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Synthesis of 2, 3- Dihydroquinazolin-4(1H)-Ones Derivatives

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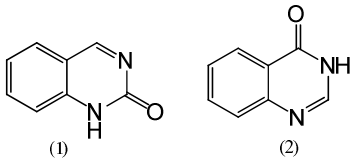
Abstract: *2,3-Dihydroquinazolin-4(1H)-one possess a wide range of pharmacological and biological activities and have important applications in the fields of synthesis and research & development of drugs. Therefore, its synthetic methods have also attracted considerable attention. In this paper, some synthetic methods in the synthesis of 2,3-dihydroquinazolin-4(1H)-ones were reviewed.*

Keywords: Quinazolinone derivatives; o-aminobenzamides; isatoic anhydrides; N-alkyl anilines; C—H activation & functionalization.

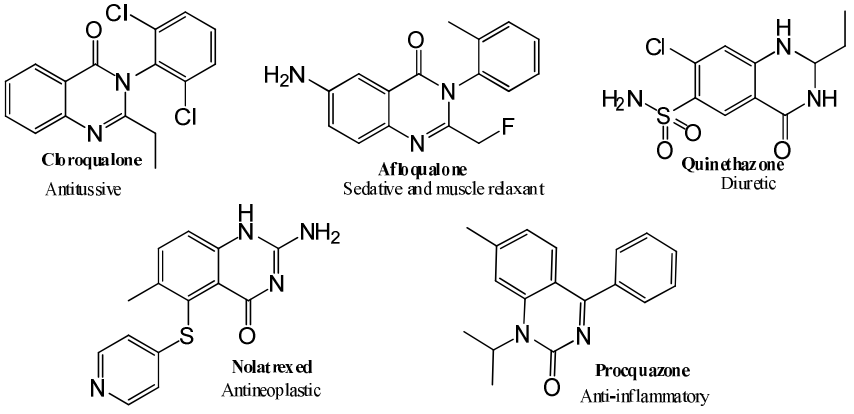
I. INTRODUCTION

Quinazolinone is a heterocyclic compound with two conjoined aromatic rings incorporating two nitrogen atoms and one carbon oxidized with keto oxygen. It is present in two structural isomeric forms namely 2-quinazolinone (1) and 4-quinazolinone (2).



2,3-Dihydroquinazolin-4(1H)-one possess a wide range of pharmacological and biological activities and have important applications in the fields of synthesis and research & development of drugs.

Quinazolinones constitute a class of sedative drugs that contain a 4- quinazolinone core. These compounds acquire a unique place in pharmaceutical and medicinal chemistry [1]. Quinazolinone and related compounds are the building blocks of more than 150 natural products [2]. Afloqualone (3) is a quinazolinone derivative commonly functioning as sedative and muscle relaxant [3]. Cloroqualone (4) is a sedative and has antitussive (against cough) properties resulting from its agonist activity [4]. Quinethazone (5); commonly known as hydromox is a diuretic used in the treatment of hypertension [5]. Halogenated derivative of fuginone is used in veterinary medicine as a coccidiostat (an antiprotozoal agent that acts upon Coccidia parasites [6].



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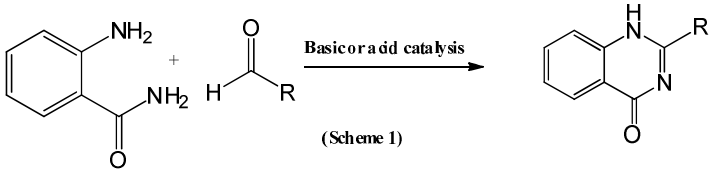
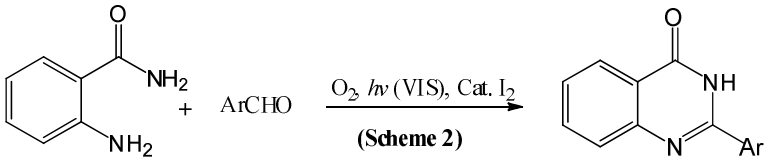
Considering the therapeutic potential and wide range of biological activities associated with quinazolinones; there has been an enormous increase in the attention of medicinal and synthetic organic chemists towards this class of heterocyclic compounds. Consequently search for the development of new synthetic strategies for the synthesis of quinazolinone derivatives becomes essential.

Although numerous strategies have been developed for the construction of the DHQ core, the most common and simple synthetic route for the preparation of DHQs is the direct cyclocondensation of anthranilamide and an aldehyde (Scheme 1).



