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Synthesis of some aryl amino acetyl -2-amino-4-nitrobenzothiazole Derivatives

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Abstract:

Substituted anilines are readily converted to 2-amino substituted benzothiazole by reaction With Potassium thiocynate and bromine in glacial acetic acid.

The -4-nitro-2-amino benzothiazole acetyl chloride obtained from reaction between -4-nitro-2-amino benzothiazole with chloro acetyl chloride .The product 4-nitro-2-amino benzothiazoleAcetyl chloride was allowed to react with various aryl amine to give aryl aminoacetyl -2-amino-4-nitrobenzothiazole Derivatives . The reaction of hydrazine hydrate and ethyl -3-amino beridyl acetate gave acide hydrizide. The synthesized compounds have been characterized on the basise of IR spectral analysis and the results are compatible with their assigned structures.

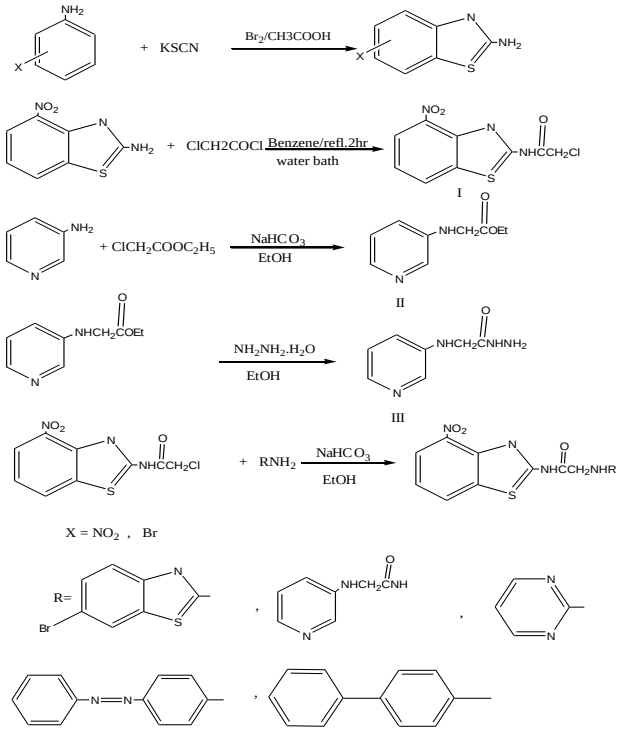
Introduction:

The aryl amino acetyl derivatives are used as biological activity .as a potential Insecticides agricultural garden fungicides and localanaesthetics [1-3].

2-minoBenzothiazole are widly used as precursors for the synthesis of compounds of medicinal importance [4]. Some of them have been showed to have antitumer activity [5-7] anticandidous [8] Parkinson's disease [9] anti flammatory and antihistaminic [10]. Benzothiazole have also shown significant effect against cancer [11]. Similarly acide hydrzide also shows abiologecal activity such as antibacterial. [12-13]

Thus the aim of this work was to synthesize new substituted benzothiazole with the hope that the meor portion of this moiety with amide linkage may enhance biological activity.

The scheme (1) of this work involves synthesis of different five new benzothiazole derivatives.



Experimental:

Melting point was determined on Electro thermal Apparatus were uncorrected. The IR absorption spectra were recorded by FTIR model 84005 Shimadzu Japan. Infrared spectrophotometer as KBr disk.

Synthesis of 2- Amino substituted benzothiazoles (a1-a2). [14]

General Procedure:

To a solution of(0.1 mole) of substituted anilines and (0.4 mole) of potassium thiocyanate in 150m1 of 96% acetic acid glacial was add drope wise, with stirrings 16g. (0.1 mole) of bromine dissolved in 100 ml of glacial acetic acid while the temperature was kept below (1OC°.). After all the bromine solution had been added the mixture was stirred for 10 hr.

The combined filtered are dissolved in warm water. The combined filtrate and neutralized with 10% Na OH. The precipitate was collected on a filter and dried. recrystllazition from a suitable solvent. The physical properties of the synthesized compound are given in Table (1).

Synthesis of 2-chloro acetyl amino 4-nitro benzothiazole (I). (1, 2, 3)

Freshly distilled chloro acetyl chloride (2.5ml) dissolved in dry benzene (100ml) was gradually added to (0.033 mole) 2-amino 4-nitro benzothiazole dissolved in dry Benzene (30ml).

The reaction mixture was refluxed on a water bath for 2 hr. Benzene was distilled off and the residue was washed with 5% sodium bicarbonate solution to remove the acid impurities and finally washed with distilled water. It was dried and recrystallised from ethanol. Yellow powder m.p 75-78 c° yield 80%.

Synthesis of ethyl 3-amino pyridyl acetate (II). [15]

3-aminopyriden (0.02) mole was reflexed with sodium bicarbonate (0.02) mole and ethyl chloro acetate (0.02) mole for 4-6 hr. the mixture cooled & evaporated it under redused pressuer. The red prodact is oily .yield 70%.

Synthesis of 3-amino pyridyl carboxylic acid hydrazide (III). [16]

To suspension of (II) (0.01) mole in (50) ml EtOH was hydrazine hydrate (0.05) mole added the reaction mixture was refluxed for 2hr. after cooling the product was collected and recrystallized from EtOH to give the desired product as red crystals M.P 220-222c° yield 75% .

