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# Benzothiazole-based amide derivatives: Microwave-assisted synthesis, biological screening, and *in silico* validation against multidrug-resistant tuberculosis

**Thirumala Roopesh Ganachari[1]* and Geethavani Meka[2]**

[1]Assistant Professor, Balaji College of Pharmacy, Research Scholar, JNTUA, Ananthapuramu, Andhra Pradesh, India
[2]Department of Pharmaceutical Chemistry, Balaji College of Pharmacy, Anantapuramu, Andhra Pradesh, India

**ABSTRACT** A series of benzothiazole-based amide derivatives **(S1-S15)** was synthesized through a rapid and efficient three-step protocol involving carboxylic acid formation, the carboxylic acid was then converted into the corresponding acid chloride intermediate using thionyl chloride, and microwave-assisted coupling with various aromatic amines, amino acids, and aromatic acids, yielding the target compounds in good-to-excellent purity and yield, evaluated for anti-tubercular activity using both *in vitro* and *in silico* approaches. *In vitro* activity was assessed via the microplate alamar blue assay against *Mycobacterium tuberculosis* H37Rv (ATCC 27294), with compounds **S8, S9, S13,** and **S14** showing significant inhibition (minimum inhibitory concentration: 1.6 µg/mL). Molecular docking against glutamine synthetase (**PDB ID:2BVC**), glutamyl-tRNA synthetase (**PDB ID:2JA2**), and InhA (**PDB ID:6R9W**) identified **S4, S5,** and **S7** as top binders. Absorption, distribution, metabolism, excretion, and toxicity predictions supported the drug-likeness of **S1, S4, S7,** and **S15** with favorable pharmacokinetic profiles. Overall, the *in vitro* and *in silico* studies highlight **S8, S9, S14, S15,** and **S4, S5, S7** as promising multi-target lead candidates for further pre-clinical development against resistant tuberculosis.

**KEYWORDS** Benzothiazole derivatives, *In vitro*, Microplate alamar blue assay, Anti-tubercular activity, Docking, PyRx.