Synthesis of alkyl 2-(4-oxoquinazolin-3(4H)-yl) acrylate by nucleophilic additionof alkyl propiolates catalysed by Ph_3P

Mehdi babakeshizadeh[1]*, Bita Mohtat

Department of Organic Chemistry, Karaj Branch, Islamic Azad university, Karaj, Iran; Email: mehdibabaei69@gmail.com

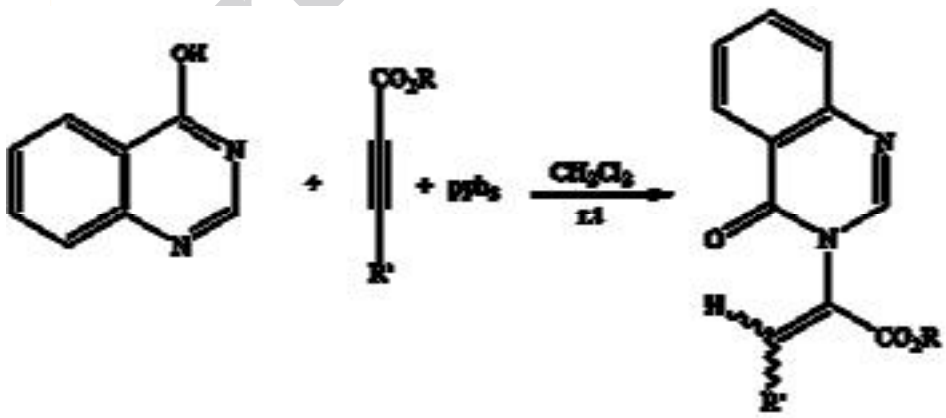
Abstract- 4-Hydroxyquinazoline undergoes neutral conditions with alkyl propiolates in the presence of triphenylphosphine (0.26g), and by α substituation the corresponding 2-(4-oxoquinazolin-3(4H)-yl acrylate was obtained in good yields.

Keywords: 4-Hydroxyquinazoline, alkylacrylat, alkyl propiolates, triphenylphosphine

Introduction

Organophosphorus compounds have been used in organic synthesis as useful reagents as well as legends of a number of transition catalysts [1,2]. The phosphine induced isomerization of alkynoates and addition to the α-substituted alkyl acrylates [3].

An important point is the ability of the nucleophile to undergo Michael addition in preference to the α-attack since phosphines could also serve as general base catalysts for conjugate addition [4]. Thus the addition of 4-hydroxyquinazoline to alkyl propiolates proceeds under neutral conditions in the presence of triphenylphosphine to give a corresponding α-substituted alkyl acrylates in excellent yields.



Scheme 1

Experimental Method

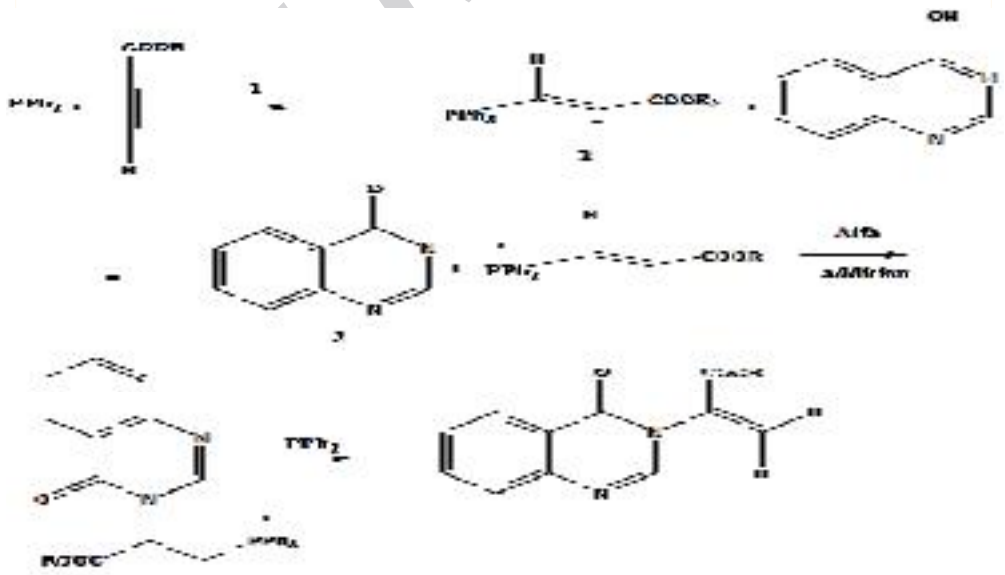
To a stirred solution of 0.26 g of Ph_3P and 0.15 g of 4-Hydroxyquinazoline in 10 mL of CH_2CI_2 was added, drop wise, a mixture of 0.8 g Methyl acetylene carboxylate in 3 mL of CH_2CI_2 at

