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A Brief Review on Synthesis of Meldrum Acid Chalcone Derivatives and It's Pharmacological Studies

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ABSTRACT

This review presents a arranged and complete investigation of the method of preparation, the chemical reactivity, and the anti-microbial properties linked with this system Meldrum acid and its chalcones are possible pharmacological and biologically active molecules got from the ordinary source. Meldrum's acid has been used in the plan and synthesis of various types of heterocyclic compounds and considered as a activehouseslab in organic synthesis activity. Meldrum acid is a useful stage in irregular organocatalysis. This work clarifies the current information about synthesis applies, pharmacologic importance, and scientific applications of Meldrum acid chalcone derivatives. Meldrum's acid and its derivatives have established their effectiveness and flexibility in organic synthesis. Showing very unusual properties and multiple sides of reactivity, this small construction has become the grounding of many synthetic methodologies. The DFT worldwide chemical awareness signifiers were calculated for the created compounds and used to predict their relative stability and reactivity.

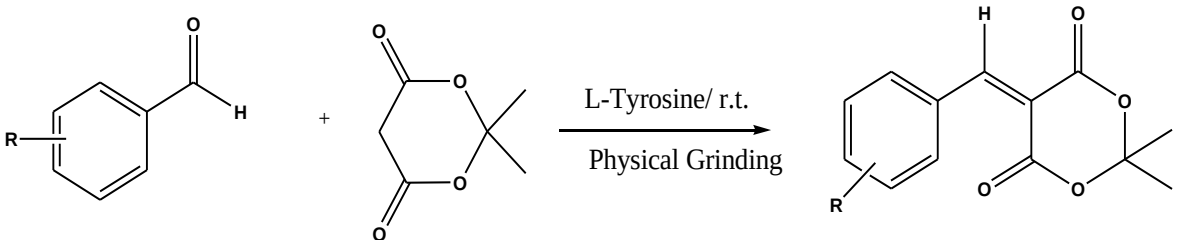
Keywords: Meldrum acid, Chalcone, Aldehyde, Knoevenagel Condensation, Biological Application.

I. INTRODUCTION

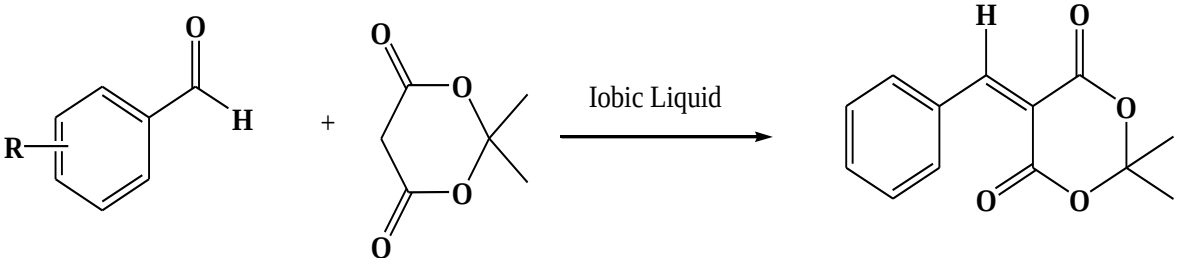
The Structural easiness of Meldrum's combined with is single properties has made this a adaptable reagent inorganic synthesis. The CH_2 group of Meldrum acid is place in between two carbonyl group shows more acidic properties and configuration to approach to hypothesis c-c linkage in organic compounds(1) The condensation of various derivative of aldehyde compounds and Meldrum acid iscatalyzed by different bases such as piperidine ,pyridine(2) Knoevenagel condensation of Meldrum's acid and aldehydes gives rise to corresponding alkylidene derivatives. The alkylidene derivatives obtained are versatile substrates for variability of reactions. (3)

Synthesis:

