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FACTORS AFFECTING MECHANICAL PROPERTIES OF LOW-DENSITY POLYETHYLENE (LDPE)/STARCH BLENDS: A REVIEW

Ramin Radfar[a,b], Hedayat Hosseini[a,c], Mehdi Farhoodi[a], Dominika Średnicka-Tober[d], Ismail Ghasemi[e], Morteza Fathi[f], Amin Mousavi Khaneghah[g]

[a]Food Sciences & Technology Department, National Nutrition & Food Technology Research Institute, Faculty of Nutrition Sciences & Food Technology, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[b]Department of Agriculture and Food Policies, Agricultural Planning, Economic and Rural Development Research Institute (APERDRI), Tehran, Iran
[c] Food Safety Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[d] Department of Functional and Organic Food, Institute of Human Nutrition Sciences, Warsaw University of Life Sciences, Nowoursynowska 159c, 02-776 Warsaw, Poland
[e] Department of Plastics, Iran Polymer and Petrochemical Institute (IPPI), Tehran, Iran
[f]Research Center for Controlled Release, Transfer Phenomena Laboratory (TPL), Department of Food Science, Technology and Engineering, College of Agriculture and Natural Resources, University of Tehran, Islamic Republic of Iran
[g] Department of Food Science, Faculty of Food Engineering, University of Campinas, Campinas- SP, Brazil.
rr_date@yahoo.com

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ABSTRACT

Due to the environmental concerns associated with non-biodegradable polymers like low-density polyethylene (LDPE), the production of eco-friendly and partially biodegradable films based on starch/LDPE blends is the point of interest. However, due to immiscibility between hydrophilic starch and hydrophobic LDPE, the mechanical properties of the produced films are not good enough. In this context, several investigations have been conducted to improve the mechanical properties of the films, mainly through the improvements in miscibility and compatibility of two layers. The mechanical characteristics of the films fabricated from these blends are affected by different factors including modification of starch via esterification, cross-linking and thermo-plasticization, starch granule characteristics (amylose to amylopectin ratio, size, and shape) and their content, type, and quantity of compatibilizers, presence of nanoparticles (type and content), using of recycled polymers, type of plasticizers and processing technique. The current article presents an overview of the factors that affect the mechanical properties of LDPE/starch blends.