ACTIVE EDIBLE FILMS BASED ON TAMARIND KERNEL POWDER (TKP) INCORPORATED WITH POMEGRANATE SEED OIL (PSO)

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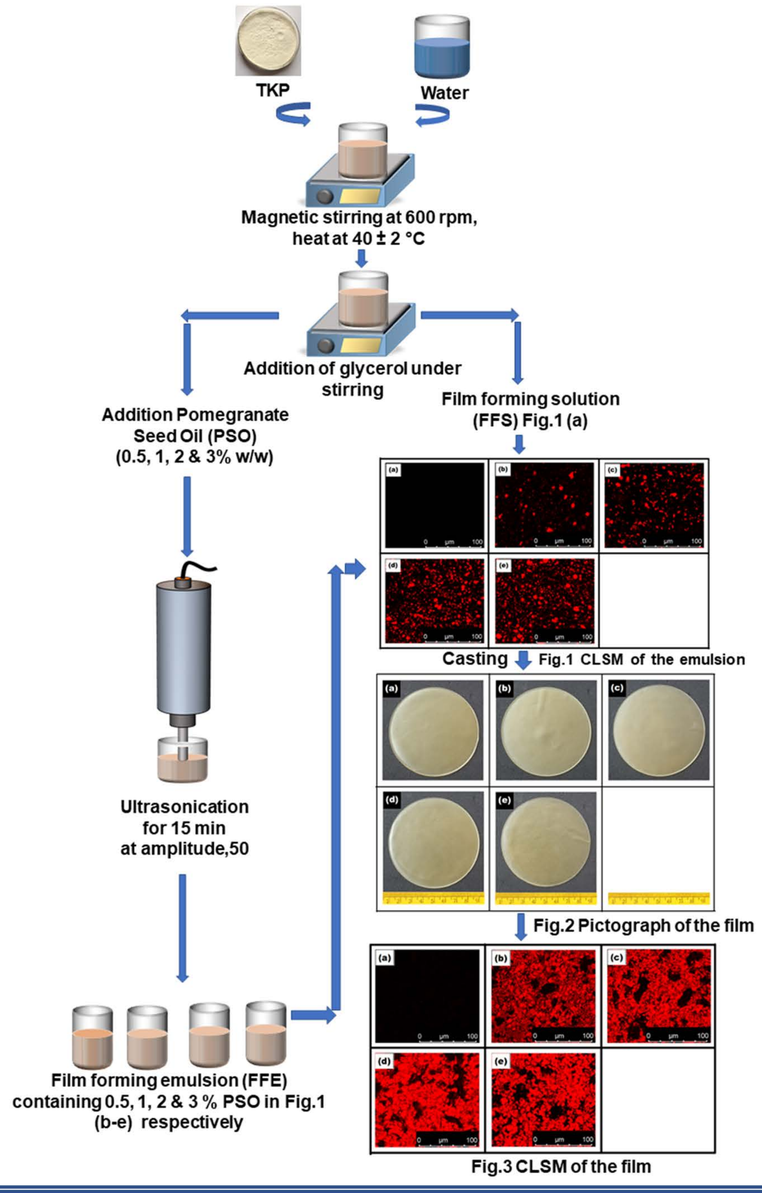
INTRODUCTION

- Edible films and coatings incorporated with antimicrobials are gaining research interest due to raising awareness in food safety and application of renewable biopolymers.
- Compared to petroleum-based polymers, edible film offers several added advantages such as edibility, aesthetic appearance, prevents microbial contamination, biocompatibility, and biodegradability.
- Edible films can be used as a delivery vehicle for active compounds such as antimicrobials and antioxidants.
- Various polysaccharides, proteins, lipids and their combinations are utilised to formulate such active edible films.

MATERIALS AND METHODS



MORPHOLOGICAL STUDY

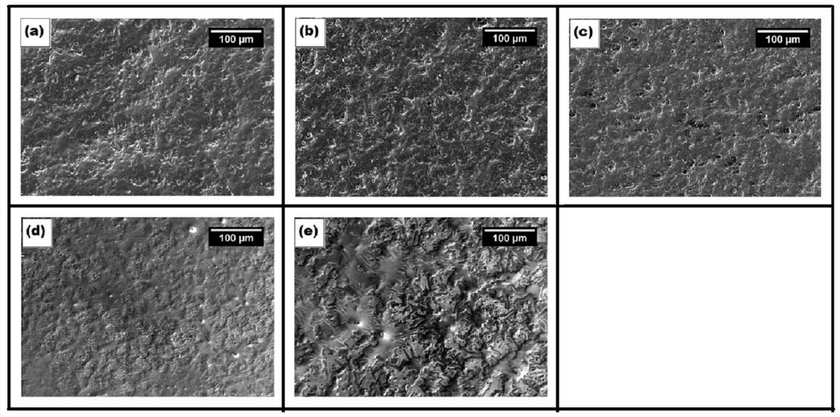


Fig. 4 FE-SEM images of TKP/PSO films.

