

# Synthesis, Characterization and Biological Activity of Newly Synthesized Benzoic Acid and Phenylthiourea Derivative

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**Abstract:** Benzoic acid, a simple aromatic carboxylic acid, has a rich history of use and study due to its diverse biological activities and applications. Historically, it has been known since ancient times, originally obtained from natural sources like gum benzoin, and later synthesized for industrial use. The synthesis of benzoic acid has evolved from early methods such as the oxidation of toluene to more modern, efficient techniques involving catalytic reactions. The structure of benzoic acid consists of a benzene ring with a carboxyl group (-COOH) attached, which contributes to its acidic properties and influences its reactivity. The structure-activity relationship (SAR) of benzoic acid is characterized by its ability to interact with a variety of biological targets, with modifications to the aromatic ring or the carboxyl group affecting its potency and specificity. Benzoic acid derivatives, such as esters and salts, exhibit a wide range of applications in medicine, agriculture, and the food industry. It is used as an antimicrobial agent, a food preservative, and a precursor in the synthesis of various pharmaceutical. The mechanism of action of benzoic acid and its derivatives typically involves the disruption of cellular processes through their acidic nature, interactions with enzymes, or membrane disruption. In the pharmaceutical field, benzoic acid's derivatives exhibit anti-inflammatory, antimicrobial, and anticancer properties. The compound's widespread applications and continued research into its bioactivity make it an essential molecule in various scientific and industrial domains..

**Keywords:** Benzoic acid, History, Preservatives, Antimicrobial activity , Synthesis, Structure activity Relationship, mechanism of action

