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Abstract	:	The potential of Hylocereus polyrhizus peel (HPP) as a new eco-friendly reinforcement for thermoplastic sago starch/agar composite (TPSS/agar) was investigated. The integration of HPP into TPSS/agar composite aimed to enhance its mechanical and thermal characteristics. The study employed Fourier transform-infrared spectroscopy (FT-IR), Scanning electron microscopy (SEM), Thermogravimetric analysis (TGA), and Differential Scanning Calorimetry (DSC), as well as mechanical, physical properties and soil burial testing to analyse the composites. The results showed a favourable miscibility between the matrix and filler, while at higher concentrations of HPP, the starch granules became more visible. The tensile and impact properties of the composites improved significantly after incorporating HPP at 20 wt%, with values of 12.73 MPa and 1.87 kJ/m2, respectively. The glass transition temperature (Tg) and initial decomposition temperature (Ton) decreased with the addition of HPP. The density of the composites reduced from 1.51 ± 0.01 to 1.26 ± 0.01 g/cm3 as the HPP amount increased. The environmental properties indicated that the composites can be composted, with weight loss accelerating from 35 to 60 % and 61 to 91 % by the addition of HPP in 2- and 4-weeks' time, respectively. The study demonstrates the potential of TPSS/agar/HPP composites as eco-friendly materials for various applications.