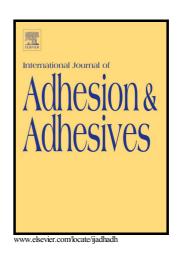
Author's Accepted Manuscript

Effects of phosphorus-containing additives on soy and cottonseed protein as wood adhesives

H.N. Cheng, Catrina Ford, Michael K. Dowd, Zhongqi He



PII: S0143-7496(17)30058-1

DOI: http://dx.doi.org/10.1016/j.ijadhadh.2017.03.008

Reference: JAAD1988

To appear in: International Journal of Adhesion and Adhesives

Received date: 26 September 2016 Accepted date: 12 March 2017

Cite this article as: H.N. Cheng, Catrina Ford, Michael K. Dowd and Zhongq He, Effects of phosphorus-containing additives on soy and cottonseed protein a wood adhesives, *International Journal of Adhesion and Adhesives* http://dx.doi.org/10.1016/j.ijadhadh.2017.03.008

This is a PDF file of an unedited manuscript that has been accepted fo publication. As a service to our customers we are providing this early version o the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable 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

ACCEPTED MANUSCRIPT

Effects of phosphorus-containing additives on soy and cottonseed protein as wood adhesives

H. N. Cheng*, Catrina Ford, Michael K. Dowd, Zhongqi He

Southern Regional Research Center, USDA Agricultural Research Service, 1100 Robert E. Lee Blvd., New Orleans, LA 70124, USA

Abstract

Soy and cottonseed proteins appear promising as sustainable and environment-friendly wood adhesives. Because of their higher cost relative to formaldehyde-based adhesives, improvement in the adhesive performance of proteins is needed. In this work, we evaluated the adhesive properties of soy and cottonseed protein formulations that included phosphorus-containing acids and esters. For cottonseed protein isolate, most of these additives improved dry adhesive strength, with methylphosphonic acid, phosphorous acid, and phosphoric acid increasing the dry strength by 47, 44, and 42%, respectively, at their optimal concentrations. For soy protein isolate, these additives did not show significant benefits. The phosphorus-containing additives also improved the hot water resistance of the cottonseed protein formulations but showed either no effect or a negative effect for the of soy protein formulations. Thus, the combination of cottonseed protein with phosphorus additives appears to be attractive as wood adhesives.

Keywords: Adhesive strength, cottonseed protein; phosphorus compounds; soy protein; water resistance; wood adhesive

Download English Version:

https://daneshyari.com/en/article/5014704

Download Persian Version:

https://daneshyari.com/article/5014704

<u>Daneshyari.com</u>