

**ENVIRONMENTAL FRIENDLY  
COLLAGENASE POLYURETHANE  
ADHESIVE FROM BOVINE BONE POLYOL**

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## ABSTRACT

A new development of polyurethane (PU) adhesive has been successfully defined from a collagenase bovine polyol. The purpose of this study is to create a polyurethane adhesive from bovine bone polyol besides the requirement of the modern world due to increasing concern about the environment and various issues related to petroleum based and vegetable oil based adhesive. The PU adhesive of bovine based was studied on its characterization through thermal and morphological analysis. The result indicated that the polyol were successfully synthesized from derived bovine bone by using esterification process. FTIR spectra shows that the PU adhesive consists of NH, C=O and –CONH groups while polyol consists of OH, C-O and C=O. While, the thermal analysis performed has identified higher transition midpoint temperature ( $T_m$ ) which is  $81.77^\circ\text{C}$  and the glass transition temperature ( $T_g$ ) of bovine bone is  $28.06^\circ\text{C}$ . Physical properties of PU bovine based showed that lowest moisture content is PU sample compared to collagenase bovine bone (CBB) and polyol (CBP). This water content contributes to the stabilization of helical structure within the PU adhesive. Viscosity test result revealed that the reading of polyol's viscosity is higher that which is 45.8cP compared to the collagen, 24.8cP. pH value was found to influence the viscosity and density of PU sample because increases in the viscosity has lower the pH value of the solution and increasing the density of the sample. The pH test showed that the value pH value of CBP is 4, more acidic and slightly lower than CBB which is 5.86. Hence, considering the versatile properties of the elongated fibril including biocompatibility of polyurethane, this review shed a light on bovine based polyurethane materials with their potential applications especially focusing the wood adhesive field.

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