Synthesis of aryl amino acetyl-2-amino-4-nitrobenzothiazole (b1-b5). [1, 2, 3]

General procedure:-

To compound (I) (0.001 mole) dissolved in 20m1, ethanol. Aryl amine (0.00lmole) was added gradually. When addition was complete reaction mixture was reflex for 6 hr**.** After the reaction excesses of ethanol and aryl amine were recovered distillation. The residue was washed with sodium bicarbonate to remove the acid impurities and finally with water. The product was crystallized from a suitable solvent. The physical properties of the synthesized compound are given in Table (2).

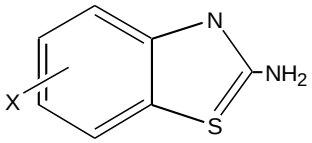


Table (1): The physical and (I.R.) spectroscopy properties to compound (A_1–A_2)

Comp. No.	X	M.P. C^O *Lit.c^o*	Yield %	Solv. of recy.	IR(KBr)cm-1		
					C=N	-NH	CH arom
A1	4-NO_2	**108-111 (112)***	**80**	EtOH	1620	**3300**	**3020**
A2	**6-Br**	**210-212 (212)***	**85**	ACOOH	1625	**3500**	**3100**

* *lit* m.p = 212°, 112°. [15, 16]

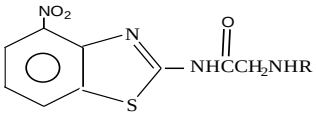
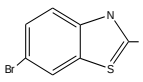
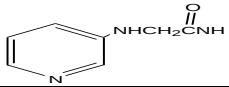
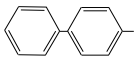
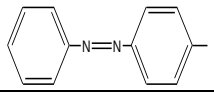


Table (2): The physical and (I.R.) spectroscopy properties to compound (B_1–B_5)

Comp. No.	R	M.P. C^O	Yield %	Solve. Recry.	IR(KBr)cm^{-1}			
					ʏC=N	ʏC=O	ʏCH arom	NH
B1		140-143	70	EtOH	1627	1683	3000	3300
B2		95-98	40	EtOH	1627	1691	3100	3350
B3		110-112	55	EtOH	1623	1691	3000	3175
B4		104-106	60	EtOH	1620	1680	3100	3300
B5		57-61	60	EtOH	1620	1691	3100	3300

Results and Discussion:

Aniline substituted potassium thiocynate and bromine were stirring at room temp. To give the expected 2-amino substituted benzothiazole (a1-a2).The structure of the synthesized compounds were confirmed by their melting point and IR spectroscopy. The characteristic absorption bands (KBr cm^{-1}) are shown in Table (1)

The -4-nitro-2-amino benzothiazole and chloro acetyl chloride were heated to give the expected 2-chloro acetyl amino (-4-nitro benzothiazol). The IR spectrum of this compound -2-chloro acetyl amino -4-nitro benzothiazole is showed a band at 1712 cm^{-1} which was assigned to The typical carbonyl group for acid chloride . More over this compound exhibited significant bands in the region at (3080, 1450) belong to C-H arm. , C=N., respectively that clearly indicated the presence of benzothiazole .The 3-amino pyridyl acid hydrizid was synthesized from 3-amino pyridyl acetate and hydrazine hydrate as it was stated in the experimental part. the IR –spectrum of this compound showed (KBr cm^{-1}) stretching bands at (3300 , 3190 and 3041) cm^{-1} which assigned to the asymmetrical and symmetrical band stretch bands of NH2 and (NH) group and band at 1720 cm^{-1} which was assigned to the carbonyl group for acid hydrizid . a number of N-aryl –N-2-acetyl(-4-nitro benzothiazol) (B1-B5) were synthesized through the reaction of compound 2-chloro acetyl amino-4-nitro benzothiazol with aryl amines in the presence of ethanol (scheme 1) .The structure of the synthesized compounds were confirmed by their melting point and IR-spectroscopy . The characteristic absorption bands (KBr cm^{-1}) are shown in Table (2) .It was worth to say here that the synthesized compounds will be studied in the nearest future to show their expected biological activity.

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Tikrit Journal of Pure Science Vol. 13 No.(1) 2008, 162 - 165

تحضير بعض مشتقات أريل أمينواستايل-٢-امينو-4- نايترو بنزوثايازول

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الملخص:

يتضمن البحث تحضير عدد من مشتقات أريل أمينو اسيتايل أمينو - ٤- نايترو بنزوثايازول(b1-b5) من خلال مفاعلة معوضات الأنيلين مع ثايوسيانات البوتاسيوم بوجود البروم في وسط من حامض الخليك الثلجي للحصول على معوضات -٢- أمينو بنزوثايازول(a1-a٢) . ثم مفاعله ٤-نايترو بينزوثايازول الناتج مع كلورو كلوريد الاستيل ليعطي المركب [I] الذي بدوره عند مفاعلته مع أمينات اريليه مختلفه يعطي المركبات(b1-b5).

وكذلك تم الحصول على الهيدرازيد [III] من خلال مفاعلة الاستر [II] مع الهيدرازين المائي ٩٩%. تم تشخيص المركبات الناتجة بالطرق الفيزياوية والطيفية المتاحة وقد دلت النتائج المستحصله على صحة التراكيب المقترحة.