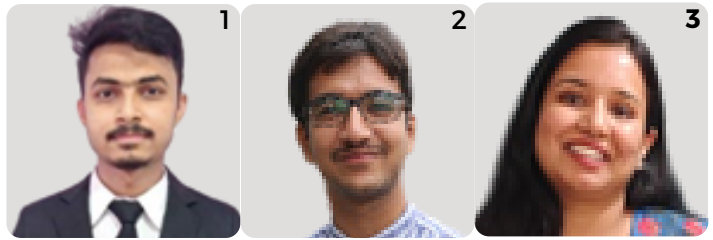


## Sensors for Food Packaging Applications

KID: 20231307



Smart/Intelligent food packaging is emerging as a novel technology, capable of monitoring the quality and safety of food during its shelf-life time. This technology makes use of indicators and sensors that are applied in the packaging and that detect changes in physiological variations of the foodstuffs (due to microbial and chemical degradation). These indicators usually provide information, e.g., on the degree of freshness of the product packed, through a colour change, which is easily identified, either by the food distributor or the consumer.

Our cellulose and composites research group at MSME, IITH is working on food packaging to enhance the shelf life of fresh farm produce. We are also working on integrating anthocyanin into existing packaging films to make pH-sensitive films for monitoring food freshness.

Anthocyanin-loaded films change colour based on the pH of the packed fruits/vegetables thereby helping the consumer to get an idea of spoilage. As anthocyanin has antioxidant properties, it can also be used as an oxygen scavenger.

“Our cellulose and composites research group at MSME, IITH is working on food packaging to enhance the shelf life of fresh farm produce. We are also working on integrating anthocyanin into existing packaging films to make pH-sensitive films for monitoring food freshness.”

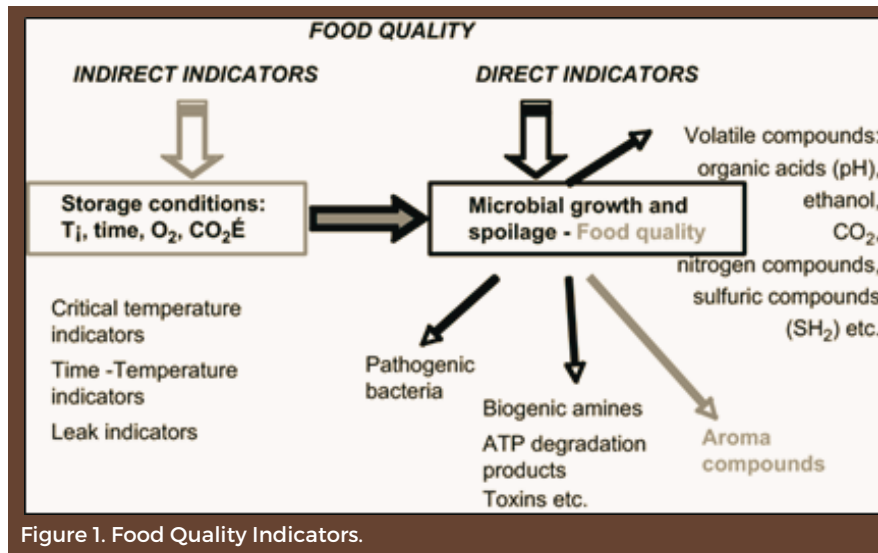


Figure 1. Food Quality Indicators.

As per the Sustainable Development Goals, we are looking for sustainability in every aspect. The current trend in food packaging is to create sustainable packaging materials made of natural materials and extracts of anthocyanin, which is a polyphenol pigment of plants endowed with antioxidant activity and pH-responsive properties to monitor microbial food deterioration of fresh cut fruits and vegetables as customers are inclined towards the consumption of cut packed fruits and vegetables. Anthocyanins change colour at different pH levels because their molecular structure shifts as the pH of the solution they are in changes from acidic to basic and vice versa. This makes these pigments unique compared to other natural colours.

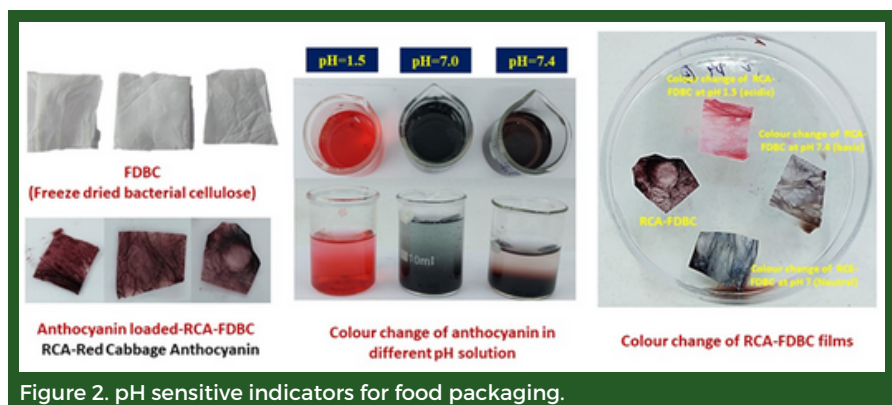


Figure 2. pH sensitive indicators for food packaging.

[1] Mr Partha Pratim Das  
MTech 2nd Year  
[2] Mr Shreyansh Agarwal  
BTech 3rd Year

[3] Dr Mudrika Khandelwal  
Associate Professor  
Department of Materials Science and Metallurgical Engineering,