

Development of Antimicrobial Materials based on PLA/ Mediterranean Propolis and Thymus Vulgaris Essential Oil

H. DJIDJELL*I, A. BOUKERROU, N. CHIBANI, N. ARDJOUUM

University of Bejaia, Département de Génie des Procédés, LMPA laboratory, Algeria.

hocdjidj@yahoo.fr

Keywords. (PLA, Propolis, Antimicrobial, Thymus).

Abstract.

Antimicrobial films based on polylactic acid (PLA) were developed by incorporated *thymus vulgaris* essential oil Thymol (EOs) (2%) v/v with different concentration of ethanolic extract of Mediterranean propolis (EEP) (5-10%) w/w. The results of antibacterial and antifungal test indicated that (EEP) was showed a high antibacterial and antifungal effect with (12.1 mm and 11.58 mm) against *Staphylococcus aureus* and *Penicilliumsp*, respectively. FTIR analysis exhibited a successful dispersion of (EEP) and Thymol (EOs) in polymer matrix. The mechanical test revealed a decreasing of tensile strength and elastic modulus from the active films. But the percentage of elongation increased. In addition, the incorporation of (EEP) concentration was resulted a darker color films. Antimicrobial activity of films exhibited that films containing (10%) w/w of (EEP) was inhibited the growth of *C. albicans* and the combination of (EEP) and (EOs) in PLA matrix showed a synergistic effect against *E.coli*.