Synthesis of active Pharmaceutical Ingredient Derivatives and its Characterization

I. Introduction:

A chemical synthesis begins by selection of compounds that are known as reagents or reactants. Various reaction types can be applied to these to synthesize the product, or an intermediate product. This requires mixing the compounds in a reaction vessel such as a chemical reactor or a simple round-bottom flask. Organic synthesis is a special branch of chemical synthesis dealing with the synthesis of organic compounds. The different factor affecting for the preparation of derivatives in chemical reaction

Steric effects

Within the frame of a program directed toward high pressure synthesis of hindered functionalized compounds we have turned to the Knoevenagel reaction between carbonyl compounds and an active methylene group affording olefins. The reaction involving ethyl cyanoacetate occurs easily with aldehydes or unhindered ketones in the presence of a weak base such as piperidine. When R and R’ in Figure I are made bulkier,

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\begin{align*}
R'\text{O} & \quad + \quad \text{H}_2\text{C} & \quad \text{CN} \quad \rightarrow \quad R & \quad \text{CN} \quad \text{COOEt} & \quad + \quad R' & \quad \text{CN} \quad \text{COOEt}
\end{align*}
\]

the reaction is slowed down or even fails utterly. Taking into account the possible beneficial effect of high pressure in sterically demanding reactions we have been prompted to examine the Knoevenagel condensation under pressure.

The Knoevenagel reaction is a multistep process consisting of a base-catalyzed enolate formation followed by water elimination. The rate-determining step can be a nucleophilic $S_N2$ attack on the electrophilic $\beta$-position of the ketone acceptor yielding the intermediate.
Alternatively, it was earlier proposed that ionization of the carbon-hydrogen bond of the active methylene group was rate-determining.\textsuperscript{4} Dehydration follows via a four-center transition state.\textsuperscript{2,5}