



**National Conference on Advanced Research in Science,
Engineering, Management and Humanities
(NCARSEMH – 2025)**
27th July, 2025, Jharkhand, India.

CERTIFICATE NO : NCARSEMH /2025/ C0725708

A Study of Biological Activities of Amino-Benzothiazole Derivatives in Therapeutic Applications

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ABSTRACT

Amino-benzothiazole derivatives exhibit a wide range of biological activities that make them valuable candidates for therapeutic applications in modern medicinal chemistry. The presence of an amino group in the benzothiazole scaffold enhances molecular reactivity and facilitates strong interactions with biological targets such as enzymes, receptors, and nucleic acids. These derivatives have demonstrated significant anticancer activity, showing the ability to inhibit tumor cell proliferation, induce apoptosis, and interfere with key signaling pathways involved in cancer progression. In addition, amino-benzothiazoles possess notable antimicrobial and antifungal properties, making them effective against various Gram-positive and Gram-negative bacteria as well as pathogenic fungi, including drug-resistant strains. Their anti-inflammatory activity is attributed to the inhibition of inflammatory mediators and enzymes such as cyclooxygenases, contributing to the management of chronic inflammatory disorders. Furthermore, several amino-benzothiazole derivatives exhibit antioxidant and neuroprotective effects, suggesting potential applications in neurodegenerative diseases. These compounds have also shown promise as antiviral and antitubercular agents, expanding their therapeutic relevance. Overall, the diverse biological activities of amino-benzothiazole derivatives, combined with their structural versatility and favorable pharmacological properties, highlight their significant potential as lead molecules for the development of novel and effective therapeutic agents.