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The reactions of cyclohexan-1,3 and 1,4-diones for the synthesis of heterocyclic compounds with antitumor activities

Rafat M Mohareb
Cairo University, Egypt

As typical reactive cyclohexan-1,4-dione and cyclohexan-1,4-dione were recently used for the synthesis of different heterocyclic compounds. On the other hand, its one or two carbonyl groups could take part in substitution and cyclization reactions through the tautomerized enolate form. Thus the cascade reactions of addition, elimination and substitution could be achieved in many reactions involving dimedone. The reactions of cyclohexane-1,3-dione and cyclohexan-1,4-dione with aldehydes have been extensively studied in the past years, from which several types of compounds have been produced according to the reaction conditions. The normal Knoevenagel condensation of the title compounds with aldehydes have been conducted with numerous methods including promotion via amines surfactants, zeolites, ionic liquids. The use of environmentally benign methods like in aqueous medium or in the absence of vents and the usage of ultrasound or microwave heating have also been developed in recent years. The reactions usually proceed further through Michael addition reaction of the second molecule of dimedone to yield tetraketones as main products. On the other hand, tetraketones could be easily converted to 9-substituted 1,8-dioxo-xanthenes by dehydration step. In our continued interest in the design of new multicomponent reactions and the application in the synthesis of heterocyclic compounds, we found some unprecedented reaction patterns in the reaction of the aryl hydrazodimedone derivatives with elemental sulfur and cyanomethylene reagents to produce thiophene derivatives. These were capable for further heterocyclization reactions to produce potential antitumor agents. Also due o the lower reactivity of cyclohexan-1,4-dione our goals were to increase its reactivity through building of active centers through the molecule.

e:raafat_mohareb@yahoo.com

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