

The present investigation comprises a survey covering the synthesis and biological importance of many imidazo and oxazolo[4,5-*b*]pyridines.

The thesis involves the preparation of 2,3-diaminopyridine (**VIIa**) and 2-amino-3-hydroxypyridine (**VIIb**) and their reaction with *p*-aminobenzoic to give the imidazo and oxazolopyridines **VIIIa,b**. The latter were halogenated to afford **VIIIc-h**.

The imidazo and oxazolopyridines **VIIIa-h** were acetylated with acetyl chloride, chloroacetyl chloride, dichloroacetyl chloride and benzoyl chloride to give the corresponding acylated derivatives **IXa-h**, **XIa-h**, **XIIa-h** and **XIIIa-h**. The diacetyl derivatives **Xa-d** were also synthesized.

On the other hand, the imidazo and oxazolopyridines **VIIIa-h** were diazotized and the diazonium salts of **VIIIa,b** were reacted with diethylmalonate to give **XIVa,b**. The latter were condensed with two hydrazines to give the cyclized products **XVa-d**. The intermediates **XIVa,b** were also reacted with urea and thiourea to give the cyclized derivatives **XVIa-d**. Moreover, the diazonium salts of **VIIIa,b,g** and **h** were reacted with malononitrile to afford the dicyano derivatives **XVIIa-d**. The latter when condensed with hydrazine afforded compounds **XVIIIa-d**.

In addition a number of azo dyes of imidazo and oxazolopyridines were also, synthesized **XIXa-v** via coupling of the diazonium salts of **VIIIa-h** with different phenolic compounds. The azo dyes **XIXa,f,o** and **p** were acetylated to give the corresponding acetyl derivatives **XXa-d**.

The investigation comprises also the reaction of **VIIIa-h** with different aromatic aldehydes to give arylidene derivatives **XXIa-v**. Some of the latter were reacted with chloroacetyl chloride to yield β -lactam containing derivatives

XXIIa-d and with thioglycolic acid to give compounds **XXIIIa-d**.

Additionally some of these new imidazo and oxazolo[4,5-*b*]pyridine derivatives

were subjected to antimicrobial screening and molecular modeling study.

The study includes the synthesis of certain unavailable starting and intermediates materials:

- 1) Ethyl pyridine-3-carboxylate (Ethyl nicotinate) (**I**).
- 2) Pyridine-3-carboxhydrazide (Nicotinhydrazide) (**II**).
- 3) 3-Ethoxycarbonylamino pyridine (**III**).
- 4) 3-Ethoxycarbonylamino-2-nitropyridine (**IV**).
- 5) 3-Amino-2-nitropyridine (**V**).
- 6) 2,3-Diaminopyridine (**VIIa**).
- 7) 3-Hydroxy-2-nitropyridine (**VI**).
- 8) 2-Amino-3-hydroxypyridine (**VII b**).
- 9) 2-(4-Aminophenyl)imidazo(or oxazolo)[4,5-*b*]pyridines **VIIIa,b**.

The thesis includes also the synthesis of certain new intermediates and final products:

- 1) 2-(4-Amino-3-iodophenyl)imidazo(or oxazolo)[4,5-*b*]pyridines **VIIIc,d**.
- 2) 2-(4-Amino-3-chlorophenyl)imidazo(or oxazolo)[4,5-*b*]pyridines **VIIIe,f**.
- 3) 2-(4-Acetamidophenyl)imidazo(or oxazolo)[4,5-*b*]pyridines **IXa,b**.
- 4) 2-(4-Acetamido-3-bromophenyl)imidazo(or oxazolo)[4,5-*b*]pyridines **IXc,d**.
- 5) 2-(4-Amino-3-bromophenyl)imidazo(or oxazolo)[4,5-*b*]pyridines **VIII g,h**.
- 6) 2-(4-Acetamido-3-halophenyl)imidazo(or oxazolo)[4,5-*b*]pyridines **IXe-h**.
- 7) 2-(4-Diacetylaminophenyl)oxazolo[4,5-*b*]pyridines (**Xa-d**).
- 8) 2-(4-Chloroacetamidophenyl)imidazo(or oxazolo)[4,5-*b*]pyridines **XIa-h**.
- 9) 2-(4-Dichloroacetamidophenyl)imidazo(or oxazolo)[4,5-*b*]pyridines **XIIa-h**.
- 10) 2-(4-Benzamidophenyl)imidazo(or oxazolo)[4,5-*b*]pyridines **XIIIa-h**.

- 11) 2-{4-[N²(Bis(ethoxycarbonyl)methylene)hydrazino]phenyl}imidazo
(or oxazolo)[4,5-*b*]pyridines **XIVa,b**.
- 12) 2-{4-[N²-(3,5-Dioxopyrazolidin-4-ylidene)hydrazino]phenyl}imidazo
(or oxazolo)[4,5-*b*]pyridines **XVa-d**.
- 13) 2-{4-[N²-(2,4,6-Trioxoperhydropyrimidin-5-ylidene)hydrazino]phenyl}imidazo
(or oxazolo)[4,5-*b*]pyridines **XVIa,c**.
- 14) 2-{4-[N²-(4,6-Dioxo-2-thioxoperhydropyrimidin-5-ylidene)hydrazino]phenyl}
imidazo (or oxazolo) [4,5-*b*]pyridines **XVIIb,d**.
- 15) 2-{4-[N²(Bis(cyano)methylene)hydrazino]phenyl}imidazo(or oxazolo)
[4,5-*b*]pyridines **XVIIa-d**.
- 16) 2-{4-[N²-(3,5-Diaminopyrazol-4-ylidene)hydrazino]phenyl}imidazo
(or oxazolo)[4,5-*b*]pyridines **XVIIIa-d**.
- 17) 2-[4-Arylazophenyl]imidazo(or oxazolo)[4,5-*b*]pyridines **XIXa-v**.
- 18) 2-[4-(4-acetoxyphenyl)azophenyl]imidazo(or oxazolo)[4,5-*b*]pyridines **XXa-d**.
- 19) 2-[4-Arylidenaminophenyl]imidazo(or oxazolo)[4,5-*b*]pyridines **XXIa-v**.
- 20) 2-[4-(3-Chloro-2-oxo-4-substituted phenylazetid-1-yl)phenyl]imidazo
(or oxazolo)[4,5-*b*]pyridines **XXIIa-d**.
- 21) 2-[4-(4-oxo-2-substituted phenylthiazolidin-3-yl)phenyl]imidazo
(or oxazolo)[4,5-*b*]pyridines **XXIIIa-d**.

The structure of the new compounds was substantiated from elemental analysis as well as IR and in certain cases ¹H-NMR and mass spectra.