A novel synthetic route of polyacrylates-grafted chicken feather for bio-based polymer film application

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PURPOSE OF THE ABSTRACT
Chicken feather (CF) is a large waste by-product in the poultry industry and it causes environmental problem, so that CF recycling has attracted much attention by using chemical modification. The CF mainly consists of keratinous protein, which is highly cross-linked by disulfide linkages. Thiol groups were formed by breaking of disulfide bonds from keratin in the presence of a reducing agent, which were able to initiate the radical polymerization of acrylates. In this study, we prepared polyacrylates-grafted chicken feather (PA-g-CF) by a free-radical polymerization mechanism for bio-based polymer film application. The keratin of CF was extracted using L-cysteine as a reducing agent in dimethyl sulfoxide (yield >87%). The PA-g-CF was synthesized by the graft polymerization of acrylate monomers on to the extracted keratin without an additional initiator to give a high yield. The obtained PA-g-CF was characterized by fourier transform infrared spectroscopy, nuclear magnetic resonance, thermogravimetric analysis, and differential scanning calorimeter. The bio-based polymer films prepared by compression-molding showed a high tensile strength property.
FIGURES

FIGURE 1

FIGURE 2

KEYWORDS
CHICKEN FEATHER | GRAFT POLYMERIZATION

BIBLIOGRAPHY