

# Use of anthocyanin enriched fraction of *C. citrinus* for the functionalization of PVA-based bioplastic

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Today, attempts are being made to overcome the economic model based on the linear economy and to apply the circular economy model, favouring environmentally friendly and green industrial and chemical processes. As a result, molecules from the plant world are becoming increasingly valuable and attempts are being made to construct new materials. This work focuses, on the first part, on the production and optimization of bioplastics based on poly(vinyl) alcohol (PVA) that has been modified, and after its functionalisation with an anthocyanin-enriched fraction obtained from the flower of *C. citrinus* (EAC), a by-product of the horticultural industry. Besides being an ornamental plant, *C. citrinus* is also used for its therapeutic potential in drug therapies. We obtained the EAC fraction via a protocol we developed and then prepared bioplastics with and without different concentrations of EAC to provide new properties to the bioplastics in a dose-dependent manner. In addition, morpho-functional analysis was conducted by spectroscopy techniques. From the data obtained, the functionalised films acquire antioxidant and antimicrobial activity, while the mechanical properties are almost unchanged, making them a good candidate as biodegradable packaging for preserving the shelf-life of different fruits and vegetables. Further investigations into their effect on real food will also be evaluated.

\* The authors marked with an asterisk equally contributed to the work.