THIAZOLE DERIVATIVES WITH A 3-N-METHYLENE BRIDGE

A. M. Yurkevich, V. N. Rekunova, and I. P. Rudakova

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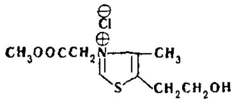
Vitamin B_1 (thiamine), its biological precursors (derivatives of thiamic acid [1]), and also a thiazole-containing coenzyme (scordinine [2]) contain a bridge methylene group connected with the nitrogen atom of the ring.

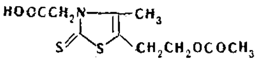
There are three possibilities for the introduction of a CH_2 group into position 3 of the thiazole nucleus.

In analogy with previous work [3, 4], by the action of methyl chloroacetate on 5-(β-hydroxyethyl-4-methylthiazole we have obtained with a 60% yield the chloride of 5-(β-hydroxyethyl-3-methoxycarbonylmethyl-4-methylthiazole (I) mp 148°-150° C (ethanol). Found, %: C 42.83; H 5.60; Cl 14.11; N 5.55. Calculated for $C_9H_{14}ClNO_3S$, %: 42.94; H 5.60; Cl 14.09; N 5.56.

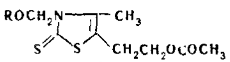
From the dithiocarbamate of sodium glycinate and γ-acetyl-γ-chloropropyl acetate we have obtained 5-(β-acetoxyethyl)-3-carboxymethyl-4-methylthiazoline-2-thione (II), yield 95%, mp 98°-100° C (ethanol). Found, %: C 43.33; H 4.77; N 5.27; S 23.28. Calculated for $C_{10}H_{13}NO_4S_2$, %: C 43.60; H 4.76; N 5.09; S 23.3. UV spectrum (methanol): λ_{max} 322 nm, log ε 4.19. IR spectrum, cm^{-1}: 3000-2500, 1700, 1210 (COOH, dimer), 1745 (C=O), 1240 (C—O—C), 1620 (thiazoline ring).



I



II



III R = H
IV R = C_6H_5NHCO-

By the hydroxymethylation [5, 6] of 5-(β-acetoxyethyl)-2-mercapto-4-methylthiazole with formaldehyde, we obtained a quantitative yield of 5-(β-acetoxyethyl)-3-hydroxymethyl-2-mercapto-4-methylthiazole (III) in the form of an oil. UV spectrum (methanol): λ_{max} 322 nm, log ε 4.18. IR spectrum, cm^{-1}: 3500-3300, 1010 (OH). To identify this compound, we prepared the crystalline phenylurethane (IV), mp 149°-151° C (ethanol). Found, %: C 52.24; H 5.09; N 7.71. Calcuated for $C_{16}H_{18}N_2O_4S_2$, %: C 52.43; H 4.95; N 7.95.

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All-Union Scientific-Research Institute
for Vitamins, Moscow