PHYSICAL PROPERTIES

Film properties	TKP Film	TKP/0.5% PSO	TKP/1% PSO	TKP/2% PSO	TKP/3% PSO
pH	5.61 ± 0.01	5.72 ± 0.02	5.83 ± 0.02	5.91 ± 0.01	5.97 ± 0.01
Viscosity (N/mm)	0.189 ± 0.001	0.202 ± 0.003	0.218 ± 0.002	0.232 ± 0.002	0.245 ± 0.003
Thickness (mm)	0.189 ± 0.005	0.198 ± 0.011	0.275 ± 0.014	0.296 ± 0.012	.316 ± 0.012
Moisture content (%)	29.10 ± 1.93	27.26 ± 1.79	24.41 ± 0.93	22.71 ± 1.09	19.04 ± 0.39
Water solubility (%)	25.01 ± 0.26	23.63 ± 0.22	20.75 ± 0.41	19.03 ± 0.15	18.01 ± 0.19

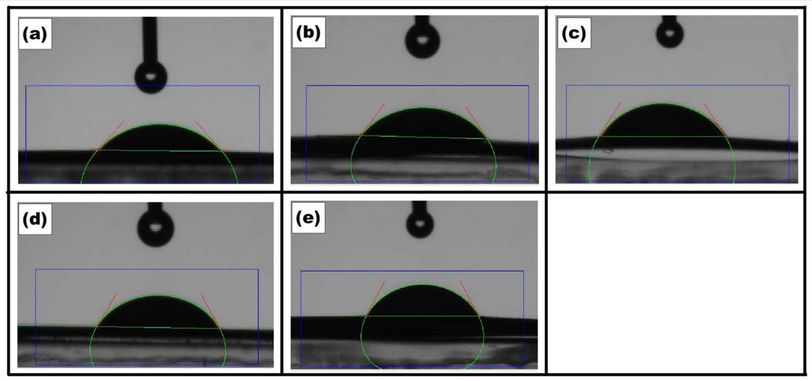


Fig.5 Water contact angle of the TKP/PSO films

COLOR PROPERTIES

Film type	L*	a*	b*	WI	C*	ΔE
TKP Film	32.18 ± 0.64	0.123 ± 0.010	8.71 ± 0.29	31.62 ± 0.66	8.71 ± 0.29	62.66 ± 0.66
TKP/ 0.5% PSO	33.37 ± 0.74	0.544 ± 0.091	7.24 ± 0.11	32.97 ± 0.73	7.26 ± 0.10	61.30 ± 0.72
TKP/1% PSO	39.35 ± 0.33	0.399 ± 0.017	15.44 ± 0.44	37.41 ± 0.28	15.45 ± 0.45	57.05 ± 0.28
TKP/2% PSO	43.55 ± 0.38	0.301 ± 0.016	15.61 ± 0.47	41.43 ± 0.34	15.61 ± 0.47	53.08 ± 0.34
TKP/3% PSO	44.65 ± 0.40	0.529 ± 0.077	15.61 ± 0.47	42.49 ± 0.45	15.62 ± 0.47	52.03 ± 0.47

MOLECULAR & THERMAL STUDY

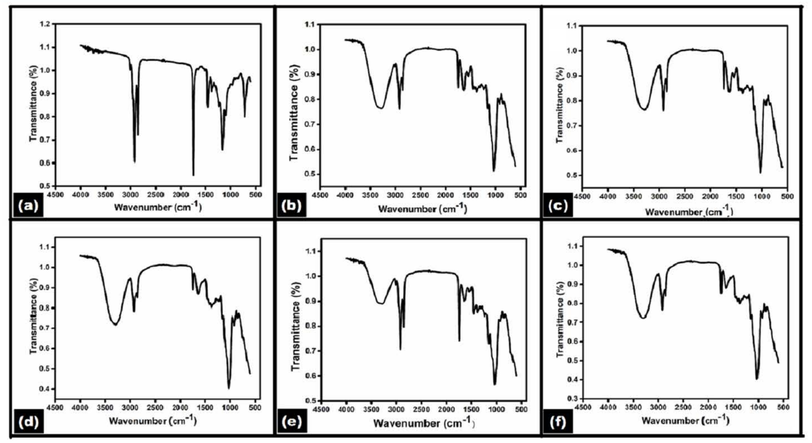


Fig.6 FTIR profile of TKP/PSO

Fig.7 XRD profile of TKP/PSO

Fig.8 TGA profile of TKP/PSO

MECHANICAL, BARRIER AND ANTIMICROBIAL PROPERTIES

CONCLUSION AND REFERENCE

The results presented in this study demonstrated that the incorporation of PSO into TKP produced antimicrobial films, which can be used for edible packaging with optimum mechanical properties and reduced water vapor transmission rate. Therefore, the TKP/PSO films might be commercially useful for active packaging applications. (Dhumal, Ahmed, Bandara, Sarkar, & Life, 2019).