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Original article

Synthesis and glycosidase inhibition of C-7 modified casuarine derivatives

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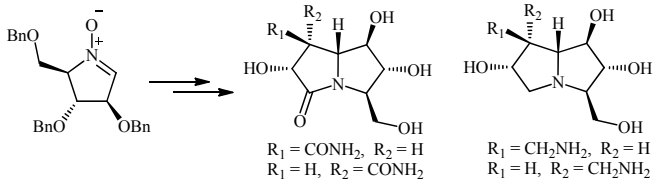
Graphical Abstract



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ABSTRACT

A series of C-7 modified analogues of casuarine have been synthesized from sugar-derived nitrone and assayed against various glycosidases. Introduction of C-7 aminomethyl or amide group led to sharp decrease of the inhibitory activities.

1. Introduction

Casuarine (**1**) was first isolated from the bark of *Casuarina equisetifolia* L. (Casuarinaceae) in 1994 [1] and then from the leaves and bark of *Eugenia uniflora* L. (Myrtaceae) [2], which are traditionally used for treatment of cancer and diabetes, respectively. Casuarine (**1**) and its related analogues constitute an important class of the polyhydroxylated pyrrolizidines for their six continuous stereogenic centres and also the most-oxygenated bicylic framework. This class of alkaloids has been shown to exhibit attractive biological activities. For example, casuarine (**1**) was a potent inhibitor of processing glycosidase I [3], rat intestinal maltase and rat intestinal isomaltase [4], and also showed potent inhibition of amyloglucosidase in a competitive manner [4,5]. Importantly, casuarine (**1**) was