ABSTRAK

SINTESIS DAN KARAKTERISASI *POLYDIMETHYLSILOXANE* MELALUI RUTE HIDROLISIS *DICHLORODIMETHYLSILANE* SEBAGAI BAHAN TAMPONADE DALAM BEDAH VITREORETINAL

Polydimethylsiloxane (PDMS) yang dikenal juga dengan nama *silicone oil* merupakan salah satu cairan yang umum dipakai sebagai cairan pengganti *vitreous humour* dalam bedah vitreoretinal. PDMS memiliki karakteristik inert secara kimia, transparan, hidrofobik, dan bersifat tidak menyerap (*non-absorbable*). PDMS dapat disintesis dari monomer *octamethylcyclotetrasiloxane* dan *hexamethyldisiloxane* melalui *ring-opening polimerization* pada kondisi basa. Harga dari monomer *octamethylcyclotetrasiloxane* yang relatif mahal, sehingga diperlukan alternatif bahan baku monomer untuk produksi PDMS yang memiliki sifat-sifat spesifik sesuai dengan kebutuhan pada bedah vitreoretinal. Dalam penelitian ini, dilakukan hidrolisis *dichlorodimethylsilane* (DCMS) untuk memperoleh bahan monomer serta *polydimethylsiloxane* (PDMS). Sintesis dilakukan melalui metode refluks dengan variasi penambahan KOH dan variasi waktu 2, 4, dan 6 jam. *Polydimethylsiloxane* berhasil disintesis, ditandai dengan gugus fungsi yang menunjukkan adanya serapan Si–O–Si, Si–CH_3, Si–C dan C–H. PDMS hasil sintesis memiliki nilai viskositas dalam kisaran 1,50 – 7,43 Pa.s, dengan nilai densitas dalam kisaran 0,7513 – 1,0071 g/mL, nilai indeks bias dalam kisaran 1,4008 – 1,4040 dan nilai tegangan permukaan dalam kisaran 17 – 21 mN/m.

Kata-kata kunci: *polydimethylsiloxane* (PDMS); *dichlorodimethylsilane* (DCMS)*;* hidrolisis; *vitreous humour*; bedah vitreoretinal

ABSTRACT

SYNTHESIS AND CHARACTERIZATION OF POLYDIMETHYLSILOXANE THROUGH THE HYDROLYSIS ROUTE OF DICHLORODIMETHYLSILANE AS A TAMPONADE SUBSTANCE IN VITREORETINAL SURGERY

Polydimethylsiloxane (PDMS), also known as silicone oil, is a liquid that is commonly used as a substitute for vitreous humor in vitreoretinal surgery. PDMS is chemically inert, transparent, hydrophobic, and non-absorbable. PDMS can be synthesized from the monomers octamethylcyclotetrasiloxane and hexamethyldisiloxane through ring-opening polymerization techniques under base conditions. The price of the monomer octamethylcyclotetrasiloxane is relatively expensive, so an alternative monomer raw material is required for PDMS production which has specific properties according to the needs of vitreoretinal surgery. In this study, hydrolysis of dichlorodimethylsilane (DCMS) was carried out to obtain monomer and polydimethylsiloxane (PDMS). The synthesis was carried out through the reflux method with the addition of KOH variations and reflux time variations of 2, 4, and 6 hours. Polydimethylsiloxane was successfully synthesized, characterized by functional groups showing the presence of Si-O-Si, Si-CH3, Si-C and C-H absorption. The synthesized PDMS has a viscosity value in the range of 1.50 - 7.43 Pa.s, with density values are in the range 0.7513 - 1.0071 g/mL, refractive index values are in the range of 1.4008 - 1.4040 and surface tension values are in the range of 17 - 21 mN/m.

Keywords: *polydimethylsiloxane (PDMS); dichlorodimethylsilane (DCMS); hydrolysis; vitreous humour; vitreoretinal surgery*