(Scheme 1)

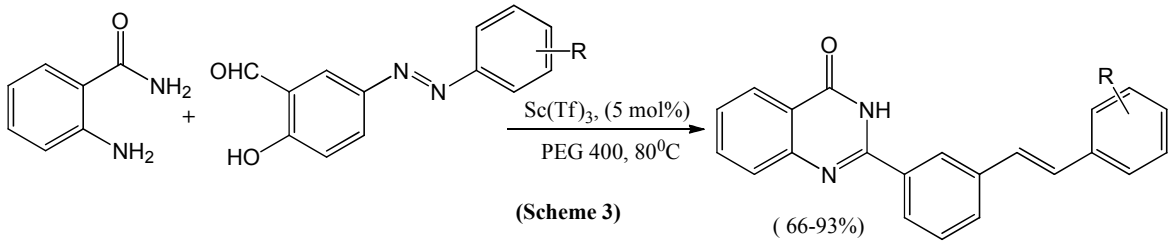
Y. Nagasawa studied the synthesis of 2-aryl-4-quinazolinones from aromatic aldehydes and aminobenzamides through a cyclization–oxidation sequence using iodine as catalyst, visible light irradiation, and molecular oxygen with moderate to good yield. (Scheme 2) [7]



(Scheme 2)

(66-93%)

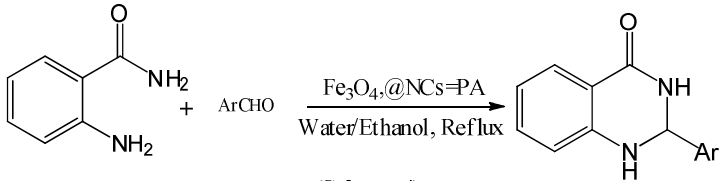
Scandium triflate was reported as reusable catalyst for 80 ^{0}C temperature synthesis of novel dibenzo[*b,f*][1,5]oxazocin-6-ones in PEG-400 as a greener medium. Using this simple and greener protocol in good yields(Scheme 3) [8]



(Scheme 3)

(66-93%)

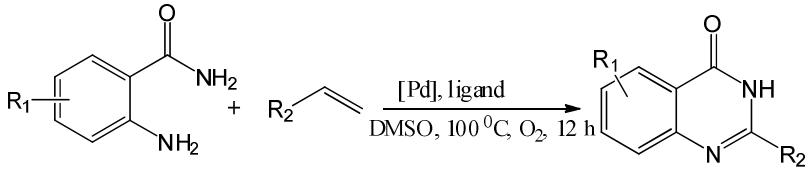
Fe_3O_4@nano-cellulose–OPO_3H was documented as magnetic bio-based nanocatalyst for the synthesis of 2,3-dihydroquinazolin-4(1*H*)-ones via condensation of 2-aminobenzamide and different aldehyde. (Scheme 4) [9]



(Scheme 4)

(71-95%)

W. Liu studied Palladium-catalyzed oxidative cleavage/cyclization for the synthesis of various quinazolinone derivatives from readily available 2-aminobenzamides and terminal alkenes with excellent functional group tolerance. (Scheme 5) [10]



(Scheme 5)

(67-92%)

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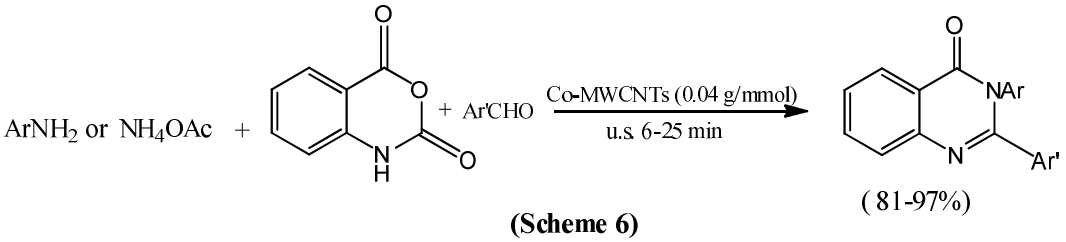
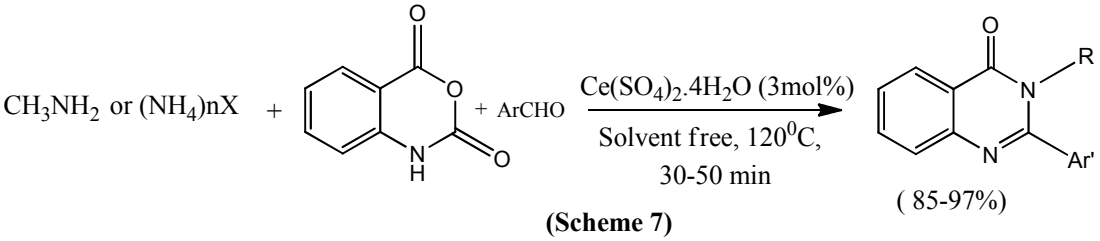
J. Safari reported Multi-walled carbon nanotubes (MWCNTs) as the heterogeneous heterogeneous catalyst under ultrasound irradiation for the synthesis of mono and di-substituted dihydroquinazolinones by three-component condensation of isatoic anhydride, ammonium acetate or primary amines and aromatic in excellent yield (Scheme 6) [11].