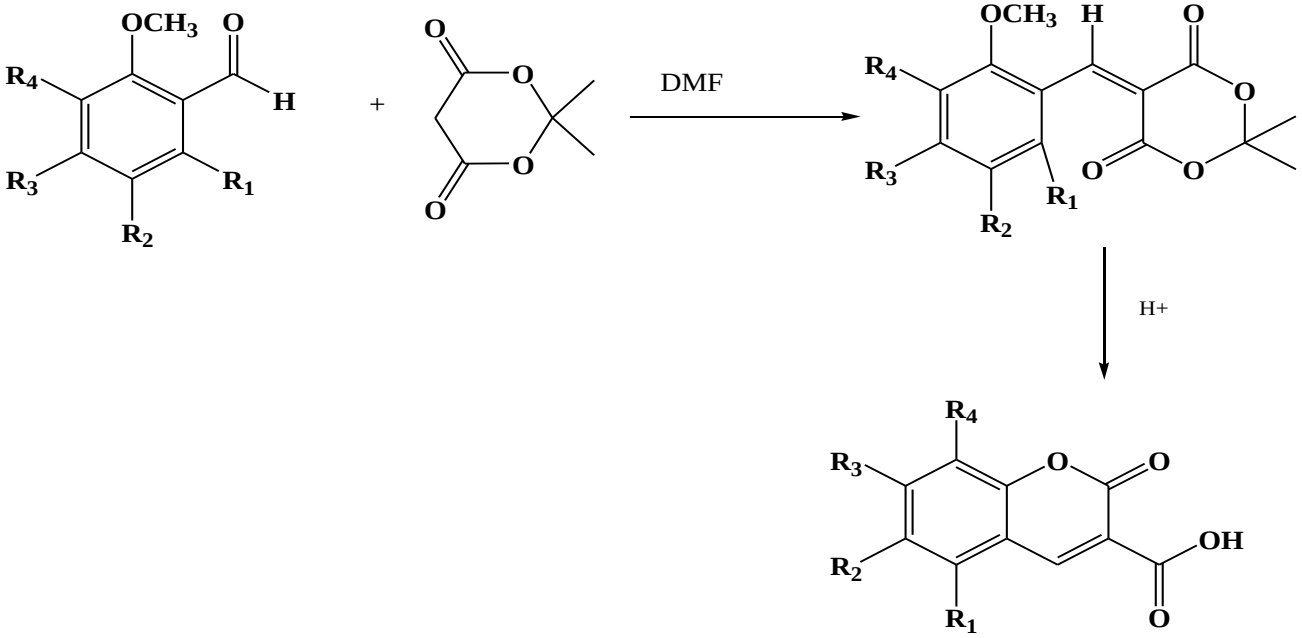
G.Tirupati et al. (4) have synthesized Meldrum acid chalcone derivatives by using L-Tyrosine as an Recyclable and Effectual Catalyst for Knoevenagel Condensation of Arylaldehydes with Meldrum's Acid in Solvent-Free Condition under Grinder Method.



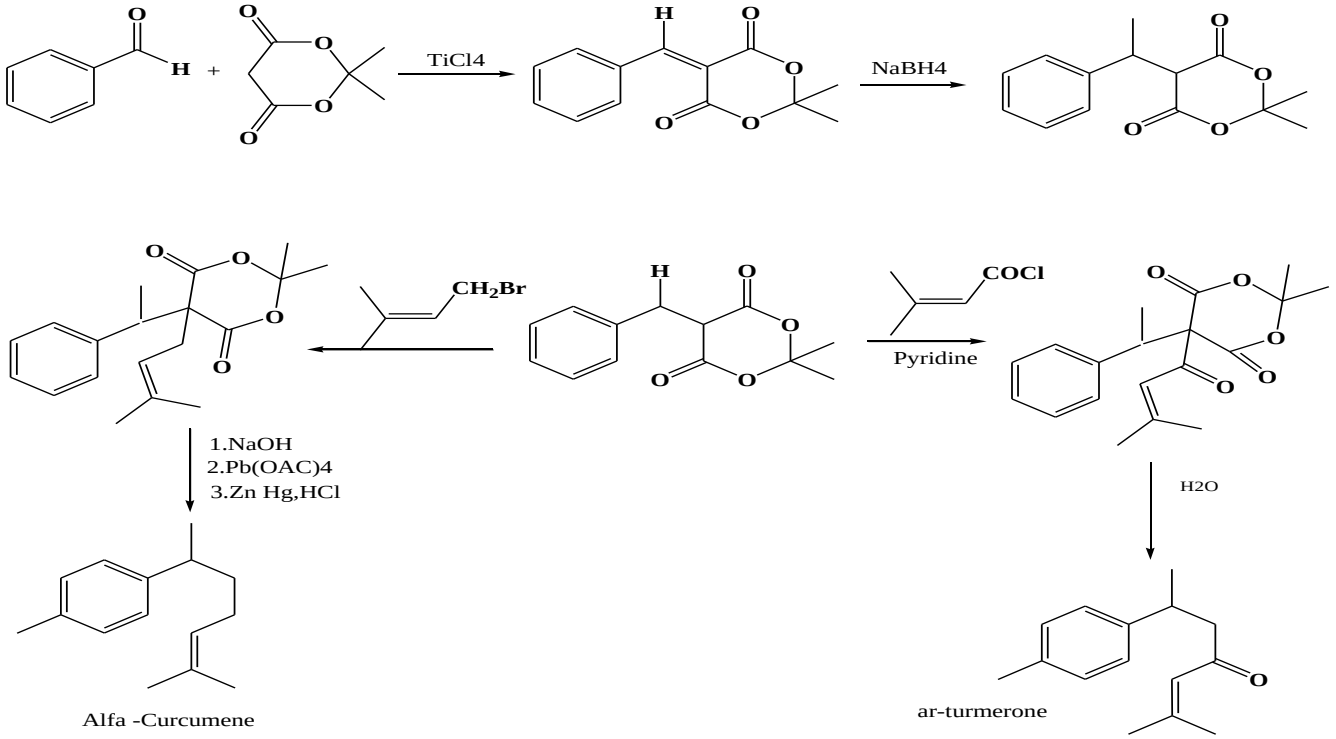
Nitin Darvatkar et al.(5)reported the Knoevenagel condensation of Meldrum acid and different derivatives of aldehyde in presence of ionic liquid at R.T.



