TRENDS IN MEDICINAL AND ENVIRONMENTAL SCIENCE: AN INTRODUCTION

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AZOLE DERIVATIVES AND THEIR BIOLOGICAL ACTIVITIES

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Abstract

Azoles, a significant category of nitrogen-containing heterocycles, have attracted considerable interest in medicinal chemistry due to their structural flexibility, capacity to form hydrogen bonds, and diverse biological effects. This chapter delves deeply into azole derivatives, highlighting their synthesis and their importance in pharmacology. Azoles, such as imidazole and benzimidazole derivatives, are renowned for their significant contribution to the advancement of antifungal, anticancer, and antimicrobial medications. The chapter explores various synthetic methods, including Williamson etherification and regioselective nucleophilic ring-opening reactions, used to produce coumarin-based azole derivatives. These derivatives exhibit remarkable therapeutic properties due to their distinct structural features and interactions with biological targets. Furthermore, the crucial role of nitrogen heterocycles in FDA-approved medications is highlighted, underscoring their extensive use in the development and manufacture of drugs. This chapter highlights the vital role of nitrogen-containing heterocycles in contemporary pharmacology and their ability to tackle a wide range of medical issues through showcasing examples of clinically approved drugs and recent breakthroughs.

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