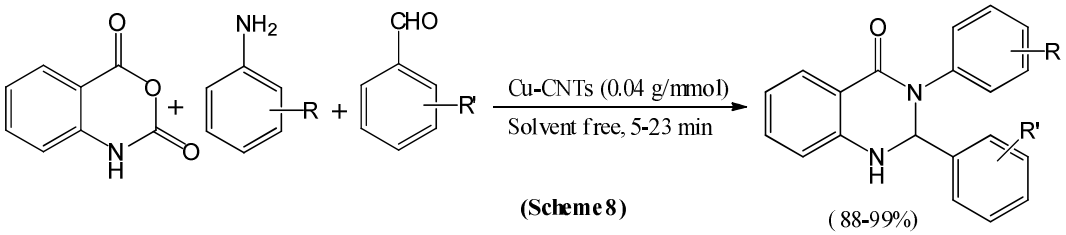
(Scheme 6)

Cerium (IV) sulfate tetrahydrate was used as a reusable inorganic solid acid catalyst for the synthesis of 2,3□ dihydroquinazolin□4(1H)□ones by one-pot three-component reaction of isatoic anhydride, aromatic aldehydes and a nitrogen source under solvent□free condition (Scheme 7) [12].



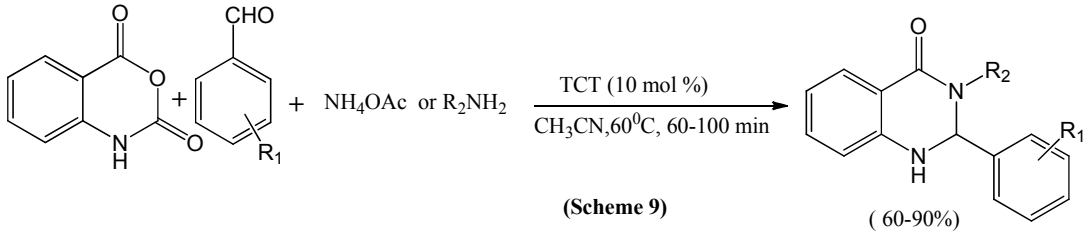
(Scheme 7)

An environmentally benign copper carbon nanotubes catalyzed employed in the synthesis of 2,3- dihydroquinazolin-4(1H)-one derivatives via the reaction of isatoic anhydride, ammonium acetate or primary amines and aldehydes in high yield by J. Safari (Scheme 8) [13].



(Scheme 8)

M. Sharma reported synthesis of 2, 3-dihydroquinazolin-4(1H)-ones by the reaction of isatoic anhydride, amine or ammonium acetate and aldehyde catalyzed by cyanuric chloride (1, 3, 5 trichloro triazine; TCT) (Scheme 9) [14].



(Scheme 9)

Synthesis of 2, 3-dihydroquinazolin-4(1H)-ones were synthesized by using a catalytic amount of sulfonated porous carbon (SPC) as a reusable catalyst under solvent-free condition by A. Shokrolahi [15]. The catalyst was reused for several times and was found to work efficiently (Scheme 10).

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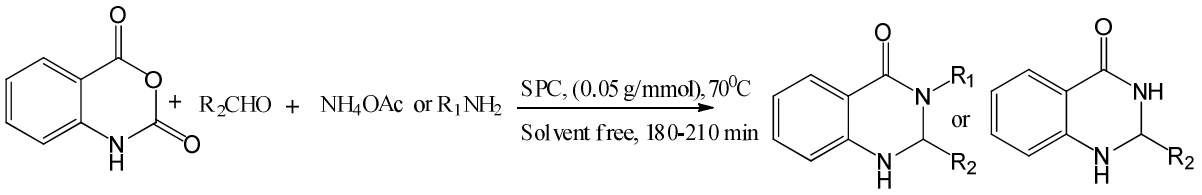

(Scheme 10) (65-90%)

II. Conclusion

In this review we have discussed about different biological activity of 2,3-Dihydroquinazolin-4(1H)-one and their synthetic methods. It is clear from above discussion that 2, 3-Dihydroquinazolin-4(1H)-one is a precursor of different heterocyclic moiety of valuable medicinal compounds.

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