

A NEW SYNTHETIC METHOD FOR 2(5H)-FURANONE DERIVATIVES

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A new and general synthetic method for 2(5H)-furanone derivatives has been investigated.

The dianion (1) of phenylthioacetic acid (2) reacts clearly with mono- and disubstituted terminal epoxides to give γ -mono- and γ,γ -disubstituted α -phenylthio- γ -butyrolactones (3). Oxidation followed by pyrolysis of the resulting sulfoxides (4) leads to 5-mono- and 5,5-disubstituted 2(5H)-furanones in excellent yield. From the reaction of (1) with a symmetrically 1,2-disubstituted epoxide 4,5-disubstituted derivative is obtained. According to the similar procedure, 3,5-disubstituted 2(5H)-furanones are prepared from the dianion of alkylated derivatives of (2) and terminal epoxides.

3-Phenylthio-2(5H)-furanones (5) are synthesized by applying the Pummerer rearrangement to α -phenylsulfinyl- γ -butyrolactones. Conjugate additions of dialkylcopperlithium reagents and enolates to (5) and the sulfoxide derivatives (6) give the corresponding γ -butyrolactones which are transformed into 4-mono- and 4,5-disubstituted 2(5H)-furanones.

3-Mono-, 3,4-di-, and 3,4,5-trisubstituted 2(5H)-furanones are prepared by α -alkylation (C-3 position of furanone) of the intermediary α -phenylthio- γ -butyrolactone derivatives followed by oxidation and pyrolysis.