Chinese Chemical Letters Vol. 15, No. 10, pp 1135-1136, 2004 1135
http://www.imm.ac.cn/journal/ccl.html

New Condensation Reaction of β-keto-δ-valerolactones, Carbon Disulfide and Alkyl Halides

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Abstract: β-keto-δ-valerolactones, which were obtained by reaction of acetoacetate with aldehydes or ketones, reacted with carbon disulfide, alkyl halides and a new condensation reaction was developed. The structures of the products **3** were confirmed by ^{1}HNMR spectra and elemental analysis.

Keywords: Condensation reaction, dianion, carbon disulfide.

The biological activities of β-keto-δ-valerolactones derivatives have drawn great interest, two American companies (Pharmacia & Upjohn, Parke-Davis Division of Warner-Lambert) have reported β-keto-δ-valerolactones derivatives have good inhibitory activity of HIV proteases[1-3]. Because two hydrogen atoms in 3 position of β-keto-δ-valerolactones are very reactive, some condensation reactions were reported[4-5]. Recently we reported the condensation reaction of β-keto-δ-valerolactones with substituted anilines (heterocyclic amines) in the presence of ethyl orthoformate[6-7]. Here we report a new condensation reaction of β-keto-δ-valerolactones, carbon disulfide and alkyl halides,by which a new heterocyclic ring including sulfur atoms was formed and a series of new heterocyclic compounds were obtained.

Because β-keto-δ-valerolactones have two reactive hydrogen atoms in 3 position, they can react with carbon disulfide in the presence of weak base such as potassium carbonate under a mild reaction condition, then react with alkyl (aryl) halides to gain the title products. It is unexpected that butyl bromide and phenyl ionide did not proceed to the title products.

In a general procedure, a slurry of β-keto-δ-valerolactones and potassium carbonate in DMF was stirred for 0.5 h at room temperature, carbon disulfide and alkyl halides were added dropwise and stirred for 7 h. The reaction mixture was poured into ice- cooled water and extrated with dichloromethane. The products were purified by silica gel column or recrystallization and confirmed by ^{1}HNMR spectrum and elemental analysis **(Table 1)**.

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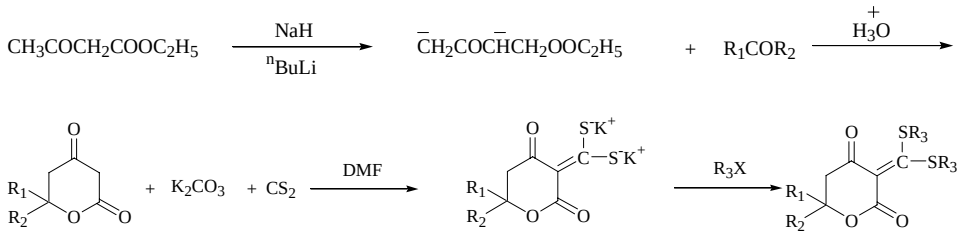

R_1=Me, Ph, Benzyl, Piperonyl; R_2=H, Me; R_3=Me,-CH_2CH_2-,-$CH_2CH_2CH_2$-

Table 1 Physical data of the title products and elemental analysis

Compound	*R_1*	*R_2*	*R_3*	*Yield(%)*	*m.p.(℃)*	*Elemental analysis(%, Cacl.)* *C*	*H*
a	Me	H	Me	68.2	148-149	57.02(57.14)	4.62(4.79)
b	Me	H	-CH_2CH_2-	65.3	246-248	46.78(46.94)	4.42(4.38)
c	Me	H	-$CH_2CH_2CH_2$-	61.2	185-186	49.16(49.16)	4.78(4.95)
d	Ph	H	Me	64.8	172-173	57.20(57.12)	4.68(4.79)
e	Ph	H	-CH_2CH_2-	62.5	217-219	57.41(57.53)	4.35(4.14)
f	Ph	H	-$CH_2CH_2CH_2$-	60.2	162-163	58.50(58.80)	4.26(4.61)
g	benzyl	Me	Me	64.3	oil	59.86(59.98)	4.38(4.40)
h	piperonyl	Me	Me	68.2	129-131	55.98(56.03)	4.52(4.42)

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Received 20 December, 2002; Revised 12 may, 2004