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Two step synthesis, characterization and anti-bacterial activity of series of 3-((5-chloro-1*H*-benzo[*d*]imidazol-1-yl)methyl)-1,2,4-oxadiazoles

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A mixture of 5-chloro-1*H*-benzo[*d*]imidazole **1**, K_2CO_3 and 2-bromoacetonitrile in DMF is stirred at 60°C temperature for 8 h. to afford compound **2**. A mixture of 2-(5-chloro-1*H*-benzo[*d*]imidazol-1-yl) acetonitrile, $NH_2OH.HCl$ and triethylamine in dry DCM is stirred at room temperature for 8 hr. The aromatic carboxylic acids and Vilsmeier reagent are added and resulting mixture stirred for further 7 h at same temperature to give the crude 1,2,4-oxadiazoles **4a-l**. All the synthesised compounds have been screened for anti-bacterial evaluation. Among them **4f, 4g**, and **4h** are established to have more efficient bacterial inhibitory action against *B. subtilis*, with MICs of 3.12, 3.12, and 1.56 µg/mL, respectively, whereas typical streptomycin MICs are 6.25 µg/mL. Compound **4h** has shown more potent activity against *S. aureus*, with MIC value of 3.12 µg/mL, whereas compound **4f** has shown equipotent activity against the *S. aureus*, with MIC value of 6.25 µg/mL. Compound **4k** has shown equipotent activity against *B. subtilis* and good activity against *S. aureus* with MIC values of 3.12 µg/mL and 6.25 µg/mL respectively.

Keywords: 1,2,4-Oxadiazole, Imidazole, MIC, Anti-bacterial evaluation, Vil