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SYNTHESIS, CHARACTERIZATION AND BIOLOGICAL ACTIVITIES OF 3-NITRO ISOINDOLINE-1,3-DIONE ANALOGUES

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Abstract

N-substituted phthalimides are biologically active chemicals with a broad range of applications. In this present research work, eight 3-nitroisoindoline-1,3-dione analogues were synthesized and characterized. Furthermore, their antibacterial, antifungal, and antioxidant activities were evaluated in vitro. Synthesized compounds were purified using the recrystallization process and the purity was confirmed by thin layer chromatography. The structures were characterized by FTIR and mass spectroscopic analysis. Using the Disc diffusion method, synthetic 3-nitroisoindoline-1,3-dione analogues were tested for antibacterial activity against *Bacillus* spp and *Escherichia coli*, as well as antifungal activity against *Aspergillus* spp and *Trichoderma* spp. Based on the results that compounds 2- (CF₃ and Cl groups at the 3rd and 4th positions respectively), 3,4-(OCH₃ group attached to the 4th position), 7- (CH₃ group attached to the 2nd and 3rd position), and showed inhibitory effects against *Bacillus* spp with zone of inhibition ranging from 6.66 – 9.83 mm. The compounds 1- (Cl group attached to the 2nd position), 2, and 8- (CF₃ group attached to the 4th position) showed inhibitory effects against *Escherichia coli* with ZOI ranging from 7.83 – 10.66 mm. The compounds 1,3, and 5-(Br group attached to the 4th position) showed inhibitory effects against *Aspergillus* spp with ZOI ranging from 6.5 – 6.83 mm. The compounds 2, 6- (Cl group attached to the 4th position), and 8 showed an inhibitory effect against *Trichoderma* spp with ZOI ranging from 7.5 – 8.0 mm. Synthesized 3-nitroisoindoline 1, 3-dione was tested for antioxidant activity by using the DPPH assay. Compound 2 showed moderate antioxidant activity. These 3-nitroisoindoline-1,3-dione analogues could be synthesized and used as antibacterial and antifungal and antioxidant agents.

Keywords: *antibacterial and antifungal assay, antioxidant assay, 3-nitro isoindoline-1, 3-dione*