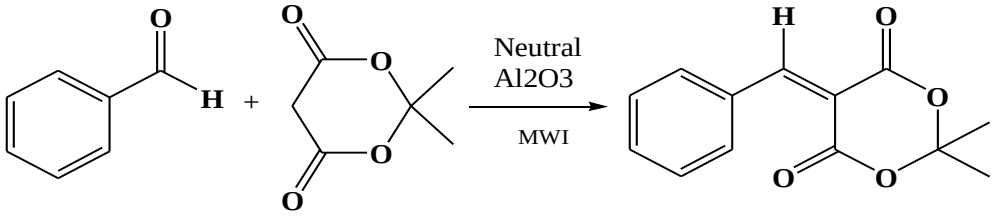
Veronica Armstrong et al (6) synthesized the 3-Carboxycoumarins from O-methoxy benzaldehyde and Meldrum acid via o-Methoxy benzylideneMeldrum acid derivatives



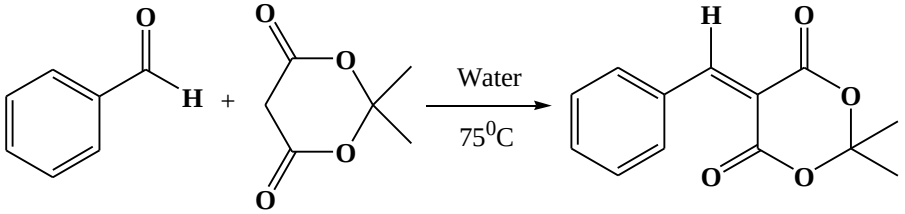
Mahulikar et al. (7) explains the application of Meldrum acid in synthesis of natural product i.e., alfa curcumin and ar-turmerone



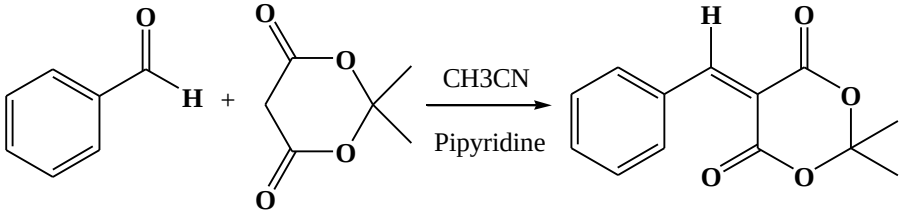
Manas Chakrabarty et al (8) reported Knoevenagel condensation of Meldrum acid by using Neutral Alumina in Microwave Irradiation and developed the higher percentage of yield and short reaction time.



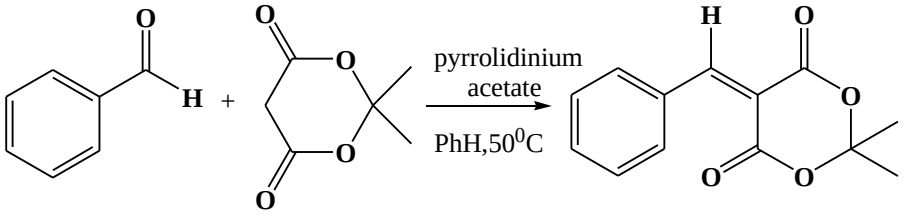
Till Drennhaus et al. (9) synthesized the Meldrum acid chalcone derivative by using aldehyde and Meldrum's acid were suspended in water and heated up to 75 °C. The reaction mixture was stirred until the condensation was completed.



