Sensor Paper for Food Safety Applications

Using Microfibrillated Cellulose

Future Work

- Higher concentration of MFC will be implemented into coating by improving
- Immobilized enzyme systems will be developed to detect harmful bacteria in food
- Bromocresol dye will be printed onto coated paper using a dot matrix printer

Innovation:
- Microfibrillated cellulose (MFC) was substituted as a binder replacing the traditional PVOH
- MFC is sustainable and its large surface area to volume ratio improves sensitivity
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Previous research used: self-assembled nanostructured particles (diatomaceous earth), bromocresol purple dye, and polyvinyl alcohol (PVOH) to coat paper

Paper Sensing Food

- Bromocresol purple dye (Fig. 2)
- Ammonia induces a color change in the pH sensitive
- \( \text{pH} \) can be sensed by the pH sensitive

Inkjet printable bromocresol purple dye epoxidized diatomaceous earth

- Using microfibrillated cellulose increases sensitivity
- Microfibrillated cellulose (MFC) was substituted as a binder replacing the traditional PVOH
- MFC can be used as a platform for enzyme immobilization
- MFC is sustainable and its large surface area to volume ratio improves sensitivity

Higher concentrations of MFC will be implemented into coating by improving

Immobilized enzyme systems will be developed to detect harmful bacteria in food

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DO NOT EAT

Figure 1: Sensor paper used to sense rotten meat. Dye turns dark purple when volatile amines are detected

Figure 2: Response of paper-based gas sensor with 6 g/m² coat weight and 0.5 part dye to various levels of volatile ammonia.

Figure 3. SEM image of the sensor paper surface at 4000X magnification. The barrels of the diatoms are clearly visible

Figure 4: SEM image showing diatoms surrounded by NFC. The diatoms have high surface area and open pores for good gas permeation (2700X mag.)

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