Journal of Molecular Structure 1048 (2013) 130–137

Contents lists available at SciVerse ScienceDirect

Journal of Molecular Structure

journal homepage: www.elsevier.com/locate/molstruc

# Synthesis, characterization and X-ray structure of glycosyl-1,2-isoxazoles and glycosyl-1,2-isoxazolines prepared via 1,3-dipolar cycloaddition

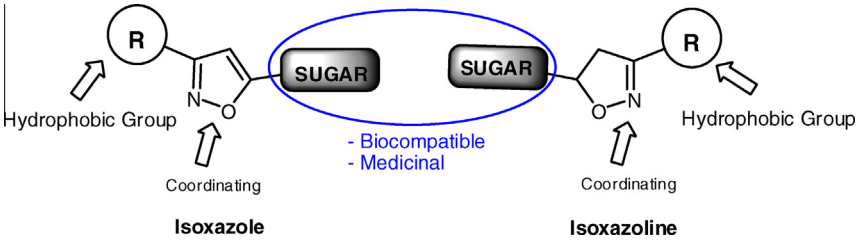
Issam Gaamoussi [a], Ismail Fichtali [a], Abdeslem Ben Tama [a], El Mestafa El Hadrami [a,*], Donatella Armentano [b,*], Giovani De Munno [b], Miguel Julve [c], Salah-Eddine Stiriba [c,*]

[a] Laboratoire de Chimie Organique Appliquée, Université Sidi Mohamed Ben Abdallah, Faculté des Sciences et Techniques, Route Immouzer, Fés, Morocco
[b] Centro di Eccelenza CEMIF, CAL, Dipartimento di Chimica e Tecnologie Chimiche, Università della Calabria, Cosenza 87030, Italy
[c] Instituto de Ciencia Molecular (ICMol), Universidad de Valencia, C/Catedrático José Beltrán 2, 46980 Valencia, Spain

## HIGHLIGHTS

- A simple strategy to prepare carbohydrate-containing 1,2-isoxazoles and 1,2-isoxazolines bio-systems is developed.
- The 1,3-dipolar cycloaddition of a variety of aryl nitrile oxides with *O*-propargyl glycosyles affords efficiently glycosyl-1,2-isoxazoles.
- The 1,3-dipolar cycloaddition of aryl nitrile oxides with *O*-allyl glycosyles affords efficiently glycosyl-1,2-isoxazolines.
- The anomeric stereochemistry and the placement of the acetal groups of these biocompounds are retained as confirmed by X-ray analysis.

## GRAPHICAL ABSTRACT




## ARTICLE INFO

*Article history:*
Received 6 February 2013
Received in revised form 19 May 2013
Accepted 20 May 2013
Available online 28 May 2013

*Keywords:*
Cycloaddition
Glycosyle
Nitrile oxide
1,2-Isoxazole
1,2-Isoxazoline

## ABSTRACT

A convenient preparative method of a series of glycosyl-1,2-isoxazoles (**6–11**) and glycosyl-1,2-isoxazolines (**15–20**) by a simple and efficient 1,3-dipolar cycloaddition of a series of aryl nitrile oxide, generated *in situ* from aryl oximes (**4–5**), with a variety of *O*-propargyl glycosyles (**1–3**) or *O*-allyl glycosyles (**12–14**) respectively, is reported. The carbohydrate-containing 1,2-isoxazoles and 1,2-isoxazolines compounds were isolated in excellent yields (81–91%) and they were fully characterized by $^{1}H$, $^{13}C$ NMR and mass spectrometry. The relative stereochemistry of the glycosyl-1,2-isoxazole **10** was confirmed by single crystal X-ray analysis. The molecular structure of **10** confirms the retention of both, the anomeric stereochemistry of the *D*-fructose as well as the placement of the acetal groups.



## 1. Introduction

1,2-Isoxazoles and 1,2-isoxazolines are oxygen–nitrogen (*O*,*N*) heterocycles that are important building blocks for the construction of a variety of compounds with medicinal applications [1] exhibiting antitumor [2], anti-HIV [3], antifungal [4], antibacterial

* Corresponding authors. Tel.: +212 35 60 9635; fax: +212 35 60 8214.
*E-mail addresses:* elhadrami_mes@yahoo.com (E.M. El Hadrami), donatella.armentano@unical.it (D. Armentano), stiriba@uv.es (S.-E. Stiriba).

