

Supporting information

Development of a polylactic acid-coated nanocellulose/chitosan-based film indicator for real-time monitoring beef spoilage

Abdus Sobhan^a, Kasiviswanathan Muthukumarappan^a, Lin Wei^{a*}, Ruanbao Zhou^b, and Hemachand Tummala^c

^a*Department of Agricultural & Biosystems Engineering, South Dakota State University,*

1400 North Campus Drive, Brookings, South Dakota 57007, United States

^b*Department of Biology and Microbiology, South Dakota State University, 1400 North Campus Drive, Brookings, SD 57007, United State*

^c*Department of Pharmaceutical Sciences, South Dakota State University, 1400 North Campus Drive, Brookings, SD 57007, United State*

*Correspondence: E-mail: Lin.Weil@sdstate.edu.; Tel: +1-605-688-4179; Fax: +1-605-688-6764.

Contents:

Fig. S1. Color variation of PLA/NCM film with respect to beef spoilage at room temperature ($22 \pm 2^\circ\text{C}$).

Fig. S2. The color change (ΔE) of PLA/NCM film towards the spoiling beef at room temperature ($22 \pm 2^\circ\text{C}$).

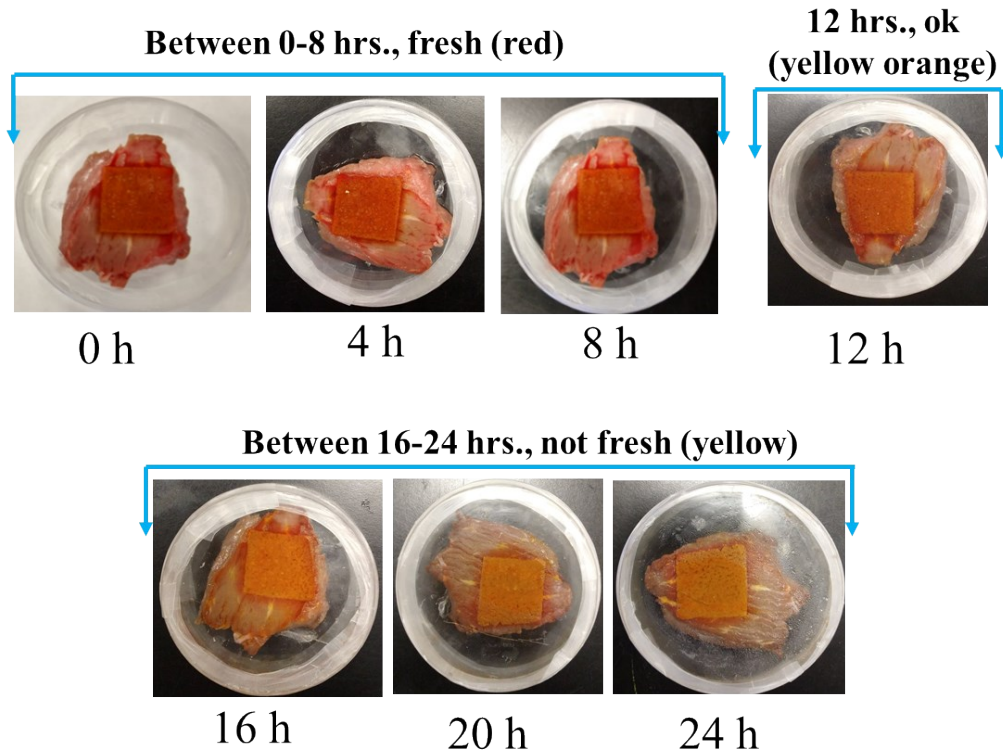


Fig. S1. Color variation of PLA/NCM film with respect to beef spoilage at room temperature ($22 \pm 2^\circ\text{C}$).

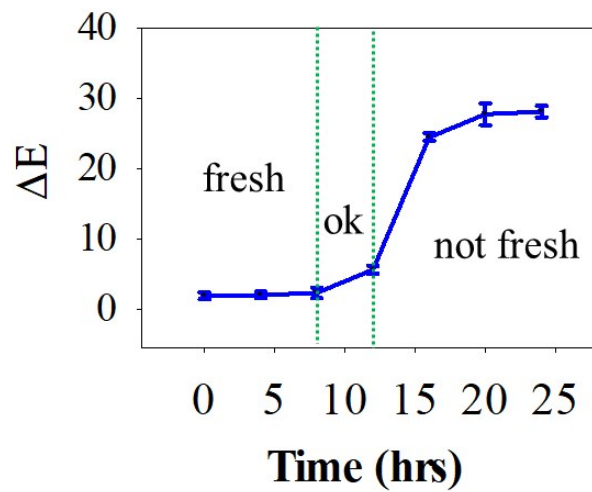


Fig. S2. The color change (ΔE) of PLA/NCM film towards the spoiling beef at room temperature ($22 \pm 2^\circ\text{C}$).