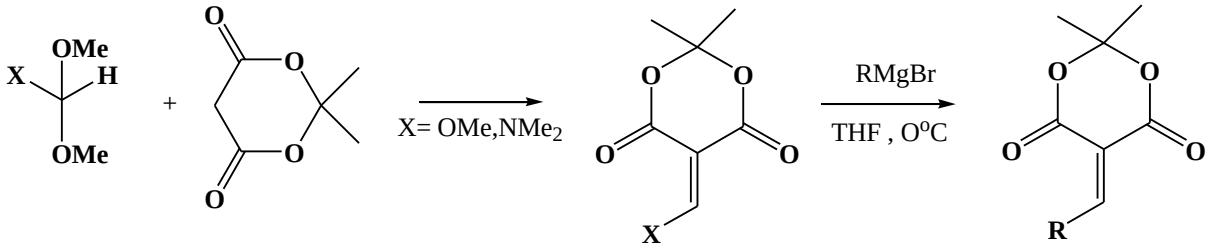
Till Drennhaus et al. (9) also developed the synthesized Meldrum acid chalcone derivatives by Meldrum's acid was dissolved in CH_3CN (10 mL), then aldehyde and piperidine were added. The reaction was stirred until the condensation was completed.



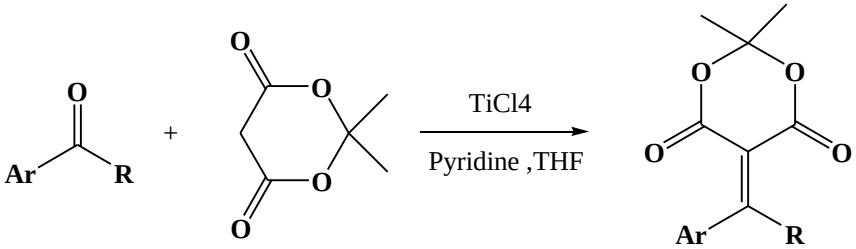
Aaron M.Dumas et al. (10) Synthesis of alkylidenes derived from aldehydes can be achieved under a large variety of conditions Alkylidene Meldrum's acids are prepared by the Knoevenagel condensation of Meldrum's acid and aldehydes in presence of pyrrolidinium acetate-catalysed condensation in benzene .



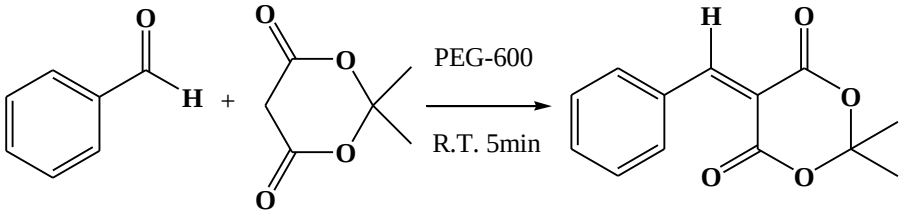
Aaron M.Dumas et al. (10) discovered the alternative route is the preparation of methoxy- or dimethylaminomethylene Meldrum's acids followed by elimination using organometallic nucleophiles .



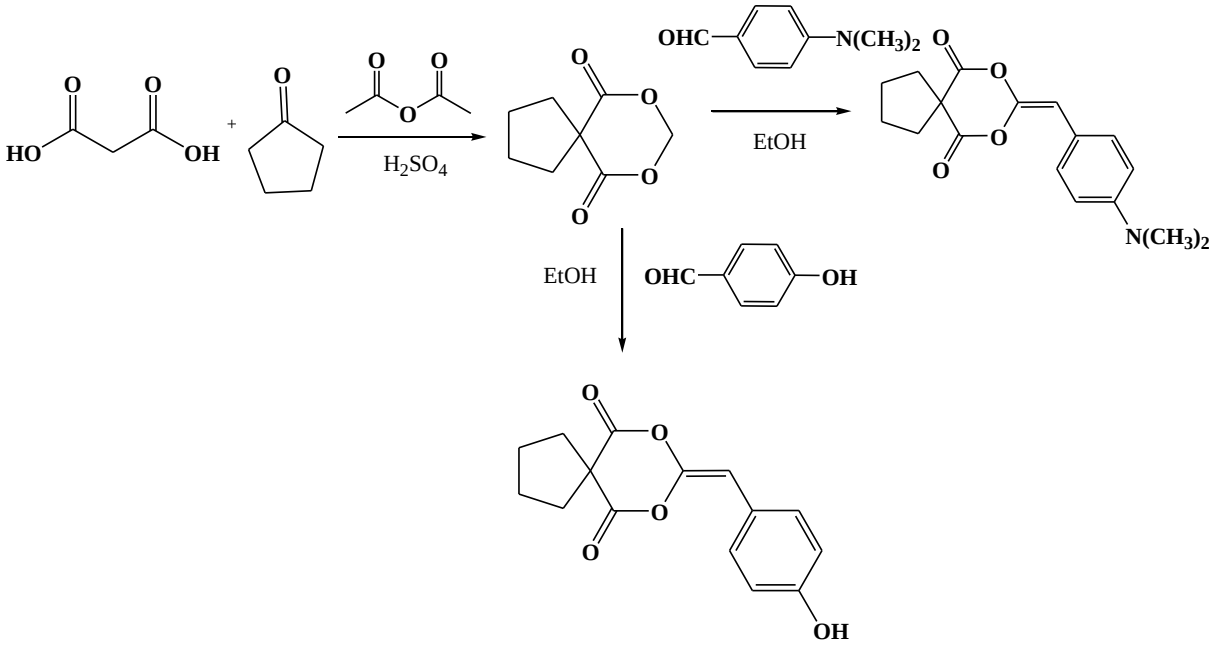
Alkylidenes derived from ketones are nearly always prepared by using the $TiCl_4$-mediated condensation in presence of pyridine of ketones with Meldrum's acid.



