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Synthesis of 2-{2-[5(4)-aryl-2*H*-[1,2,3]-triazol-4(5)-yl]vinyl}chromen-4-ones

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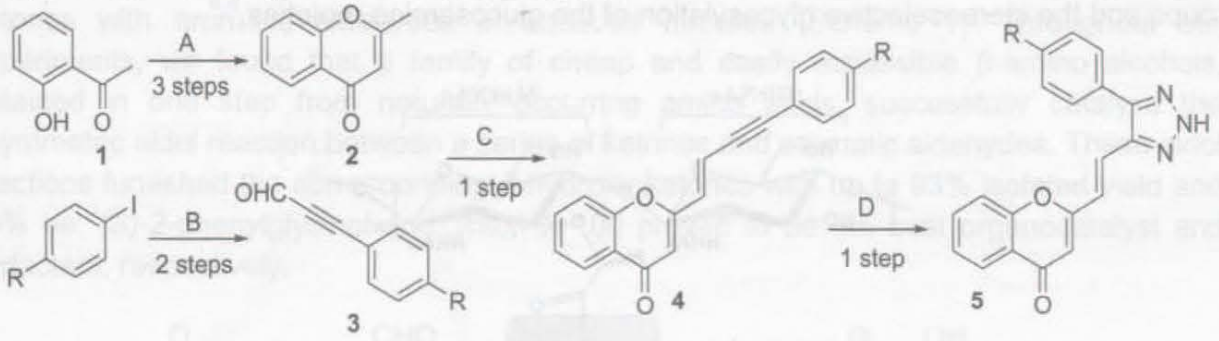
Chromones are a family of oxygen-containing heterocyclic compounds that have been shown particular relevant biological activity.[1] In what concerns to 2-methylchromones, their reactivity is well-known and allowed to exploit many different kinds of chemical reactions. The acidic character of the 2-methyl group, due to the low electron density at C-2 caused by carbonyl group enable this class of compounds to undergo oxidation, photolysis, cycloaddition and condensation reactions.[2]

In this communication we will highlight the condensation reaction of 2-methylchromone **2**[3] with propargyl aldehydes **3**[4] in order to obtain (*E*)-2-(4-arylbut-1-en-3-ynyl)-4*H*-chromen-4-ones **4**. The high reactivity of these alkynes with sodium azide provided 2-{2-[5(4)-aryl-2*H*-[1,2,3]-triazol-4(5)-yl]vinyl}chromen-4-ones **5** (**Scheme 1**) in good yields. The required starting material 2-methylchromone **2** was prepared in a three step sequence starting from 2'-hydroxy-acetophenone **1** while the propargyl aldehydes **3** were obtained from the reaction of the appropriate iodobenzene with propargyl alcohol and further MnO_2 oxidation. Experimental procedures and spectroscopic characterization of compounds **4** and of all the intermediates will be presented and discussed.



R = H, Br, OCH_3, CH_3, NO_2

Scheme 1: Synthetic route for the preparation of 2-{2-[5-aryl-2*H*-[1,2,3]-triazol-4(5)-yl]vinyl}chromen-4-ones **5**.

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References:

1. Sharma, S.K.; Kumar, S.; Chand, K.; Kathuria, A.; Gupta, A.; Jain, R. *Curr. Med. Chem.* **2011**, *18*, 3825.
2. Ibrahim, M. A.; Ali, T. E.; Alnamer, Y. A.; Gabr, Y. A. *Arkivoc* **2010**, (i), 98.
3. Hirao, I.; Yamaguchi, M.; Hamada, M. *Synthesis* **1984**, 1076.
4. a) Tretyakov, E. V.; Tkachev, A. V.; Rybalova, T. V.; Gatilov, Y. V.; Knight, D. W.; Vasilevsky, S. F.; *Tetrahedron* **2000**, *56*, 10075. b) Wadsworth, D. H.; Gecr, S. M.; Detty, M. R. *J. Org. Chem.* **1987**, *52*, 3662. c) Bumagin, N. A.; Ponomaryov, A. B.; Beletskaya, I. P. *Synthesis* **1984**, 728.

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Introduction

Chromones are a family of oxygen-containing heterocyclic compounds that have been shown particular relevant biological activity [1]. In what concerns to 2-methylchromones, their reactivity is well-known and allow to exploit many different kinds of chemical reactions. The acidic character of the 2-methyl group, due to the low electron density at C-2 caused by carbonyl group enable this class of compounds to undergo oxidation, photolysis, cycloaddition and condensation reactions [2].

