



ACTIVE PACKAGING FILMS BASED ON PUMPKIN OIL CAKE AND β -CYCLODEXTRIN INCLUSION COMPLEX



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INTRODUCTION

In addition to numerous good properties, such as biodegradability, environmental suitability, good barrier properties to gases, aromas, etc., very important and recently increasingly the most examined properties of biopolymer films are their use as active packaging materials. These active ingredients may come from a variety of synthetic and natural sources, but due to increasing consumer demand for natural food ingredients, research has focused on natural active compounds such as essential oils, or main components in essential oils known for their biological activity. A new approach in food preservation industry involves the use of different encapsulation agents in order to form micro and nanoparticles, which are intended to protect the active component and allow their gradual and slow release in food product. One of the commonly used encapsulation agent, especially for essential oil encapsulation, is β -cyclodextrin (β -CD).

MATERIAL AND METHOD

In this work, the influence of 1 % (P-IC1) and 2 % β -CD (P-IC2) inclusion complex with winter savory essential oil on pumpkin oil cake (PuOC)-based films properties, was analyzed. The impact on mechanical, physicochemical, barrier, structural and antioxidant activity of those active compounds has been examined.

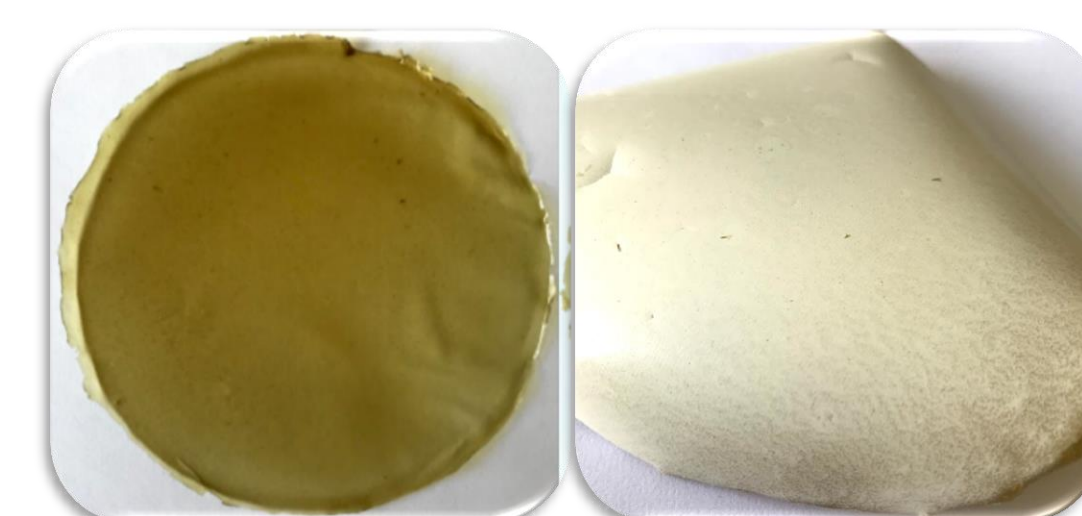
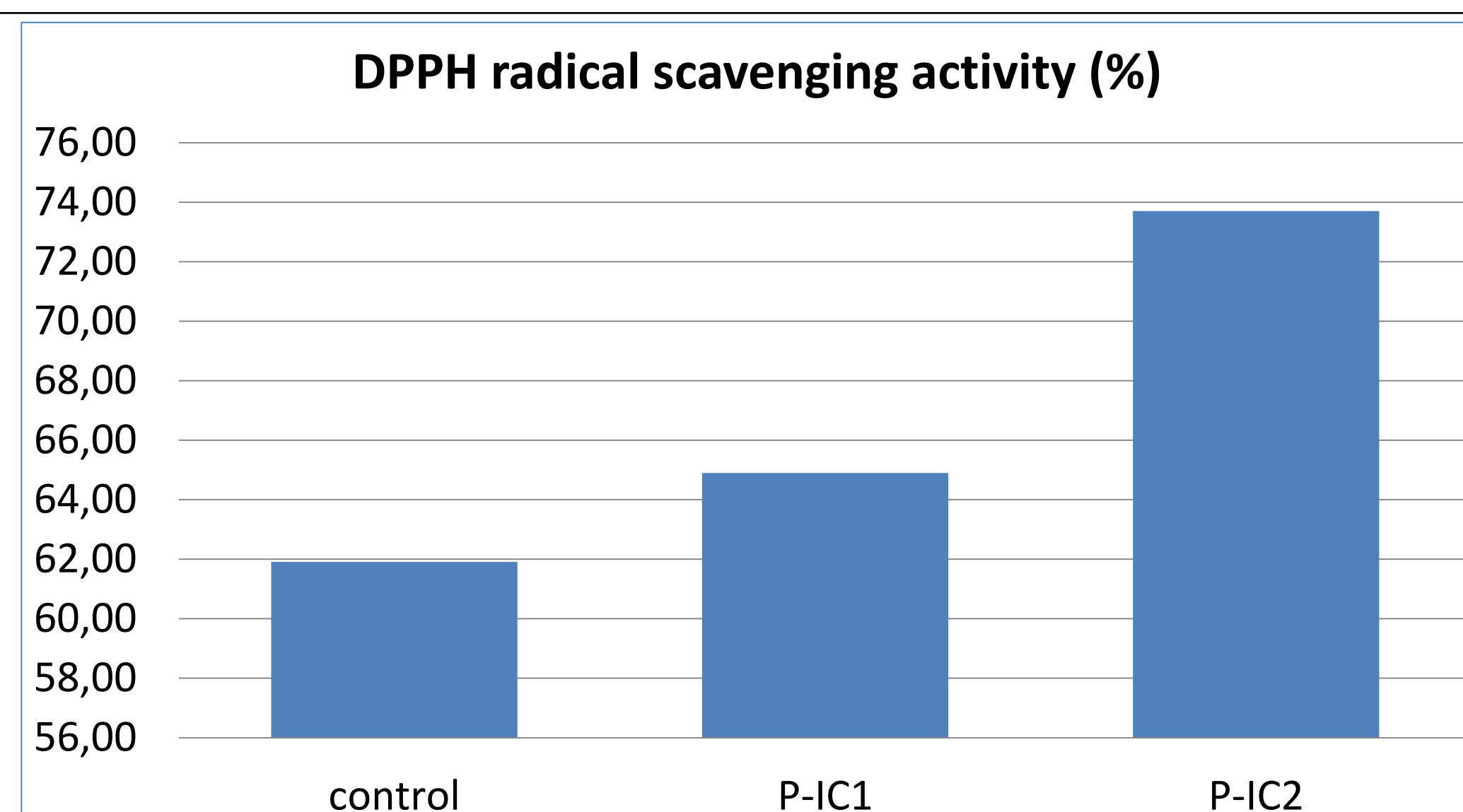
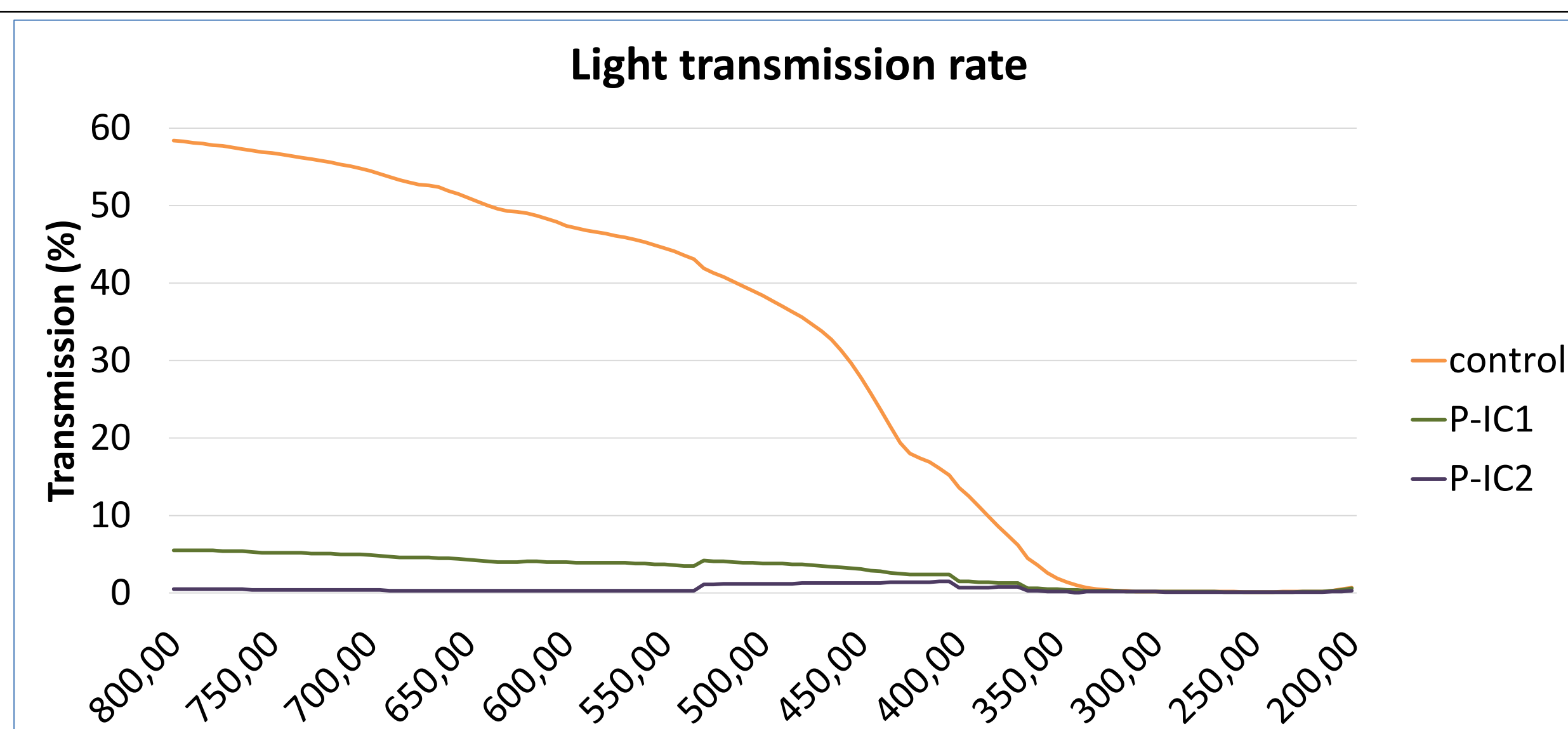


