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from D-idoitol; 1.1.3.8 Synthesis from D-mannitol; 1.1.3.9 Synthesis from D-glucosamic acid; 1.1.3.10 Synthesis from D-glyconolactone; 1.2 2-Carboxypyrrolidines; 1.2.1 Hydroxyprolines  
1.2.1.1 Synthesis from D-glucose; 1.2.1.2 Synthesis from D-mannitol; 1.2.1.3 Synthesis from L-arabinono- and L-lyxono-lactones; 1.2.1.4 Synthesis from D-ribonolactone; 1.2.1.5 Synthesis from D-gulonolactones; 1.2.1.6 Synthesis from D-gluconolactone; 1.2.1.7 Synthesis from D-glucoronolactone; 1.2.1.8 Synthesis from D-xylonolactone; 1.2.2 Bulgecins; 1.2.2.1 Synthesis from D-glucose; 1.2.2.2 Synthesis from D-glucuronolactone; 1.3 2-Aralkyl pyrrolidines; 1.3.1 (-)-Anisomycin; 1.3.1.1 Synthesis from D-galactose; 1.3.1.2 Synthesis from L-arabinose; 1.3.1.3 Synthesis from D-ribose; 1.3.1.4 Synthesis from L-threose; 1.3.1.5 Synthesis from L-threitol; 1.3.1.6 Synthesis from D-mannitol; 1.3.2 (+)-Preussin; 1.3.2.1 Synthesis from D-glucose; 1.3.2.2 Synthesis from D-mannose; 1.3.2.3 Synthesis from D-arabinose; 1.4 2-Aryl pyrrolidines; 1.4.1 Codonopsinine and codonopsine; 1.5 Miscellaneous; 1.5.1 Detoxins; 1.5.1.1 Synthesis from D-glucose; 1.5.1.2 Synthesis from L-ascorbic acid; 1.5.2 Gualamycin; 1.5.3 Lactacystin; 2. Five-membered heterocycles with two heteroatoms; 2.1 (+)-Hydantocidin; 2.1.1 Synthesis from D-fructose; 2.1.2 Synthesis from D-ribose; 2.1.3 Synthesis from D-threose; 2.1.4 Synthesis from D-ribonolactone; 2.2 Bleomycin; 2.2.1 Synthesis from D-glucosamine; 2.2.2 Synthesis from L-rhamnose; 2.2.3 Total synthesis of bleomycin A<sub>2</sub>; 2.3 Calyculins; 2.3.1 Synthesis from D-lyxose; 2.3.2 Synthesis from D-gulonolactone; 2.3.3 Synthesis from L-idonolactone; 2.3.4 Synthesis from D-ribonolactone; 2.3.5 Synthesis from D-erythronolactone; 2.4 Acivicin; 2.5 Bengazole; 3. Six-membered nitrogen heterocycles; 3.1 Hydroxymethylpiperidines; 3.1.1 Nojirimycin; 3.1.1.1 Synthesis from D-glucose; 3.1.1.2 Synthesis from L-sorbose; 3.1.1.3 Synthesis from L-threose

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## Sommario/riassunto

Carbohydrates are widely distributed in nature and widely available, and so are considered as a promising feedstock for the preparation of many organic chemical compounds. They are particularly useful in the preparation of nitrogen heterocycles because of their related structural characteristics and easy availability. Synthesis of Naturally Occurring Nitrogen Heterocycles from Carbohydrates will review the recent literature dealing with use of carbohydrates as raw materials in the synthesis of these materials. The text contains six chapters arranged according to the comple

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