The Selective Debenzylation of *N*-Acyl-*O*-benzylhydroxylamines

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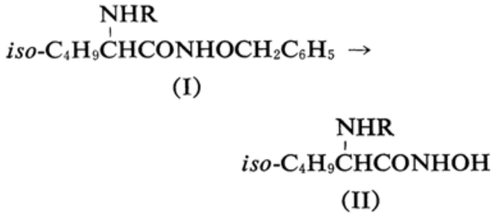
It has been shown in our laboratory[1] that the catalytic hydrogenation of *N*-leucyl-*O*-benzylhydroxylamine (I) yields *N*-leucylhydroxylamine (II). This hydrogenolytic method was applied to *N*-acyl-*O*-benzylhydroxylamines and found to yield either hydroxamic acid or amide selectively in either the presence or absence of a trace of pyridine.

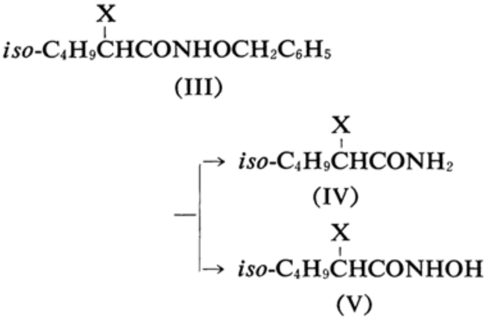


$$iso\text{-}C_4H_9\overset{NHR}{\overset{|}{C}}HCONHOCH_2C_6H_5 \rightarrow \text{(I)} \qquad iso\text{-}C_4H_9\overset{NHR}{\overset{|}{C}}HCONHOH \ \text{(II)}$$

R = H, $C_3H_7COCH_2$

N-(2-Bromo-4-methylvaleryl)-*O*-benzylhydroxylamine (III-a) prepared from 2-bromo-4-methylvaleryl chloride and *O*-benzylhydroxylamine according to the usual method[1] was dissolved in 1 N sodium hydroxide, and the solution was neutralized with 1 N hydrochloric acid to afford *N*-(2-hydroxy-4-methylvaleryl)-*O*-benzylhydroxylamine (III-b), m. p. 76—77°C (Found: C, 66.04; H, 8.27; N, 6.04. Calcd. for $C_{13}H_{19}NO_3$: C, 65.80; H, 8.07; N, 5.90%). When III-b was hydrogenated with hydrogen-5% palladium on charcoal at an initial pressure of 40 kg./cm^2 in ethanol, only the corresponding amide (IV-b) was obtained in a 81% yield, m. p. 79—81°C (lit.[2] m. p. 51—52°C) (Found: C, 54.90; H, 9.82; N, 11.90. Calcd. for $C_6H_{13}NO_2$: C, 54.94; H, 9.99; N, 10.68%), instead of the expected hydroxamic acid (V-b).

When I is compared with III-b, the difference is found to consist only in substituents of the α-position, amino- and hydroxyl-groups; thus some effect of the basic amino-group of I might cause the difference in the course of hydrogenation.



$$iso\text{-}C_4H_9\overset{X}{\overset{|}{C}}HCONHOCH_2C_6H_5 \ \text{(III)} \rightarrow \begin{cases} iso\text{-}C_4H_9\overset{X}{\overset{|}{C}}HCONH_2 \ \text{(IV)} \\ iso\text{-}C_4H_9\overset{X}{\overset{|}{C}}HCONHOH \ \text{(V)} \end{cases}$$

a, X = Br b, X = OH c, X = H

The catalytic reduction of III-b by a similar technique was then carried out in the presence of a few drops of pyridine; this yielded exclusively the corresponding hydroxamic acid (V-b), which was isolated by conversion into the copper salt, followed by treatment of the latter with hydrogen sulfide; 73% yield, m. p. 104—105.5°C (Found: N, 9.67. Calcd. for $C_6H_{13}NO_3$: N, 9.52%). The hydroxamic acid gives a wine red color with ferric chloride.

In a similar manner, *N*-(4-methyl-2-pentenoyl)-*O*-benzylhydroxylamine (VI), prepared from 4-methylpentenoyl chloride and *O*-benzylhydroxylamine, was catalytically hydrogenated in the presence of a few drops of pyridine to yield *N*-(4-methylvaleryl)hydroxylamine (V-c) in a 56% yield, m. p. 57—58.5°C (Found: N, 10.94. Calcd. for $C_6H_{13}NO_2$: N, 10.68%), which gave a wine-red ferric reaction, while the catalytic hydrogenation of VI in the absence of pyridine gave only the corresponding amide (IV-c) in a 96% yield.

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[1] M. Masaki and M. Ohta, *J. Org. Chem.*, **29**, 3165 (1964).
[2] P. Nicolle, *Bull. soc. chim. France*, **39**, 55 (1926).