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Development of lignin-PVP based dressing for wound treatment

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Lignin is a carbon renewable source and has been widely explored in different fields in the last years, especially in biomaterials as dressing and other biomedical devices due its natural origin and low cost1. Poly(ethylene oxide) (PEO) is a synthetic polymer largely used in biomedical applications due its important characteristics such as high hydrophilicity, non-toxicity and ease of process2. The present work aimed to develop a lignin-PEO based dressing for wound treatment by casting. In specific terms, three different polymer blends were formulated using a range of 3 to 10% (w/v) lignin was tested with the addition of 1 to 3% PEO. Lignin was solubilized in aqueous solution (pH>13) alkalized with sodium hydroxide and PEO was solubilized in distilled water. The solutions were heated up to 70 ºC and homogenized until complete polymer dissolution. Then, PEO solution and poly(ethylene glycol) diacrylate (PEGDA) (0.5 - 1.0%) were added to the lignin solution and the blend was mixed for 30 minutes at 70 ºC. Posteriorly the blends were submitted to casting and drying under different conditions, room temperature for 48 hours and incubated at 40 ºC for 24 hours. A control sample of 6% lignin was prepared in the same conditions. Samples were evaluated by physico-chemical and morphological characterizations. The swelling and gel fraction profiles were assessed as well as thermal behavior by differential scanning calorimetry. Chemical modifications were evaluated by infrared spectroscopy. Samples with higher PEGDA content presented minor swelling index. The blends formulated presented different thermal behavior in comparison with the control. Infrared spectroscopy pointed some chemical modifications promoted by the crosslinking agent. In general terms, the material developed presented a potential to continue been explored as dressing for wound treatment