0022-2860/$ - see front matter © 2013 Elsevier B.V. All rights reserved.
http://dx.doi.org/10.1016/j.molstruc.2013.05.043

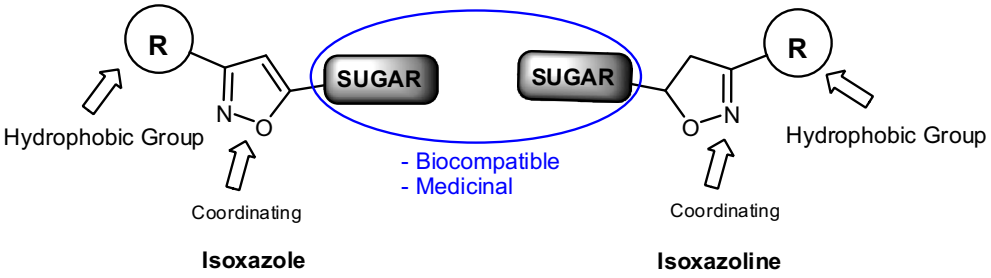
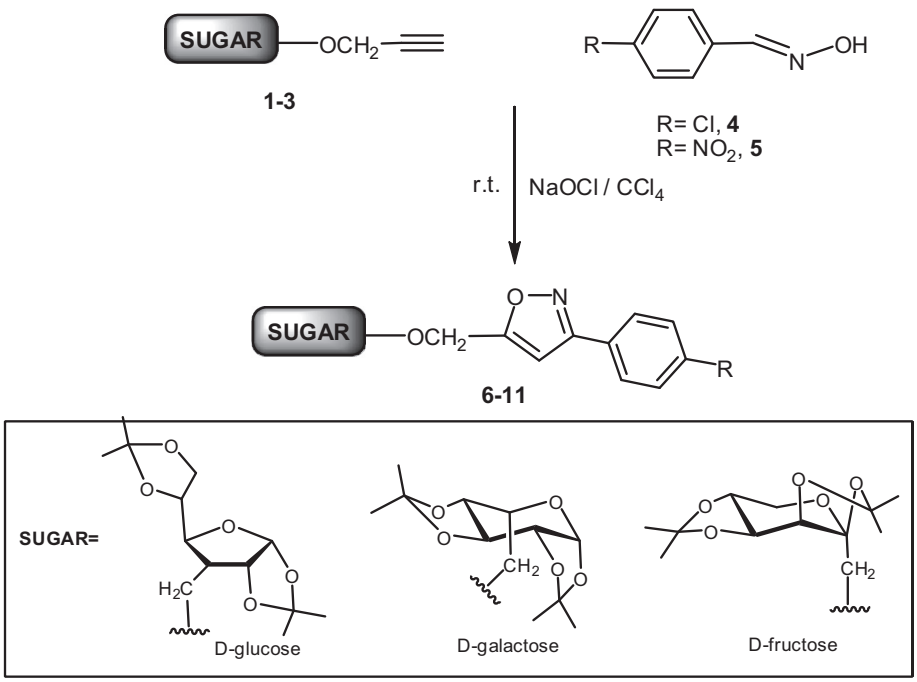
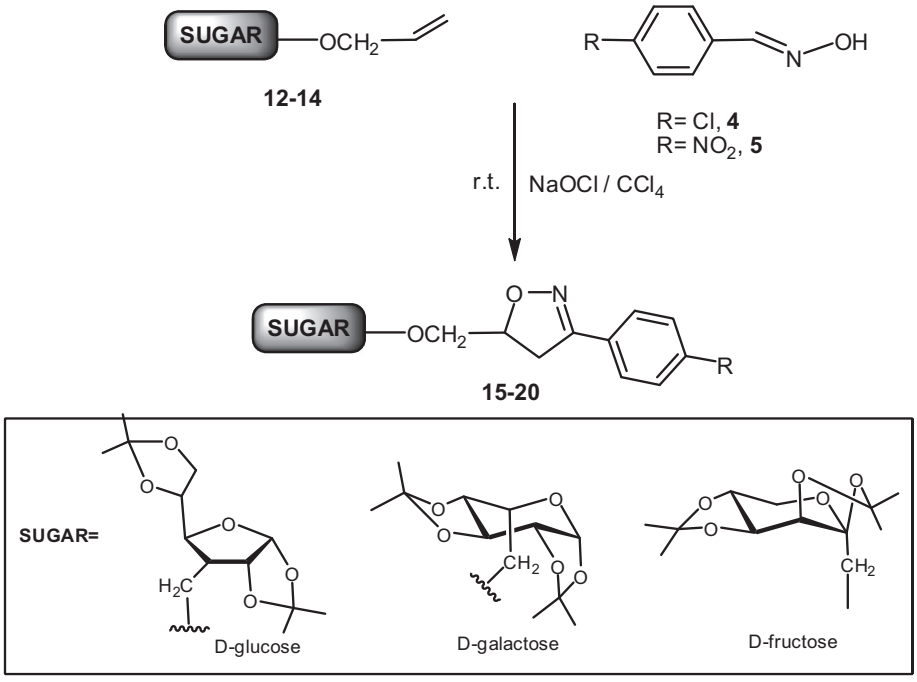



**Fig. 1.** The functional diversity of isoxazole and isoxazoline-containing sugar fragments.




**Scheme 1.**




**Scheme 2.**