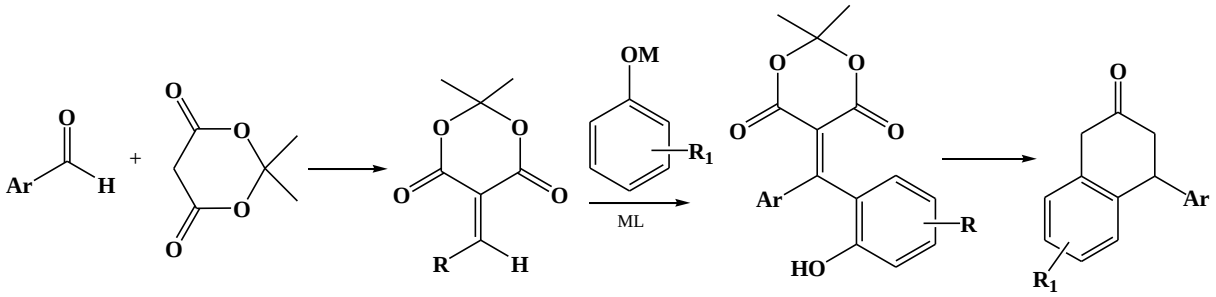
Babasaheb Bandgar et al (11) developed eco-friendly protocol for the uncatalyzed Knovengel condensation in PEG-600 at R.T. with good yields of alkylidenes derivatives of Meldrum acid



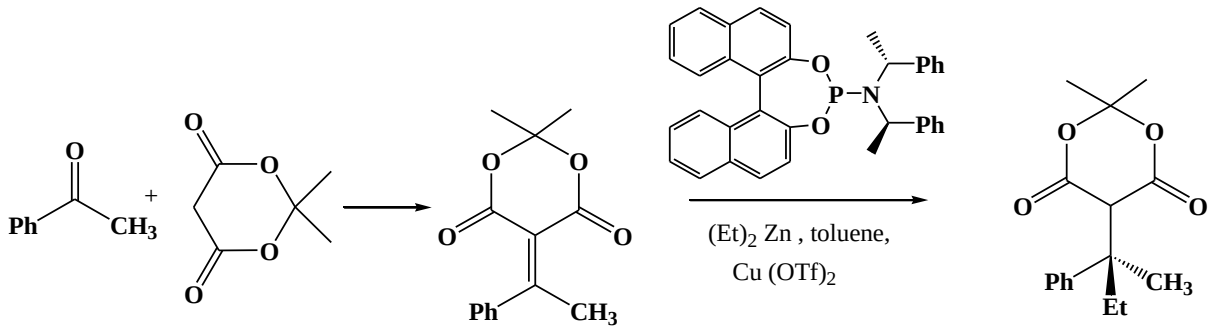
Jinhe Jiang (12) synthesized the Ox spirocyclic compound by using a mixture of malonic acid and acetic anhydride in strong sulfuric acid was stirred at 303K then added cyclopentanone dropwise and allowed to proceed for 3 h. after completion of reaction cool and filtered then above compound was react with benzaldehyde in ethanol to formed oxacyclic compounds.