-5 °C over 10 min. The reaction mixture was then allowed to warm up to room temperature and stirred for 24 h. The solvent was removed under reduced pressure and the residue was separated by column chromatography (SiO_2; n-hexane:EtOAc = 3:1) to afford the pure title compounds.

Results and Discussion

The reaction mechanism of 2-(4-oxoquinazolin-3(4H)-yl with different propiolates in presence of Ph_3P:

The addition of triphenylphosphine to alkyl propiolate and then protonation of product by the acidic NH of 4-hydroxy quinazolin is perform and then this ion is attakced from situation by the N atom of conjugated base. By the remove of triphenylphosphine, the product is performed. This compound dose not reaction with ethyl phenyl acetylene carboxylate.



Schem2

(a): ethyl (Z)-2-(4-oxoquinazolin-3(4H)-yl)-3-phenylacrylate

Yellow oil.IR (KBR): $\vartheta = 1437\ (C-O), (C=O)$esteric, $(C=O)$hetrocycle..^{1}H-NMR: δ= 0.95 (3H, t, J=7.1 Hz, CH_3), 4.38 (2H, q, J=7.1, OCH_2), 7.27-7.35, (5H, m), 7.58 (1H, t, J=7.0 Hz, CH), 7.72 (1H, s, CH), 7.75-7.86 (2H, m,2CH), 8.02 (1H, s, CH), 8.39 (1H, d, J=7.7 Hz, CH).^{13}C-NMR: δ= 14.79 (CH_2), 62,27 (OCH_2), 76.58,77,77.42 (), 126.85, 127,79, 131,26, 134.81, 139.47, 145.89, 147.07 (C), 129.22, 129.87 (CH.Anal.Calcd for $C_{15}H_{18}N_2O_3P$:m/e: 305.11 (100.00%), 306.11 (16.5%), 307.11 (2.0%)

(b): ethyl 2-(4-oxoquinazolin-3(4H)-yl)acrylate

Yellow oil.IR (KBR): $\vartheta = 1437\ (C-O), (C=O)$esteric, $(C=O)$hetrocycle. ^{1}H-NMR: δ= 0.85 (3H, t, J=7.1 Hz, CH_3), 4.30 (2H, q, J=7.1, OCH_2), 6.60 (1H, s, CH), 6.62 (1H, s, CH), 7.53(1H, t, J=7.2 Hz, CH), 7.73-7.82(2H, m,2CH), 7.95(1H, s, CH), 8.30(1H, d, J=7.6 Hz, CH).^{13}C-NMR: δ= 14 (CH_2), 62,3 (OCH_2), 76.62,77.05,77.47 (), 127.65, 134.76, 145.19 (CH), 121.97, 137,01, 147.92 (C), 162.02 (C=O).MS(… eV) m/z (%): 201 (100), 131 (94.73), 77 (84.21).Anal.Calcd for $C_{13}H_{12}N_2O_3$: m/e: 244.08 (100.00%), 245.09 (14.3%), 246.09 (1.7%)

The reaction of 4-hydroxyquinazoline with alkyl propiolates in the presence of Ph_3P provides a simple one-pot entry into the synthesis of compounds of potential interest, and may be considered as potentially useful synthetic intermediates because they possess carbon atoms with different oxidation states.

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