Effect of poly(lactic acid)/kenaf composites incorporated with thymol on the antimicrobial activity of processed meat

ABSTRACT
Bio-based composites comprised of poly(lactic acid) (PLA), kenaf fibers and thymol were developed and their antimicrobial (AM) properties and stability under different storage conditions investigated. The composite films containing 20-30\% w/w thymol reduced \textit{E. coli} in tryptone soy broth after two days at 37\(^\circ\)C and imparted a significant zone of inhibition in contact with \textit{E. coli} inoculated plates. The composite films also reduced \textit{E. coli} inoculated on the surface of processed sliced chicken samples after 30 days at 10\(^\circ\)C both in direct contact and in the vapour phase. The thymol additive was retained in the PLA/kenaf films that were wrapped with aluminium foil after 3 months of storage at ambient temperatures; however, unwrapped films lost some thymol to the atmosphere. The PLA/kenaf/thymol composite films show a strong potential for the development of active packaging systems in order to extend the shelf-life of some processed food products.

\textbf{Keyword}: Poly(lactic acid); Kenaf fibers; Food packaging; Biopolymers