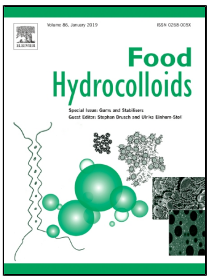
Accepted Manuscript



Construction of Bi_2WO_6–TiO_2/starch nanocomposite films for visible-light catalytic degradation of ethylene

Haidan Wang, Li Wang, Shengying Ye, Xianliang Song

PII:	S0268-005X(18)31119-6
DOI:	10.1016/j.foodhyd.2018.09.021
Reference:	FOOHYD 4658
To appear in:	*Food Hydrocolloids*
Received Date:	19 June 2018
Accepted Date:	14 September 2018

Please cite this article as: Haidan Wang, Li Wang, Shengying Ye, Xianliang Song, Construction of Bi_2WO_6–TiO_2/starch nanocomposite films for visible-light catalytic degradation of ethylene, *Food Hydrocolloids* (2018), doi: 10.1016/j.foodhyd.2018.09.021

Construction of Bi_2WO_6–TiO_2/starch nanocomposite films for visible-light catalytic degradation of ethylene

Haidan Wang, Li Wang, Shengying Ye, Xianliang Song*[1]

College of Food Science, South China Agricultural University, Guangzhou 510642, PR China

Abstract

Bi_2WO_6–TiO_2 (BT)/starch nanocomposite films were prepared by incorporating BT nano-particles through the casting method. The BT nano-particles used were synthesized by solvothermal method. The effects of BT loadings (0, 1, 2, 3, 4, and 5 wt% dry basis) on the optical, mechanical, microstructural, spectral, and thermal properties of the nanocomposite films were investigated, and their photocatalytic activities were evaluated from the degradation of ethylene under visible light. With the increase in BT loading, the tensile strength of the film specimens increased while elongation at break and transparency decreased; the nano-particle agglomerates increased when excess BT nano-particles were added into the films. When the loading was 4%, the film exhibited the highest photocatalytic activity, and the rate of ethylene degradation reached 12.47%. In conclusion, the BT/starch films can effectively degrade ethylene in gaseous phase, and they have the potential to be used as fruit and vegetable packaging materials.

Keywords: Starch film; Nanocomposite; Bi_2WO_6–TiO_2; Photocatalytic degradation; Ethylene; Visible light

1. Introduction

Ethylene (C_2H_4), a plant hormone, accelerates the ripening and senescence of fruits and vegetables. It can be released by horticultural products themselves through respiration (Ansari & Tuteja, 2015; Chaves & Mello-Farias, 2006); hence, removing C_2H_4 from the storage environment of horticultural commodities is the key to the prolongation of shelf life during the sale period and to reducing economic losses. Reported methods such as physical absorption (Albunia, Minucci & Guerra, 2008), as well as the use of oxidants (Mehlhorn, O'shea & Wellburn, 1991) and catalysis

[1] Corresponding author: Xianliang Song, E-mail address: songxl2000@163.com;