

## Seeing is believing– Food freshness indicator in intelligent packaging

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**Statement of the Problem:** Food wasting is a serious issue worldwide. According to FAO (Food and Agriculture Organization of the United Nations), about 1/3 of food produced globally is wasted. Intelligent packaging materials are “materials and articles that monitor the condition of packaged food or the environment surrounding the food”, which is considered as a solution to reducing food waste. Freshness indicator fall within the category of food quality indicators in intelligent packaging. The actual freshness of food inside the package can be monitored, reducing the dispose of edible food. We developed a simple, low-cost, natural-derived food freshness indicator. By detecting metabolites from spoilage-causing microbes, the food deterioration inside the package is directly reflected through visible colorimetric change of the indicator.

**Methodology & Theoretical Orientation:** Plant-derived pigments such as anthocyanins show different colour in respond to pH change. The sensitivity of these pigments to pH vary due to their chemical composition. During meat spoilage, the breakdown of protein by microorganisms produces volatile biogenic amines, which alter the ambient pH inside the package. By observing the colorimetric change of anthocyanin-indicator, we are able to distinguish the freshness of meat inside the package.

**Findings:** Combining natural pigments with different color and sensitivity, we found the indicator showed multiple color during pH change, which correlated to the spoilage level. According to this phenomenon we developed a colorimetric indicator which represents the deterioration level of meat inside the package: fresh, medium fresh or spoiled.

**Conclusion & Significance:** Intelligent packaging incorporate quality sensing platforms offer great opportunities of reducing food waste, enhance food quality and safety. Some indicators have been developed using synthetic chemical dyes, which may cause worries to users if leakage happens inside the food package. Combining natural-derived anthocyanins we developed a safer indicator which monitors the quality of perishable food such as sea food, meat or poultry inside the package through visual colorimetric change

### Biography

Chia-Ying Tang is an associate researcher in Industrial Technology Research Institute (ITRI), Taiwan since 2016. Her experience in biotechnologies dated back to her college time. She has received her Master degree in Agriculture with specialty in molecular biology from Nation Taiwan University. Previous research was on colorectal cancer in college of biological science and technology, National Chiao Tung University as research assistant. She joined Biomedical Technology and Device Research Laboratories in ITRI 2 years later. Currently focus on the development of freshness indicator and cancer molecular diagnosis platform.

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