

Annisa Wahyu Alifiany, 2018. Komposit selulosa Bakteri – Kolagen – Gliserol sebagai Inovasi Kandidat Duramater Artifisial bagi Solusi Kasus Trauma Kepala Terbuka. Skripsi dibawah bimbingan Drs. Adri Supardi, M.Si., dan Dr. Prihartini Widiyanti, drg., M.Kes., Program Studi S1 Teknik Biomedis, Fakultas Sains dan Teknologi, Universitas Airlangga.

ABSTRAK

Cedera kepala merupakan salah satu penyebab kematian dan kecacatan utama pada usia produktif. Menurut World Health Organization (WHO) mencatat bahwa 90% penyebab cedera kepala di Indonesia disebabkan karena kecelakaan lalu lintas yang menyebabkan robeknya lapisan duramater di kepala dan akan berakibat fatal apabila tidak segera ditangani. Penelitian ini bertujuan untuk mengetahui komposit pengganti lapisan duramater kepala buatan yang bersifat kompatibel. Dalam penelitian ini, duramater artifisial berasal dari selulosa bakteri *Acetobacter xylinum* yang disintesis pada media air kelapa. Pada penelitian ini digunakan 4 variasi komposisi yaitu Selulosa bakteri (Kontrol), Selulosa bakteri – Gliserol, Selulosa bakteri – Kolagen dan Selulosa bakteri – Kolagen – Gliserol. Karakterisasi gugus fungsi (FTIR), kekuatan tarik, *swelling* dan MTT Assay dilakukan dalam penelitian ini. Karakterisasi gugus fungsi menunjukkan adanya gugus fungsi ciri khas dari selulosa bakteri, kolagen dan gliserol. Hasil karakterisasi kuat tarik menunjukkan bahwa dari keempat variasi komposisi sampel memiliki rata-rata nilai UTS dan Elongasi yang mendekati nilai standar dari duramater artifisial. Pada uji *swelling* didapatkan hasil terbaik pada komposisi sampel Selulosa bakteri – Kolagen – Gliserol dengan nilai *swelling* sebesar 28,30%, hasil tersebut tidak melebihi batas rasio *swelling* dari membran yaitu 70%. Untuk uji MTT Assay didapatkan presentase sel hidup dari setiap sampel di atas 50%, yang berarti material yang dihasilkan tidak toksik apabila diaplikasikan ke tubuh. Komposit Selulosa Bakteri – Kolagen berpotensi sebagai kandidat duramater artifisial berdasarkan karakterisasi gugus fungsi, kuat tarik, *swelling*, dan MTT Assay.

Kata Kunci : Duramater artifisial, Selulosa bakteri, Kolagen, Gliserol

Annisaa Wahyu Alifiany, 2018. Bacterial Cellulose – Collagen – Glycerol Composite as an Artificial Duramater Candidate Innovation for Opened Head Injury Case. Thesis under guidance of Drs. Adri Supardi, M.Sc and Dr. Prihartini Widiyanti, drg., M.Kes., CCD., S. Bio. S1 Program of Biomedical Engineering, Faculty of Science and Technology, Airlangga University.

ABSTRACT

Head injury is one of the leading causes of death and disability in productive age. According to the World Health Organization (WHO) noted that 90% causes of injuries in Indonesia are caused by traffic accident and cause the tearing of duramater layer in the head and will be fatal if not handled immediately. This study aims to determine composite replacement layer of artificial head mater duration that is compatible. Artificial duramater was synthesized from bacterial cellulose of *Acetobacter xylinum* within coconut water as the media. In this study used 4 variation of composition such as Bacterial cellulose (Control), Bacterial cellulose – Glycerol, Bacterial cellulose – Collagen and Bacterial Cellulose – Collagen – Glycerol. The resulting of bacterial cellulose membrane were then characterized using FTIR, tensile strength characterization, swelling characterization and MTT Assay characterization. From analysis of FTIR characterization shows the presence of functional groups characteristic of bacterial cellulose, collagen, and glycerol. The tensile strength characterization result show that from the 4 variation of composition have an average of UTS and Elongation values close to the standart values of the artificial duramater. In the swelling test, the best results were obtained on the composition of sample bacterial cellulose – Collagen – Glycerol with swelling value is 28,30%, the result did not exceed from swelling ratio of the membrane (>70%). From MTT Assay characterization obtained a percentage of live cells throughout until above 50% which means that the resulting material is not toxic when applied to the body. In this study indicate that the Bacterial Cellulose – Collagen Composite product have good potential for use as an duramater artificial candidate based on FTIR characterization tensile strength, *swelling* test and MTT Assay.

Keyword : Artificial Duramater, Bacterial Cellulose, Collagen, Glycerol