

Synthesis and physicochemical characterization of polymer film-based anthocyanin and starch

ABSTRACT

Colorimetric indicators, used in food intelligent packaging, have enormous promise for monitoring and detecting food quality by analyzing and interpreting the quality data of packaged food. Hence, our study developed and characterized a biopolymer film based on starch and anthocyanin for prospective meat freshness monitoring applications. The developed film was morphologically characterized using different morphology instruments to identify the interaction between anthocyanin and starch. The color differences of the proposed film in response to different pH buffers have also been investigated. The combination of anthocyanin and starch produces a smooth and homogenous surface with an intermolecular hydrogen bond that increases the biopolymer's wavelength. The film indicated bright red at pH 2.0–6.0, bluish-grey at pH 7.0–11.0, and yellowish-green above 11.0 that the naked eye can see. The indicator film shows high sensitivity toward pH changes. The inclusion of anthocyanin increases the biopolymer film's thickness and crystalline condition with low humidity, water solubility, and swelling values. As a result, the polymer film can be employed in the food industry as an affordable and environmentally friendly indication of meat freshness.