



DEVELOPMENT OF BIODEGRADABLE POLYMERIC FILMS FROM PVA, GLYCEROL, AND SESAME RESIDUE: SUSTAINABILITY AND APPLICATION INSIGHTS

Letícia S. Silva (PG)*, Aparecida B. Mageste (PQ), Raphael C. A. Vaz (PQ), Gabriel M. D. Ferreira (PQ)

Federal University of Ouro Preto, UFOP, Department of Chemistry, Ouro Preto, Minas Gerais, Brazil, 35400-000.

*e-mail: leticiasamara64@gmail.com

Biodegradable polymeric films represent a sustainable alternative to traditional plastic materials, promoting the reduction of environmental impact. Such films can be obtained using components extracted from biomass waste, contributing to waste management and the circular economy. In this study, we investigated the development of polymeric films based on polyvinyl alcohol (PVA), glycerol, and components from peeled or toasted sesame seed cake for applications in smart and edible packaging. The casting method was used to prepare PVA-glycerol films containing extracts from the biomass. The extracts were obtained using water at pH 1, water at pH 12, or ethanol. A control film without biomass extract was also prepared. Film characterization included solubility tests, thickness measurements, and visual analysis (Figure 1). Films prepared with ethanol presented many imperfections, being rough and heterogeneous, underscoring the importance of solvent selection for extracting components from the sesame seed cake to be used in film manufacture. Because of this, solubility and thickness were determined only for films containing extracts obtained at pH 1 or 12 (Table 1). Variations in these properties reveal the critical role of both the type of sesame seed cake (peeled or toasted) and the pH of extract obtention in determining film characteristics. Despite this, compared to the control film, the presence of the

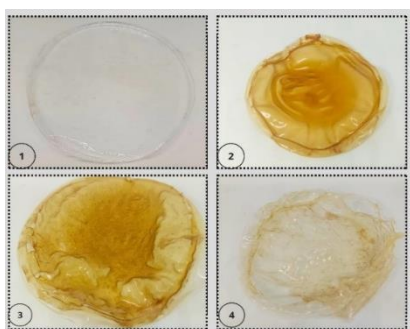


Figure 1: Control film (1) and films with extracts in water pH 1 (2); water pH 12 (3); and ethanol.

Table 1: Solubility (S) after 60 min and film thickness (T) of PVA-glycerol films with peeled and toasted sesame seed cake.

Property	Toasted sesame		Peeled sesame		Control film
	pH1	pH12	pH1	pH12	
T (mm)	0.7481	0.5068	0.4646	0.5280	0.2044
S (%)	21.35	20.86	17.65	17.18	9.67

extract increased the thickness and solubility. This can be associated with the incorporation of components from the biomass into the polymeric matrix, which could affect specific properties of the film (experiments under investigation). We conclude that integrating sesame residues in polymeric films of PVA and glycerol not only promotes sustainability but also offers potential for practical applications in eco-friendly packaging.

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