DIRECT TRANSFER FROM α-FURFURYLIDENE KETONES TO HYDROXYPROPYLPYRROLIDINES

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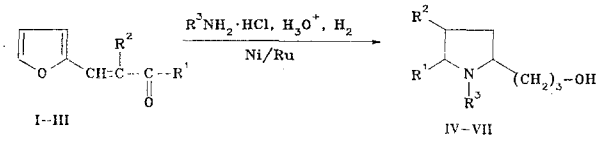
A method was previously proposed for obtaining alcohols of the pyrrolidine series and involved the hydroamination of α,β-unsaturated furyl-substituted aldehydes and ketones with the formation of the corresponding amines and hydrogenation of the latter in an acidic aqueous solution [1, 2].

For the first time, we have worked out the conditions for direct transfer from the readily available α,β-enones I-III to (hydroxypropyl)-pyrrolidines IV-VII:



I-III IV-VII

I, V $R^1=R^3=CH_3$, $R^2=H$; IV $R^1=CH_3$, $R^2=R^3=H$; II, VI $R^1-R^2=-(CH_2)_3-$, $R^3=CH_3$; III, VII $R^1-R^2=-(CH_2)_4-$, $R^3=CH_3$

The reaction involves the catalytic hydroamination of furfurylidene ketones I-III in an acidic hydroalcoholic medium (pH 4) at an elevated temperature and hydrogen pressure in the presence of Raney nickel promoted by ruthenium. Methylamine hydrochloride and ammonium chloride served as the aminating agents.

N-methyl-substituted alcohols of the pyrrolidine series V-VII form with 53-80% yields upon hydromethylamination. The use of ammonium chloride as an aminating agent makes it possible to obtain heterocyclic amino alcohols of type IV, which are not substituted at the nitrogen atom with a 30% yield.

In all cases, the reaction is stereospecific and results in the predominant formation of the cis isomers of 2-pyrrolidinylpropanols IV and V and one of the possible isomers of 2,3-cycloalkanopyrrolidine alcohols VI and VII.

The structures of amino alcohols IV-VII were confirmed by comparing their constants with the known constants [1, 2] by GLC according to the fit between the retention times of the peaks of pure samples of amino alcohols IV-VII obtained by the method described here and the previously known [1, 2] data from IR and PMR spectroscopy.

LITERATURE CITED

1. A. A. Ponomarev, A. P. Kriven'ko, and M. V. Noritsina, Khim. Geterotsikl. Soedin., No. 5, 850 (1967).
2. A. A. Ponomarev, A. P. Kriven'ko, and M. V. Noritsina, Khim. Geterotsikl. Soedin., No. 6, 787 (1970).

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