7. Conclusion

With an aim to design and develop novel therapeutics for the treatment of Alzheimer's disease, three general schemes were adopted to synthesize proposed compounds. According to the literature survey conducted, combination of various scaffolds was designed and docked to check the interaction with AChE, BuChE and MAO-B enzyme. Four derivatives were finalized and proposed for further development as anti-AD agents. All the proposed compounds have been confirmed for their structures by IR, ^{1}H & ^{13}C-NMR, HRMS and mass analysis. Using general **scheme 1**, a vicinal diaryl-pyrazole scaffold was combined with substituted benzylpiperidine (**91-121**) and carbamates (**130-153**) through urea linker. It was envisaged that the newly synthesized compounds would be potential anti-Alzheimer's agents via inhibition of cholinesterase (ChEs) and monoamine oxidase B enzymes (MAO-B). Presence of nitrogen containing pyrazole heterocycle could be helpful in controlling the basicity of the resulting compounds which would be crucial for the BBB permeation. The biological activity data proved that the proposed compounds possess potent MAO-B inhibitory activity having >90% inhibition at 10μM concentration. Compound (**152**) showed the most potent MAO-B having IC_{50} value of 92.86 ± 7.66 nM inhibitory activity. Compounds (**121, 96, 111** and **140**) showed IC_{50} values of 101.4 ± 10.62 nM, 109.3 ± 20.78 nM**,** 146.8 ± 22.15 nM and 1448.5 ± 18.25 nM respectively. The compounds from this series **(144, 152)** showed good AChE inhibitory activity having inhibition of 89.5 % and 94.7% respectively. Various other activities including neurotoxicity studies, metal chelation and anti-oxidant studies are reported for the synthesized compounds.

Using general **scheme-2** and **3**, an attempt was also been made to prepare novel benzofuran derivatives wherein the benzofuran scaffold is clubbed with carbohydrazide (**181-199**), carbamate (**203-208**), (**212-215**) and amide (**222-227**) functional groups. The compounds so synthesized were also evaluated for their ChEs and MAO-B inhibitory activities. Surprisingly, this benzofuran-containing series was found to be a negative inhibitor of MAO-B. These compounds were found to possess moderate to low activity against ChE enzymes. Metal chelation and anti-oxidant studies were performed and are reported for the synthesized compounds.

Finally, with all the work carried out it can be concluded that the vicinal diaryl pyrazole-based molecules are proved as a lead molecule and can be further investigated to develop as small molecules to treat Alzheimer's disease.