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Antimycobacterial Activity of Some New Pyridinylpyridazine Derivatives

Mazen M. ALMEHMADI [1], Mustafa HALAWI [2], Mehnaz KAMAL [3], Mohd YUSUF [4], Udeep CHAWLA [5] & Mohammad ASIF [6] *

[1] *Department of Clinical Laboratory Sciences, College of Applied Medical Sciences, Taif University,*

[2] *Department of Medical Laboratory Technology, College of Applied Medical Sciences, Jazan University, Jazan, Saudi Arabia*

[3] *Department of Pharmaceutical Chemistry, College of Pharmacy, Prince Sattam Bin Abdulaziz University, Al Kharj 11942, Saudi Arabia*

[4] *Department of Natural & Applied Sciences, School of Technology, Glocal University, Saharanpur, Uttar Pradesh 247121 India*

[5] *School of Life & Allied Health Sciences, Glocal University, Saharanpur, Uttar Pradesh 247121 India*

[6] *School of Pharmacy, Glocal University, Mirazapur pole, Saharanpur, Uttar Pradesh 247121 India*

SUMMARY. **Some new pyridazine compounds were synthesized, characterized, and evaluated for their *in vitro* antimycobacterial activity against *Mycobacterium tuberculosis* by the microplate Alamar blue dye assay (MABA) method. Isonicotinohydrazide was condensed with appropriate heterocyclic aldehydes to form compounds *N*-(heteroaryl-2-yl-methylidene)-isonicotinohydrazides. Intramolecular cyclization of compound *N*-(heteroaryl-2-yl-methylidene)-isonicotinohydrazideto formed 4-(pyridine-4-yl)furo[*2,3-d*]pyridazine,4-(pyridine-4-yl)-*1H*-pyrrolo[*2,3-d*]pyridazineand4-(pyridin-4-yl) thieno [*2,3-d*]pyridazine, respectively. All the title compounds were characterized byusing IR, NMR, and mass spectral data. Docking study, optimized geometries, electrical and optical parameters were also studied in a solvent phase of synthesized pyridazine derivatives. Compound 4-(pyridin-4-yl) thieno[*2,3-d*]pyridazinewas found to have the most significant antimycobacterial activity (12.5 µg/mL) when compared to reference drugs streptomycin (6.25 µg/mL) and pyrazinamide (3.125 µg/mL).**

RESUMEN. Se sintetizaron, caracterizaron y evaluaron algunos nuevos compuestos de piridazina en cuanto a su actividad antimicobacteriana in vitro contra *Mycobacterium tuberculosis* mediante el método de ensayo de colorante azul de Alamar en microplacas (MABA). Se condensó isonicotinohidrazida con aldehídos heterocíclicos apropiados para formar compuestos N-(heteroaril-2-il-metiliden)-isonicotinohidrazidas. Ciclación intramolecular del compuesto N-(heteroaril-2-il-metiliden)-isonicotinohidrazida para formar 4-(piridin-4-il)furo[*2,3-d*]piridazina,4-(piridin-4-il)-1H-pirrolo [*2,3-d*]piridazina y 4-(piridin-4-il) tieno [*2,3*-d]piridazina, respectivamente. Todos los compuestos del título se caracterizaron usando datos de IR, RMN y espectro de masas. También se estudió el estudio de acoplamiento, geometrías optimizadas, parámetros eléctricos y ópticos en fase solvente de derivados de piridazina sintetizados. Se encontró que el compuesto 4-(piridin-4-il) tieno[*2,3-d*]piridazina tiene la actividad antimicobacteriana más significativa (12,5 µg/mL) en comparación con los medicamentos de referencia estreptomicina (6,25 µg/mL) y pirazinamida (3,125 µg /mL).

KEY WORDS: antimycobacterial activity, pyridazine derivative, spectral characterization, synthesis, tuberculosis.

* Author to whom correspondence should be addressed. *E-mail:* aasif321@gmail.com

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