Synthesis of furo[3,4-d] imidazoles

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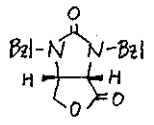
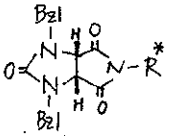
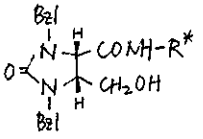
A new synthetic route of an optically active furo[3,4-d]-imidazole(I) is reported. The compound (I) is an intermediate in the synthesis of d-biotin. Treatment of a cis-1,3-dibenzyl-2-oxo-imidazolidine-4,5-dicarboxylic acid (III) or its reactive derivatives with an optically active primary amine (IV) gives a cyclic imide (V). Asymmetric reduction of (V) with sodium borohydride affords an isomeric mixture of amide-alcohols (VI), in which one diastereomer predominates. Hydrolysis of the amide-alcohol with aqueous hydrochloric acid gives the hydroxy-acid which spontaneously cyclizes to yield the optically acitive furoimidazole (I).



(I)



(V)



(VI)