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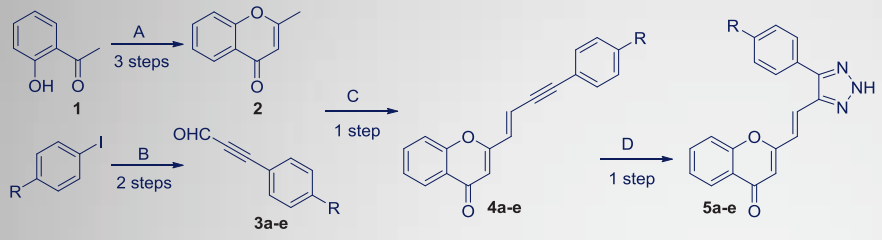
Experimental and Results



Compound	R	Yield (%)
4a	H	52
4b	Br	59
4c	OCH_3	80
4d	CH_3	80
4e	NO_2	30

Compound	R	Yield (%)
5a	H	90
5b	Br	97
5c	OCH_3	98
5d	CH_3	98
5e	NO_2	91

Reaction Conditions:

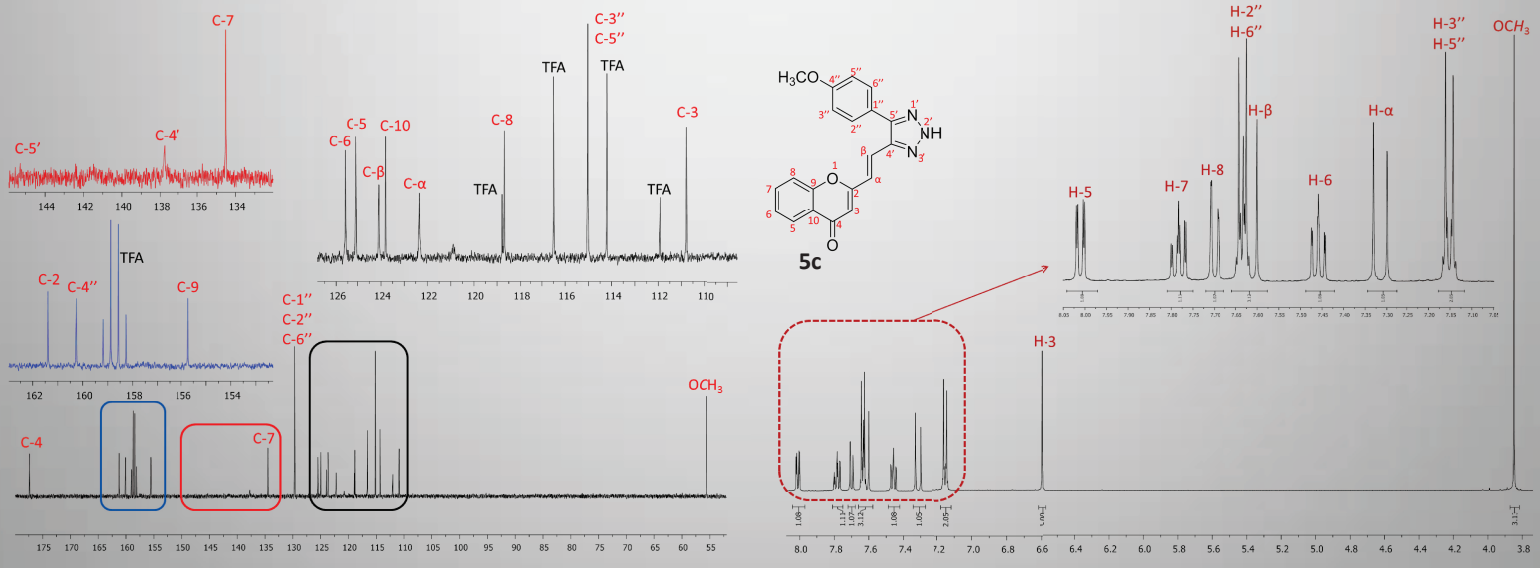
A: (i) MeCOCl, dry pyridine, r.t., 12 h; (ii) NaH, dry THF, reflux, 2 h; (iii) *p*-TSA, DMSO, 100°C, 2 h.

B: (i) $Pd(PPh_3)Cl_2$, PPy, CuI, propargyl alcohol, toluene, 60 °C, 2h; (ii) activated MnO_2, ethyl acetate, reflux, 2h.

C: Sodium, dry EtOH, r.t., 4 h.

D: NaN_3, DMF, reflux, 2h.

Structural Analysis



Conclusions

(*E*)-2-(4-arylbut-1-en-3-ynyl)-4*H*-chromen-4-ones were synthesized via aldol condensation of 2-methylchromone with propargyl aldehydes in fair to good yields. 2-{2-[5(4)-aryl-2*H*-[1,2,3]-triazol-4(5)-yl]vinyl}chromen-4-ones were obtained in excellent yields by the 1,3-dipolar cycloaddition reaction between the alkyne moiety of (*E*)-2-(4-arylbut-1-en-3-ynyl)-4*H*-chromen-4-ones and sodium azide. The assignment of C-4' and C-5' resonances of the 1,2,3-triazole ring of all compounds was only possible by the addition of a few drops of trifluoracetic acid (TFA) to the DMSO-d6 solution and further ^{13}C NMR acquisition.

References:

1. Sharma, S. K.; Kumar, S.; Chand, K.; Kathuria, A.; Gupta, A.; Jain, R. *Curr. Med. Chem*. **2011**, *18*, 3825.
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