Chapter 6

SUMMARY AND CONCLUSIONS

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The objectives of the present work and summary of the work done are presented in this chapter.

6.1 Objectives of the work

1) Development of a new green synthetic approach for the synthesis of eight derivatives of bisindolizines.
2) Characterisation of these synthesised bisindolizine compounds.
3) Development of a sensor for the determination of Fe^{3+}.
4) Antibacterial activity studies of bisindolizine compounds.
5) Development of a new green synthetic approach for the synthesis of eight derivatives of cycl[3.2.2]azines.
6) Characterisation of the synthesised cycl[3.2.2]azine compounds.
7) Development of a sensor for the determination of Co^{2+}.
8) Antibacterial activity studies of the cycl[3.2.2]azine derivatives.
9) Development of a new green synthetic approach for the synthesis of eight derivatives of imidazo[1,2-a]pyridines.

10) Characterisation of the synthesised imidazo[1,2-a]pyridine compounds.

11) Development of a sensor for the determination of Fe^{3+}.

12) Antibacterial activity studies of the imidazo[1,2-a]pyridine compounds.

13) Development of a new green synthetic approach for the synthesis of five derivatives of 1-azacycl[3.2.2]azines.

14) Characterisation of the synthesised 1-azacycl[3.2.2]azine derivatives.

15) Development of a sensor for the determination of Co^{2+}.

16) Antibacterial activity studies of the synthesised 1-azacycl[3.2.2] azine compounds.

6.2 Summary of the work done

Due to the varied applications of nitrogen heterocyclic compounds, the synthesis of new derivatives and development of new synthetic path are the thrust areas of synthetic organic chemistry. Recently developed microwave assisted organic synthesis has been considered superior to conventional heating methods. Using the microwave assisted organic synthesis some new derivatives and some new synthetic paths have been developed for the four class of bisindolizines, cycl[3.2.2]azines, imidazo[1,2-a]pyridines, azacycl[3.2.2]azines.

A total of 29 derivatives consisting of eight each of bisindolizines, cycl[3.2.2]azines and imidazo[1,2-a]pyridines and five derivatives of azacycl[3.2.2]azines have been synthesised using green technology and characterised by elemental analysis and spectral techniques. New synthetic routes have been developed for the synthesis of these derivatives. X-ray

crystal studies of imidazo[1,2-a]pyridine derivatives have also been carried out. Four different types of fluorescent sensors have been developed based on the synthesised compounds for the determination of metal ions. Further, the antibacterial activities of the synthesised compounds were studied by Kirby Bauer's method. The minimum inhibition concentration was also found out.

The summary of the work done is compiled in Table 6.1.

Table 6.1 Summary of work done

Sl. No.	Compounds synthesised	Developed sensors	Metal ions determined	Compounds showing maximum antibacterial activity
1	Bisindoizines (VIa-h)	1,2,1',2'-Tetra(methoxycarbonyl)-3,3'-bis(p-methylbenzoyl)-7,7'-bisindolizine	Fe^{3+}	VI e, VI f
2	Cycl[3.2.2]azines (XIIa-h)	2-(4-Methoxyphenyl)-4,5-dicarbmethoxycycl[3.2.2]azine.	Co^{2+}	XII c, XII f
3	Imidazo[1,2-a] pyridines (XVIa-h)	2-(4-Methylphenyl)-imidazo[1,2-a]pyridine	Fe^{3+}	XVI g
4	1-Azacycl[3.2.2] azines (XVIIIa-e)	2-(4-Methylphenyl)-4,5-dicarbmethoxy-1-azacycl[3.2.2]azine	Co^{2+}	XVIII e

For (VIa-h), (XIIa-h) & (XVIa-h): a-phenyl, b. p-nitrophenyl c. p-chlorophenyl d. p-methoxyphenyl, e. p-methylphenyl, f. p-hydroxyphenyl, g. p-bromophenyl & h. p-fluorophenyl. For (XVIIIa-e): a- p-nitrophenyl, b. p-chlorophenyl, c. p-methylphenyl, d. p-bromophenyl & e. p-fluorophenyl.

In conclusion, this green synthetic technology is noteworthy due to its simplicity and economic aspects along with the green concepts. The pharmacological action of the studied compounds may be further exploited for future applications. The fluorescent sensors developed out of the presently synthesized compounds are also promising.

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