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Abstract

The chemistry of 2-amino-5-substituted-1,3,4-thiadiazole family of compounds indicating their preparations, reactions, properties together with review of their most important biological activities were dealt with in chapter one.

Eleven final products were prepared in this work together with their corresponding intermediates. The appropriate retrosynthetic analysis of the compounds revealed five possible routes for the target 2-amino-5-substituted-1,3,4-thiadiazoles.

Five methods were tried to prepare the final products. The first one-step route involve a direct reaction between acid chloride and thiosemicarbazide using dehydrating agent such as sulphuric acid or phosphoric acid and benzene as solvent. A second route involve a reaction between acid and thiosemicarbazide using sulphuric acid as cyclizative dehydrating agent without other solvent.

Three approaches involve two step reaction. The first one involve the reaction between appropriate aldehyde and thiosemicarbazide, which form thiosemicarbazone then dehydrative cyclization using phosphoric acid or sulphuric. The second one involve the reaction of thiosemicarbazide and acid unhydride or acid chloride to form the substituted thiosemicarbazide, which undergoes the dehydrative cyclization with sulphuric acid or phosphoric acid. The third one involve a reaction between an aldehyde and thiosemicarbazide that produced a Schiff base which when react with ferric chloride in an oxidation reduction reaction to produce the target 2-amino-5-substituted 1,3,4-thiadiazole.

The methods which were tried resulted in the formation of the same product.

The last product react with ethylchloroformate to produce 2-(N(ethyl formate)amino-5-substituted-1,3,4-thiadiazole. The later when react with the appropriate amine yields the final product alkyl thiadiazolyl urea.

The reaction course was followed with TLC and the identity of the product was identified through IR, ^{1}HNMR and MS.

The retrosynthetic analysis of the compound were discussed together with suitable mechanism of each different reaction. The spectral data were discussed and interpreted.

The final products were tested found to have moderate biological activities against seven microorganisms examined except compound No. XI which was found to have high activity against all of the microorganisms.

الخلاصــة

تمت دراسة كيمياء 2-أمينو-5-الكيل (اريل) 4,3,1-ثيا ثنائي زول وتم توضيح طرق تحضيرها ، تفاعلاتها وخواصها بالإضافة لنشاطها ضد الكائنات الدقيقة.

تم تحضير أحد عشرة مركباً نهائياً مع عدد من مركباتها الوسيطة. عملية التخليق الضدي اتبعت في هذه الدراسة وتم الوصول إلى خمسة طرق للحصول على المركبات المستهدفة.

خمس طرق للتحضير تم استخدامها ووجد أنها تقود إلى نفس النتائج (2-أمينو-5-مستبدل-1،3،4-ثياثنائي زول).

طريقتين من خطوة واحدة يم استخدامها.

الطريق الأول يشمل مفاعلة كلوريد الحمض و ثيوسمكاربازايد مع استخدام حمض الكبريتيك أو حمض الفوسفوريك كعوامل نازعة للماء لاغلاق الحلقة والبنزين كمذيب. الثاني يشمل مفاعلة الحمض المعني وحمض الكبريتيك فقط بدون مذيب آخر.

ثلاث طرق من خطوتين تم استخدامهما.

الطريق الأول يتضمن تفاعل الألدهيد المطلوب وثيوسميكاربازايد ليعطي سمي ثيوكاربازون الذي يتفاعل مع حمض الكبريتيك أو الفوسفوريك المركز.

الطريق الثاني يتضمن تفاعل كلوريد الحمض أو انهيدريد الحمض المطلوب ليعطي ليعطي ثيوسمي كاربازايد المستبدل الذي يتفاعل مع حمض الكبريتيك أو حمض الفوسفوريك.

الطريق الثالث يتضمن تكوين ثيوسمي كاربازون ثم مفاعلته مع كلوريد الحديد III في تفاعل أكسدة اختزال ليعطي الناتج المطلوب.

الناتج الأخير تم مفاعلته مع اثيل كلوروفورمات ليعطي الأميد المقابل 2(N-أثيل فورمات)أمينو-5-"مستبدل" 1،3،4-ثياثنائي زول.

هذا الناتج تم مفاعلته مع الأمين المناسب ليعطي الناتج النهائي وهو كستبدل ثياثنائي زول يوريا.

هذه التفاعلات تمت متابعتها باستخدام كروماتوغرافيا الطبقة الرقيقة وتم تحديد صيغ المركبات النهائية والوسيطة بواسطة التحليل بالأشعة فوق البنفسجية ، الأشعة تحت الحمراء وطيف الرنين النووي المغنطيسي وطيف الكتلة.

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List of Abbreviations

R.T	=	Room temperature
St	=	Stretching
S	=	Singlet
vib	=	Vibration
m	=	Multiplet
d	=	doublet
j	=	Coupling constant
p-	=	para
m-	=	meta
o-	=	ortho
g	=	gram
U.V	=	Ultra violet
^{1}H-NMR	=	Proton nuclear magnetic resonance
M.S	=	Mass spectroscopy
I.R	=	Infra red
$\Rightarrow$	=	Transform
M.f	=	Molecular formula
M.p	=	Melting point
q	=	Quartet
mm	=	Millimeter
inh	=	Inhibition
Compd	=	Compound
rec	=	recrystallization