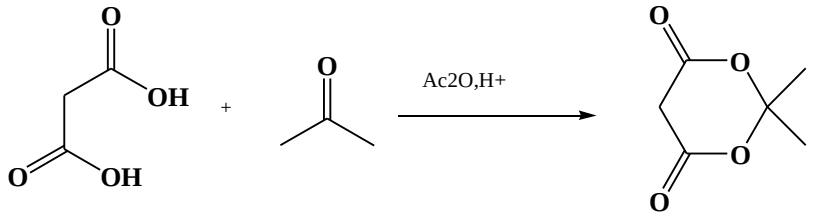
The David Thmpson (13) Moon was worked in his Master of Science degree thesis on the conjugate addition of Novel Nucleophiles and catalytic Intramolecular Tandem cyclization and Friedel-Crafts acylation with alkylidene Meldrum acid Derivatives. Addition of Metal Phenolates on to Alkylidene Meldrum's Acids by C-Alkylation/O-Acylation as shown in below



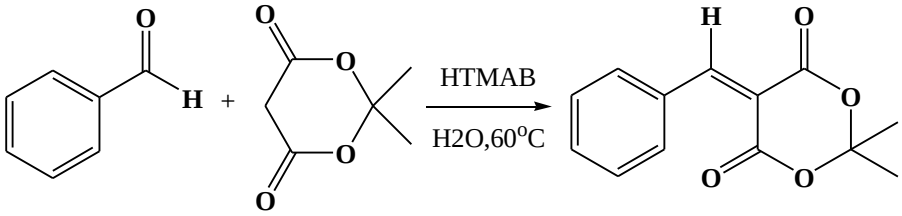
The David Thmpson Moon (13) was also work on Conjugate Addition of Dialkylzinc Reagents onto Alkylidene Meldrum's Acids via a Chiral Copper catalyst



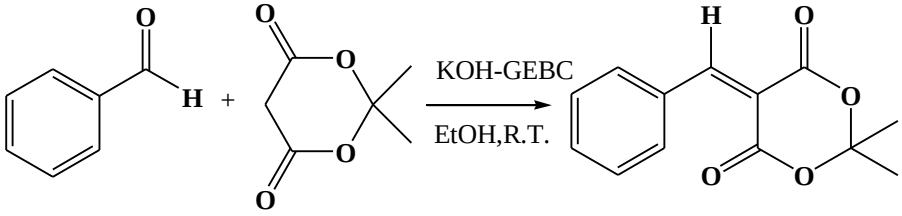
Tong-Shou Jin(14) to a solution of malonic acid in 4.8 mL of acetic anhydride, sulfuric acid was added while stirring and cooling in ice water. Acetone (4.0 mL) was added after 20 minutes, the mixture was stirred for 6 hours, and was then allowed to stand overnight in the refrigerator, and the resulting crystals filtered off.



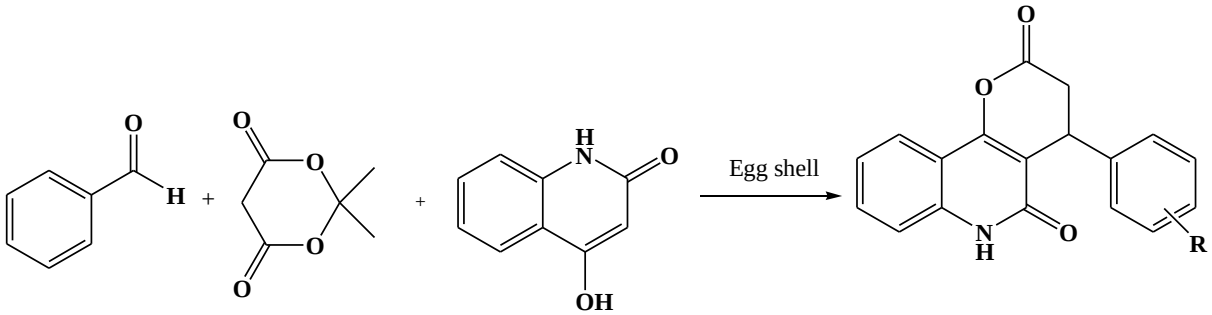
Tong-Shou Jin(14) was worked on a solution of an aromatic aldehyde and isopropylidene malonate in water was heated in the presence of a catalytic amount of HTMAB, and the corresponding 5-arylmethylene-2,2-dimethyl-1,3-dioxane-4,6-diones 3 were obtained in good to excellent yields



