Abstract

Azacyclohexane and oxadiazole possess a broad spectrum of pharmaceutical activities and this was our subject of interest. This research work is based on the synthesis, spectroscopical analysis, and biological screening of the 2,5-disubstituted oxadiazole nucleus. When oxadiazole was introduced with piperidine nucleus then the novel compound was synthesized which exhibits a wide scale of pharmaceutical applications including enzyme inhibitors, antibiotics, and many more. In this research work multiple steps have been carried out to synthesis an enzyme inhibitor named 2-[(3-Iodobenzylthio)-5-[1- [(4-methoxyphenyl)Sulfonyl] piperidine-4-yl]-1,3,4-oxadiazole. The first reaction was carried out between 4-methoxybenzene-1-sulfonyl chloride **(a)** and ethyl iso-nipecotate **(b)**. The obtained compound was ethyl 1- [(4-methoxy phenyl) Sulfonyl]piperidine-4-carboxylate **(1)** which further reacts with hydrazine and synthesizes 1-[(4-methoxy phenyl)sulfonyl]piperidine-4-carbohydrazide **(2).** In the third step, cyclization occurs and 5[1-[(4-methoxyphenyl)Sulfonyl]piperidine-4-yl]-1,3,4-oxadiazole-2-thiol was synthesized, represented in the scheme as **(3).** By treating this compound with different alkyl/aryl halides in the presence of LiH and DMF a derivative **(5a)** was synthesized. The compound was a white amorphous solid with 83 % yield. For structural elucidation spectroscopical techniques like, IR, H-NMR, and C-NMR were carried out. The Alpha-Glucosidase inhibition assay was carried out and it showed that the compound is a potent inhibitor against Alpha-Glucosidase.