

Effect of Antigonon leptopus extract in corn starch-glycerol based film as colourimetric indicator film for monitoring fish freshness

ABSTRACT

A colourimetric indicator can be used to test the freshness of fish in a rapid, straightforward and non-destructive manner. Anthocyanin, a natural dye found in *Antigonon leptopus* flowers, has a sensitive colour reactivity to a wide range of pH levels and can be made into colourimetric indicator films on a laboratory scale, making it a viable replacement for artificial dyes. The study's purpose was to see how the concentration of *A. leptopus* extract affected the colourimetric assessment of fish freshness. Ethanol was used to extract anthocyanin from *A. leptopus*. FTIR and pHrespond spectroscopies were used to characterise the extracts. Colourimetric indicator films were developed to assess fish freshness by incorporating *A. leptopus* extract into a corn starch-glycerol matrix via the solution casting method, with concentrations of 10%, 30% and 50%, respectively. The effect of *A. leptopus* extract on visual aspects, thickness, morphology, FTIR spectra, UV-Vis spectra and colour responses was analysed. Microbial analysis, TVB-N contents, firmness, and pH of the fish samples were analysed after storage. The colour of the original films became darker as the extracted content increased. There was no significant ($p > 0.05$) effect of *A. leptopus* extract on film thickness. SEM micrographs revealed that the composite films had homogeneous and whitish granules on the surface and that increasing the *A. leptopus* extract concentration caused the films to become rougher. FTIR and UV-Vis spectroscopies showed successful binding between *A. leptopus* extracts and corn starch-glycerol film. With increasing pH, the colour change of the films exposed to pH = 3-11 solutions was no significant difference due to improper storage. An increase in the microbial population, TVB-N content and pH was observed over the storage period as a result of fish deterioration. Colour changes were also identified in the film which became darker. Overall, colourimetric indicator film with 50% *A. leptopus* extract was found to be the optimal formulation since it had the highest values in ΔE^* during progressive spoilage of fish.