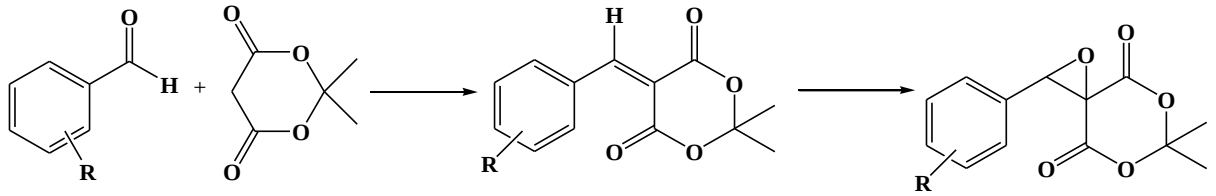
Shital Shinde et al (15), was take equimolar mixture of Meldrum acid and benzaldehyde was stirred in the presence of 1 g of various GEBCs (Gel Entrapped Base Catalysis) in EtOH at Room temperature until the completion of reaction as monitored by TLC.



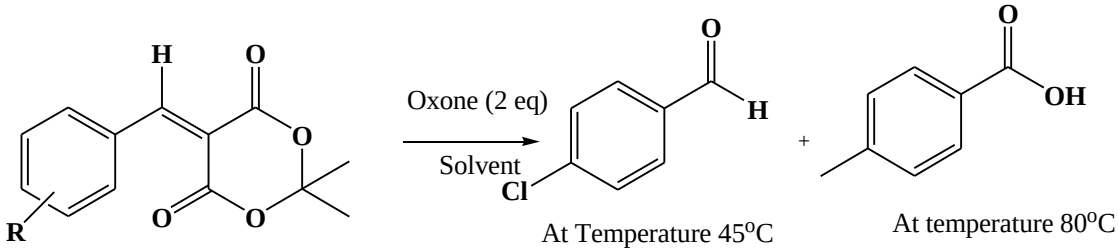
Leila Youseftabar Miri et al (16) reported a green and efficient heterogeneous catalyst for the synthesis of pyrano [3,2-c] quinoline derivatives by using a mixture ofaromatic aldehyde and Meldrum's acid with eggshell in 3 ml EtOH stirred at 60 º C (oil bath) and then added of 4-hydroxyquinolin-2(1H)-one 3 (1 mmol) to mixture of the starting materials. After completion, the reaction mixture was filtered and the obtained precipitate washed with hot ethanol.



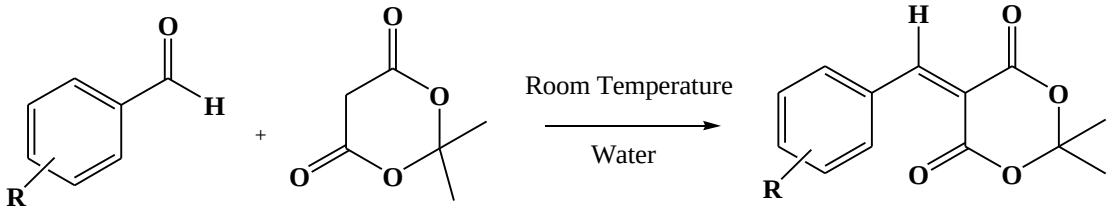
Harmeet Sandhu et al (17) reported the synthesis of arylidene derivatives of meldrum acid and its biological evaluation of meldrum acid as a antimalarial and antioxidant agent. Harmeet Sandhu et al proposed the synthetic route of arylidene and epoxide derivatives of meldrum acid.



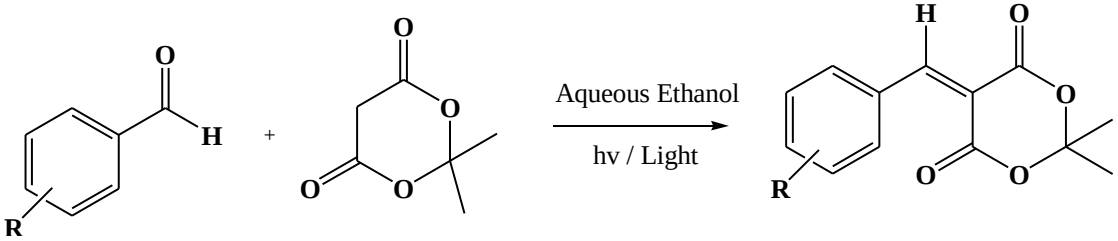
Muthish Suresh et al (18) reported the transition metal free expedient approach for the c=c bond cleavage of arylidene meldrum acid by using various oxidant.



