A.**; Frey, Wolfgang "1,4-Dihydroxyquinoxaline-2,3(1H,4H)-dione" *Acta Crystallographica, Section E: Structure Reports Online* (2008), E64(3), o571-o572, o571/1-o571/9
- 40) Abu Safieh, Kayed A.; Al-Titi, Ahmad M. S.; **Zahra, Jalal A.**; Ayoub, Mikdad T. "Oxidative cyclization of arylidene carboxyhydrazides:

**synthesis of substituted hydroxydiphenylmethyl-1,3,4-oxadiazoles"**  
*Jordan Journal of Chemistry* (2007), 2(3), 211-218.

- 41) Awadallah, Adel M.; Zahra, Jalal A. "Reaction of nitrilimines with 2-substituted aza-heterocycles. Synthesis of pyrrolo[1,2-a]pyridine and pyrimido[2,1-d]1,2,3,5-tetrazine" *Molecules* (2008), 13(1), 170-176.
- 42) Al-Huniti, Mohammed H.; El-Abadelah, Mustafa M.; Zahra, Jalal A.; Sabri, Salim S.; Ingendoh, Arnd "Heterocycles [h]fused onto 4-oxoquinoline-3-carboxylic acid, Part IV. Convenient synthesis of substituted hexahydro[1,4]thiazepino[2,3-h]quinoline-9-carboxylic acid and its tetrahydroquino[7,8-b]benzothiazepine homolog" *Molecules* (2007), 12(8), 1558-1568.
- 43) Zahra, Jalal A.; Khanfar, Monther A.; El-Abadelah, Mustafa M.; Abu Thaher, Bassam A.; El-Abadla, Naser S.; Voelter, Wolfgang "Synthesis of some Ethyl 3-(aryldiazenyl)-7-oxodihydropyrido[2,3-f]quinoxaline-8-carboxylates". *Zeitschrift fuer Naturforschung, B: Chemical Sciences* (2007), 62, 1045-1051.
- 44) Al-Huniti, Mohammed H.; El-Abadelah, Mustafa M.; Zahra, Jalal A.; Sabri, Salim S.; Ingendoh, Arnd. "Facile synthesis of some novel pyrido[3',2':4,5]thieno[2,3-b][1,4]thiazine-8-carboxylic acids". *Molecules* (2007), 12(3), 497-503.
- 45) Al-Huniti, Mohammed H.; Zahra, Jalal A.; El-Abadelah, Mustafa M. "Heterocycles [h]fused on 4-oxoquinoline-3-carboxylic acid. Part II. A facile synthesis of some 2,7-dioxo[1,4]thiazino[2,3-h]quinoline-8-carboxylic acids". *Heterocycles* (2007), 71(2), 411-418.



- 46) Hindawi, Nisreen I.; **Zahra, Jalal A.**; El-Abadelah, Mustafa M.; Abu Thaher, Bassam A.; Zeller, Klaus-Peter. "**Facile Synthesis of Dihydro-1,2,4-benzotriazepin-5-ones**". *Monatshefte fuer Chemie* (2006), 137(10), 1349-1355.
- 47) **Zahra, Jalal A.**; El-Abadelah, Mustafa M.; Abu Thaher, Bassam A.; El-Abadla, Naser S.; Boese, Roland. "**Synthesis and properties of some dihydrotetrazolo[5,1-c][1,2,4]triazines**" *Heterocycles* (2006), 68(8), 1595-1605.
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