

## Accepted Manuscript

Title: Synthesis and antioxidant property of novel 1,2,3-triazole-linked starch derivatives via 'click chemistry'

Author: Wenqiang Tan Qing Li Wancong Li Fang Dong Zhanyong Guo



PII: S0141-8130(15)30011-8  
DOI: <http://dx.doi.org/doi:10.1016/j.ijbiomac.2015.10.007>  
Reference: BIOMAC 5421

To appear in: *International Journal of Biological Macromolecules*

Received date: 7-7-2015  
Revised date: 13-9-2015  
Accepted date: 3-10-2015

Please cite this article as: W. Tan, Q. Li, W. Li, F. Dong, Z. Guo, Synthesis and antioxidant property of novel 1,2,3-triazole-linked starch derivatives via 'click chemistry', *International Journal of Biological Macromolecules* (2015), <http://dx.doi.org/10.1016/j.ijbiomac.2015.10.007>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

1 Synthesis and antioxidant property of novel 1,2,3-triazole-linked starch derivatives via  
2 'click chemistry'

3  
4 Wenqiang Tan <sup>a,b</sup>, Qing Li <sup>a</sup>, Wancong Li <sup>a,b</sup>, Fang Dong <sup>a</sup>, Zhanyong Guo <sup>a,\*</sup>

5  
6 <sup>a</sup> Key Laboratory of Coastal Biology and Bioresource Utilization, Yantai Institute of Coastal Zone  
7 Research, Chinese Academy of Sciences, Yantai 264003, China

8 <sup>b</sup> University of Chinese Academy of Sciences, Beijing 100049, China  
9

## 10 Abstract

11 Based on the copper (I) catalyzed Huisgen azide-alkyne cycloaddition (click chemistry),  
12 the novel synthesis of a variety of 1,2,3-triazole-linked starch derivatives was developed,  
13 including 6-hydroxymethyltriazole-6-deoxy starch (**HMTST**),  
14 6-hydroxyethyltriazole-6-deoxy starch (**HETST**), 6-hydroxypropyltriazole-6-deoxy  
15 starch (**HPTST**), and 6-hydroxybutyltriazole-6-deoxy starch (**HBSTST**). Their  
16 antioxidant properties against hydroxyl-radical, DPPH-radical, and superoxide-radical  
17 were evaluated *in vitro*, respectively. The antioxidant activity of the obtained novel  
18 amphiprotic starch derivatives via 'click reaction' exhibited remarkable improvement  
19 over starch. And the scavenging effect indices of most of the products were higher than  
20 60% at 1.6 mg/mL against hydroxyl-radical and DPPH-radical. Moreover, the  
21 scavenging effect of the products against superoxide-radical attained 90% above at 0.1  
22 mg/mL. Generally, the antioxidant activity decreased in the order: **HBSTST** > **HPTST** >  
23 **HETST** > **HMTST** > **starch**. Furthermore, the order of their antioxidant activity was  
24 consistent with the electron-donating ability of different substituted groups of the  
25 1,2,3-triazoles. The substituted groups with stronger electron supplying capacity  
26 provided more electrons to the various radicals, which relatively enhanced the capacity  
27 for scavenging free radicals.

## 28 Keyword

29 Starch derivatives; Click chemistry; Antioxidant activity  
30

## 31 Introduction

32 Reactive oxygen species (ROS), including hydroxyl radicals ( $\cdot\text{OH}$ ), hydrogen peroxide  
33 ( $\text{H}_2\text{O}_2$ ), and superoxide anion ( $\text{O}_2^{\cdot-}$ ) [1-3], can induce damage to cellular constituents [4],  
34 which can cause neurodegenerative diseases such as Alzheimer's and Parkinson's  
35 diseases, cancer, hypertension, diabetes, and many other diseases associated with aging in  
36 biological systems [5-9]. The role of antioxidants has received increased attention during  
37 the past decades. However, the use of synthetic antioxidants, such as butylated  
38 hydroxyanisole, butylated hydroxytoluene, and propyl gallate, has potential health

---

\*Corresponding author: Tel.:+86-535-2109171; Fax: +86-535-2109000  
E-mail address: zhanyongguo@hotmail.com

Download English Version:

<https://daneshyari.com/en/article/8330108>

Download Persian Version:

<https://daneshyari.com/article/8330108>

[Daneshyari.com](https://daneshyari.com)