Physical and water barrier properties of cross-linked chitosan/PVA composite films by adding nano-sized poly(methyl methacrylate-co-acrylic acid) particles

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The aim of this study is to prepare chitosan/PVA composite films added nano-sized poly (methyl methacrylate-co-acrylic acid) (PMMA-co-AA) particles and to investigate the mechanical properties, water barrier properties, and soil burial degradation for the prepared films. Composite films were prepared by using chitosan, polyvinyl alcohol (PVA), nano-sized PMMA-co-AA particles, and additives, i.e., glycerol (GL) and citric acid (CA). Nano-sized PMMA-co-AA particles were synthesized by emulsion polymerization. The results of the evaluation of properties for prepared films indicated that compared with films without PMMA-co-AA particles, the mechanical properties and water resistance were improved up to 65–350% by the addition of nano-sized PMMA-co-AA. In addition, the results of the soil burial biodegradation revealed that films added PMMA-co-AAm particles were degraded by about 35–60% after 150 days.