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# 35. An efficient protocol for one pot synthesis of benzimidazoles derivatives using Nanomaterial $Fe_3O_4$ as green catalysis

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**Abstract**

The synthesized benzimidazoles were prepared from the condensation reaction between *O*-Phenylenediamine and various carbony compounds in the presence of phosphnitric chloride (Trimer) as a catalyst , its commercial and environmentally benign new catalyst , the yield of all benzimidazole derivatives was found to of 75-94%, the purity of the compounds was ascertained by melting point and TLC.

**Keyword:** *O*-Phenylenediamine, magnetic nanoparticles of ferroferic oxide ($Fe_3O_4$), benzimidazoles etc.

**Introduction**

The challenge in chemistry is to develop practical methods with convenient conditions and reagents, and the concept of "green chemistry" is becoming ever important in the scientific community. Green chemistry is emerging as a high-priority guiding principle for organic synthesis. In recent years, the search for environmentally benign chemical processes or methodologies has received much attention[1]. Heterogenazation catalysts has been an interesting area research from the industrial point of view , With the increasing advantages of heterogeneous catalysts due to easy catalyst separation, long catalytic life, easy catalyst regenerability, thermal stability and recyclability Therefore, attachment of nanomaterial $Fe_3O_4$ into environmentally friendlier catalyst is by supporting them on high surface area solids, such as graphite, $Al_2O_3$,$Sio_2$,zeolites ,clays etc. The support has to be thermally and chemically stable during the reaction process and has to provide accessibility and a good dispersion of the active sites[2].

Recently,the preparation and application of nanoparticles (NPs) in organic synthesis has been the subject of intense interest [3]. Using NPs offers advantages for "clean" chemistry, since, in addition to being readily recovered, they are non-toxic and widely accessible. The NP surface can also be functionalized to append catalytically active groups,In a previous study, Goosen and co-workers reported the catalytic decarboxylative cross- ketonisation of aryl- and alkylcarboxylic acids using $Fe_3O_4$ nanoparticles.[4]Among the wide variety of nitrogen heterocycles that have been explored as pharmaceutically important compounds, benzimidazoles exhibit relatively high biological activities.