

Accepted Manuscript

Sustainability and antimicrobial assessments of bio based polybenzoxazine film

Periyasamy Thirukumaran, Asrafali Shakila Parveen, Raji Atchudan, Seong-Cheol Kim

PII: S0014-3057(18)31364-8
DOI: <https://doi.org/10.1016/j.eurpolymj.2018.09.031>
Reference: EPJ 8604

To appear in: *European Polymer Journal*

Received Date: 23 July 2018
Revised Date: 10 September 2018
Accepted Date: 17 September 2018

Please cite this article as: Thirukumaran, P., Shakila Parveen, A., Atchudan, R., Kim, S-C., Sustainability and antimicrobial assessments of bio based polybenzoxazine film, *European Polymer Journal* (2018), doi: <https://doi.org/10.1016/j.eurpolymj.2018.09.031>

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.



Sustainability and antimicrobial assessments of bio based polybenzoxazine film

Periyasamy Thirukumaran^a, Asrafali Shakila Parveen^b, Raji Atchudan^a,
Seong-Cheol Kim^{a*}

^a*School of Chemical Engineering, Yeungnam University, Gyeongsan 38541, Republic of Korea*

^b*School of Material Science and Engineering, Myongji University, Yongin, Republic of Korea*

* Author for the Correspondence: E-mail: sckim07@ynu.ac.kr

Abstract

Renewable materials are abundantly available in nature and have the capability to degrade within a short period of time. In the present study, a novel class of chitosan-based polybenzoxazine has been synthesized for the first time. Water, an edible solvent was used for the benzoxazine synthesis, adopting moderate reaction temperature. This bio-based benzoxazine monomer was crosslinked by thermal treatment via ring-opening polymerization to form free-standing polymer films [poly(E-Ch)] without the evolution of volatiles. Hydrogen bonding interactions were found to exist between chitosan and polybenzoxazine. This type of interactions significantly enhance the thermal and mechanical properties with T10 of about 260 °C; ϵ' of about 3.6GPa; and Tg of about 135 °C showing unuual levels of synergism. Interestingly, both the bio-films-poly(E-Ch) and CH do not affect the cell growth. In particular, poly(E-Ch) is effective in preventing bio-film associated infections.

Keywords: Chitosan, eugenol, bio-benzoxazine, biodegradable film

Download English Version:

<https://daneshyari.com/en/article/11031198>

Download Persian Version:

<https://daneshyari.com/article/11031198>

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