Kraft lignin degradation products for tanning and dyeing of leather

Authors: Ono Suparno; Anthony D Covington[1]; Christine S Evans[2]

Source: Journal of Chemical Technology & Biotechnology, Volume 80, Number 1, January 2005 , pp. 44-49(6)

Publisher: John Wiley & Sons, Ltd.

Abstract:

Kraft lignin degradation by a biomimetic system was investigated, using hemin as a catalyst and hydrogen peroxide as an oxidising agent, which mimics the catalytic mechanism of lignin peroxidase (LiP) to produce phenolic compounds. The degradation products were identified using spectroscopy and gas chromatography–mass spectrometry (GC–MS): 2-methoxyphenol, 4-hydroxybenzaldehyde, vanillin and vanillic acid were produced and their formaldehyde polymerisation products used for tanning hide powders. The denaturation (shrinkage) temperature of hide powder was raised to 80 °C through hydrogen-bonding interactions between the polymers and the collagenic hide powder. For dyeing of hide powder, the lignin degradation products were reacted with laccase (a polyphenol oxidase): 2-methoxyphenol gave the darkest colour. These products have potential to be used as raw materials for tanning and dyeing of animal skins. Therefore, value can be added to this industrial byproduct and reduce its environmental impact. Copyright © 2004 Society of Chemical Industry

Keywords: Kraft lignin; biomimetic degradation; phenols; dyeing; tanning; leather

Document Type: Research article

DOI: 10.1002/jctb.1150

Affiliations: 1: British School of Leather Technology, University College Northampton, Park Campus, Boughton Green Road, Northampton, NN2 7AL, UK **2:** Fungal Biotechnology Research Group, School of Biosciences, University of Westminster, 115 New Cavendish Street, London, W1W 6UW, UK