Table 1. Physicochemical and physico-mechanical properties

Samples	Thicknesses [μ m]	Tensile Strength [MPa]	Elongation at Break [%]	Moisture Content [%]	Total Soluble Matter [%]	Swelling [%]
Control	117.88	0.66	87.26	28.40	31.98	113.71
P-IC1	192.85	1.02	16.35	12.97	56.52	12.45
P-IC2	279.07	0.89	2.64	10.03	59.86	17.28



RESULTS and DISCUSSION

Obtained results showed that addition of 1 % β -CD inclusion complex significantly increased the thicknesses of films for 89 %, and for more than 130 % with addition of 2 % inclusion complex. Addition of inclusion complex led to an increase of tensile strength of biopolymer films, meanwhile decreases of elongation at break for more than 95 %, was observed. When it comes to physicochemical properties (moisture content, total soluble matter and swelling degree) the highest influence of added active compounds was observed in swelling properties, where the reduction of swelling of PuOC-based films was up to 89 %. Barrier properties, water vapor transmission rate and light transmission rate were improved after addition of β -CD inclusion complex, as well as antioxidant activity, where significant increase in DPPH radical scavenging activity of PuOC-based film after addition of 2 % β -CD inclusion complex, was observed.

Key words: biopolymers, pumpkin oil cake, β -cyclodextrin

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