made by Sato, Okawa and Akabori by means of a Knoevenagel-type condensation of acetaldehyde with the active methylene groups of glycine copper complex¹). As a continuation of their study we have investigated a similar type of reaction using acetaldehyde and glycine cobalt complex. The triglycino-cobalt was reported to occur in two isomeric forms, namely α and β -form²⁾. These two isomers can be obtained separately owing to the difference of their specific gravities.

A 0.02 g. portion of glycine cobalt complex was allowed to react with 0.1 cc. of acetaldehyde in the presence of 0.1 cc. of 6% aq. sodium carbonate as a condensing catalyst in a sealed tube. After suitable periods of time the total yields of products (threonine+allothreonine) and the ratios of threo- to allo-form in the products were determined by the dinitrofluorobenzene method³⁾ and a simplified ninhydrin method, respectively.

In general, the yields, especially when the β -form complex was used, were poor, while the threo/allo ratios obtained were much higher than those observed in the case of the copper complexes (threo/allo =1.8). The highest ratio was obtained when the condensation was carried out at 70°C for 2 hr. using the α -isomer. Under this condition the total yield (allo+threo) was 32%, (see Table I).

The poor yield may be due to remarkable stability of glycine cobalt complex, and the changes in the threo/allo ratios with reaction temperature and/or time (see Tebles I and II) suggest that the stabilities of cobalt threonine and cobalt

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		1	TABLE I			
	INFLUENCE OF REACT	TION TEMP	ERATURE ON 7	THE THREO/AL	LLO RATIO	
	A	r a react	TION TIME OF	2hr.		
Reaction		α-form	β-form			
Temp.	threo, %	allo, %	threo/allo	threo, %	allo, %	threo/allo
50°C	77	23	3.4	78	22	3.5

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TABLE II INTERPROPERTY AND AN AUTO AUTO ANALY AND ANALY

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	INFLUENCE	Or	REACTION	TIME	ON	IHE	I HKEO/ ALLO	KAIIO AI	10	C	
a-form								8-form			

Reaction		a-torm		\$-form		
Time	threo, %	allo, %	threo/allo	threo, %	allo, %	threo/allo
1/2 hr.	78	22	3.5	74	26	2.9
1 hr.	82	18	4.5	75	25	3.0
2 hr.	88	12	7.6	81	19	4.2
4 hr.	85	15	5.6	78	22	3.5

1) M. Sato, K. Okawa and S. Akabori, This Bulletin, 30, 937 (1957).

The Reaction of Glycine Cobalt Complex

with Acetaldehyde

By Yoshikazu Ikutani, Tôru Okuda,

Mikio Sato and Shiro Akabori

(Received January 8, 1959)

synthesis of threonine has recently been

70°C

90°C

Considerable progress in the chemical

88

76

2) H. Ley and H. Winkler, Ber., 42, 3894 (1909).

3) J. C. Perrone, Nature, 167, 513 (1951).

81

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allothreonine complexes are different. Moreover, as can be seen in Tables I and II, the ratios obtained with the α -form appear to be slightly higher than those obtained with the β -form.

The effect of catalysts other than sodium carbonate was also examined and only potassium carbonate was effective. Disodiumhydrogenphosphate and sodium acetate were completely inactive. The detailed results on this reaction will be reported elsewhere.

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