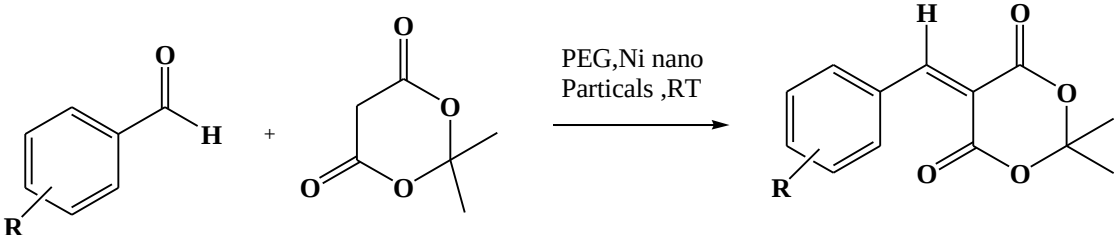
Mohit Deb et al (19) synthesized the arylidene Meldrum acid derivatives from aldehydes and meldrum acid by using water as a solvent at Room Temperature.



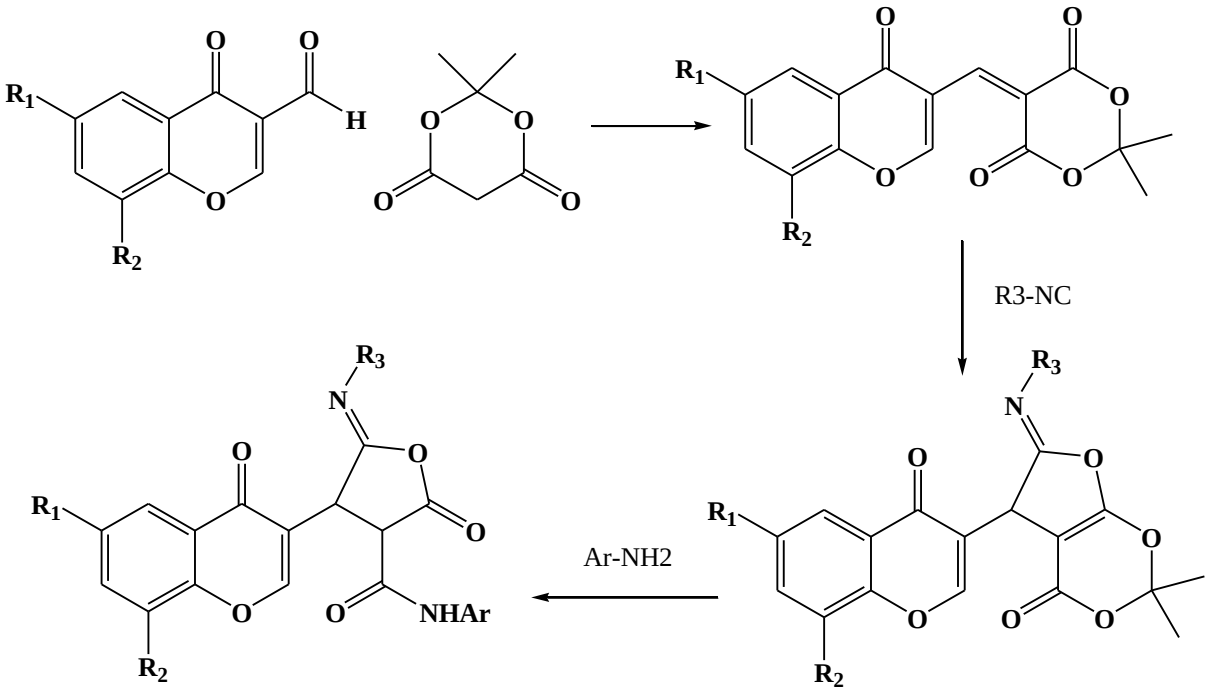
Somnath Ghosh et al (20) reported knovenagel condensation of meldrum acid with aromatic aldehydes in aquaeous ethanol initiated by photo-light.



Jitender Khurana et al (21) reported Nickel nanoparticles catalyzedchemoselective Knoevenagel condensation of Meldrum's acid and substituted aldehyde.



Mohammad Bagher et al. (22) we have developed a pseudo-five-component condensation reaction for the formation of biologically interesting tripeptide-bound chromones, which is one-pot and atom and step economic.



II. CONCLUSION

The purpose of this review is to cover systematically work on the Meldrum acid chalcone derivatives of the Meldrum's acid and the application of these processes in synthetic organic chemistry.The present study was initiated with the aim of providing an efficient and convenient method for the synthesis of arylidene analogues of Meldrum's acid. The optimization of the synthetic procedure was carried out.

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