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PP25. Lavandin essential oil combined with the biopolymer PHBV, poly(3-hydroxybutyrate-*co*-3-hydroxyvalerate), for wound treatment

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In this work, poly(3-hydroxybutyrate-*co*-3-hydroxyvalerate), PHBV, was combined with lavandin essential oil (LavEO), from *Lavandula hybrida* grown in Argentina. Linalool (36%), linalyl acetate (29%) 1,8-cineole (6%) and camphor (6%) were its main compounds as analyzed by GC-MS. PHBV is a biodegradable copolyester from a bacterial source; PHBV porous scaffolds have been shown to be suitable for fibroblast and keratinocyte proliferation [1,2] and thus for skin regeneration. In addition, LavEO exhibits strong anti-inflammatory and antibacterial activity, what improves wound healing [4,5]. Purified monoterpenes and entire EOs have been combined with other biopolymers for different applications but scarcely for wound healing and never previously with PHBV [6]. PHBV porous membranes, 100-200 µm thickness, containing LavEO at 2, 4 or 8% m/m were obtained by an emulsion-solvent evaporation method. LavEO-PHBV membranes did not show cytotoxicity when tested on NIH/3T3 fibroblasts (according to the ISO 10993-5 standard). SEM membrane analysis showed, in all cases, a high level of porosity,~20% of the surface. Keratinocytes (KC) adhesion and proliferation were evaluated with the HaCaT cell line. Membranes containing 2 or 4% of LavEO, allowed KC proliferation of the same level as that of PHBV membrane controls. However, cells neither adhered to nor proliferated on membranes with 8% LavEO although their hydrophobicity, estimated by the contact angle, was similar to that of 4%-LavEO membranes. The reduction in the elastic modulus–determined by the dynamic mechanical analysis–due to the presence of LavEO, suggests its plasticizer effect (control E=305±10 MPa; 8%-LavEO membrane E=150±20 MPa). According to these results, 2 or 4% LavEO-PHBV membranes seem as a promising treatment, especially in the case of infected and chronic wounds, often arrested at the inflammatory phase.

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