

Experimental Analysis of Low Density Poly Ethylene Effect on the Mechanical Properties of Poly Ethylene Vinyl Acetate for Prosthetic and Orthotic Application

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In this comparative study, the effect of low density poly ethylene and ethylene vinyl acetate loading ratio by melt blending with additives and without additives on mechanical properties for prosthetic and orthotic application was analyzed. To carry out this thermoplastic materials such as low density poly ethylene (LDPE), Ethylene vinyl acetate (EVA), color pigment, calcium carbonate, titanium dioxide and black carbon have been used as raw material to produce the sample in sheet form and to achieve comfortable prosthetic and orthotic application. The method used were blending, molding, testing of produced materials. Increasing the content of EVA and decreasing content of LDPE had effect on compatibility, tensile strength and elongation at break vice versa. The blended composite with additives have no significant effect on molding and without additive have significant effect on molding due to molecular mobility which leads shrinkage. The maximum tensile strength reached to 10.5Mpa and minimum tensile strength reached 2.8Mpa and the maximum elongation at break reached 469.8% and minimum elongation at break 40.2%. The other result are in between of these ranges, which have better than existing one has maximum tensile strength of 2.3Mpa and elongation at break have 265%. The mean value of maximum tear load is 74.4N/mm and minimum tear load have 38.9N/mm which have better result than existing one has 10.5N/mm. Scanning electron microscope (SEM) test result showed that specimen with more filler and less content of EVA become poor in its morphology and compatibility.

Keywords: Prosthetic, orthotic, ethylene vinyl acetate, low density poly ethylene

Biography:

Yenealem yilma has completed his Masters at the age of 28 years from Hawassa University. He is the Team ledear of Ethiopia biotechnology institute Material Science department biomaterial research group.