

Modification Of PMMA Dental Resin With Palm Oil Based Polyol

Abstract

Objectives: This study is an attempt to enhance the properties of conventional PMMA denture material by incorporation of a polyfunctional polyol derived from palm oil by copolymerization with methyl methacrylate monomer to overcome the low fatigue resistance property of PMMA.

Methods: A series of copolymerizations of palm oil polyol with MMA was performed in solution. The polyol was added from 40-20 %, MMA from 20-40% , benzoyl peroxide as initiator was at 0.04% and toluene used as solvent was at 60 % of the total weight. The copolymerization was carried out in a 500ml-round-bottom reaction flask, equipped with a magnetic stirrer, for 7.5 hour at 80°C, in a water bath. The yield of each copolymerization obtained was recorded and the conversion was estimated gravimetrically. Later, the polymers acquired were analyzed by FTIR.

Results: The copolymerizations have achieved conversions that ranged from 24% to 95%, where the higher conversion was obtained when the reactant mixture contain higher amount of MMA. The reaction produced a clear color, light-weighted copolymer that has the potential to be developed as denture material. The evidence of incorporation of the polyol into PMMA was given by the FTIR measurements, by comparing the spectrum of the copolymer to the spectrum of PMMA and polyol. Evaluations of the mechanical properties were currently being carried out.

Conclusion: The new copolymers have potential of being developed into new dental materials. The branching structure of the copolymer was expected to improve the impact strength of PMMA. In addition, the palm oil based polyol was made from natural sustainable material.

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