

ABSTRAK

PENENTUAN STABILITAS *POLYDIMETHYLSILOXANE* (PDMS) 1,00-4,00 Pa.s TERHADAP WAKTU SIMPAN

Polydimethylsiloxane (PDMS), $(\text{CH}_3)_3\text{SiO}-[\text{Si}(\text{CH}_3)_2\text{O}]_n-\text{Si}(\text{CH}_3)_3$, atau lebih dikenal dengan nama *silicone oil* merupakan cairan yang penting dalam bedah vitreoretinal. PDMS bersifat tidak menyerap (*nanoabsorbable*) dan memiliki kemampuan yang bagus sebagai agen tamponade sehingga dapat digunakan sebagai cairan pengganti *vitreous humour* pada mata. Nilai transmitansi PDMS yang diharapkan sama dengan nilai transmitansi *vitreous humour* yaitu mencapai 100% sehingga dapat ditransmisikan sepenuhnya pada rentang cahaya tampak. Dalam aplikasinya sebagai cairan pengganti *vitreous humour*, PDMS tidak lepas dari paparan sinar ultraviolet (UV). Dalam penelitian ini dipelajari pengaruh waktu penyimpanan terhadap stabilitas PDMS yang disintesis dari *octamethylcyclotetrasiloxane* (D4) dan *hexamethyldisiloxane* (MM) menggunakan inisiator KOH dengan teknik *ring opening polymerization*. Hasilnya didapatkan bahwa ketiga PDMS yang telah berhasil disintesis menunjukkan nilai transmitansi yang sempurna yaitu 100% yang artinya seluruh cahaya yang melewati sampel akan diteruskan seluruhnya. Indeks bias untuk PDMS 1,07 Pa.s; 1,69 Pa.s dan 3,00 Pa.s masing masing secara berturut – turut adalah sebesar 1,404; 1,4092 dan 1,4121. Tegangan permukaan PDMS 1,07 Pa.s; 1,69 Pa.s dan 3,00 Pa.s masing masing secara berturut – turut adalah sebesar 19 m.N/m; 19,7 m.N/m dan 18 m.N/m. Ketiga PDMS yang telah berhasil disintesis menyerupai semua gugus fungsi seperti yang dimiliki oleh PDMS standar yaitu terdapat serapan yang berasal dari vibrasi ikatan Si – O – Si, $\text{Si}(\text{CH}_3)_2$, $\text{Si}(\text{CH}_3)_3$, SiCH_3 ., Si – C dan C – H.

Kata Kunci: *Polydimethylsiloxane* (PDMS; *vitreous humour*; stabilitas PDMS; *octamethylcyclotetrasiloxane* (D4); *hexamethyldisiloxane* (MM)

ABSTRACT

DETERMINATION STABILITY OF POLYDIMETHYLSILOXANE (PDMS) 1,00-4,00 Pa.s ON SAVE TIME

Polydimethylsiloxane (PDMS), $(\text{CH}_3)_3\text{SiO}-[\text{Si}(\text{CH}_3)_2\text{O}]_n-\text{Si}(\text{CH}_3)_3$, or better known as Silicone Oil is an important fluid in vitreoretinal surgery. PDMS is non-absorbent (nanoabsorbable) and has sufficient strength as a tamponade agent so that it can be used as a vitreous humour replacement fluid in the eye. The expected PDMS transmittance value is the same as the vitreous humour transmittance value which reaches 100% so that it can be fully transmitted in the range of visible light. In its application as a vitreous humor replacement liquid, PDMS cannot be separated from ultraviolet (UV) exposure. In this study, the effect of storage time on PDMS stability will be studied. PDMS polymer was synthesized from octamethylcyclotetrasiloxane (D4) and hexamethyldisiloxane (MM) using KOH as initiator with the ring opening polymerization technique. The results of PDMS polymer obtained were tested for stability against storage time with various parameters including surface tension, refractive index, viscosity, and transparance. Its stability against exposure to UV rays is expressed in changes in surface tension, refractive index, viscosity and PDMS transmittance to storage time. The result is that the three PDMS that have been synthesized successfully show a perfect transmittance value of 100%, which means that all light passing through the sample will be passed on entirely. Refractive index for PDMS 1.07 Pa. S; 1.69 Pa.s and 3.00 Pa. S respectively are 1,404; 1.4092 and 1.4121. PDMS surface tension 1.07 Pa.s; 1.69 Pa.s and 3.00 Pa.s respectively in the amount of 19 m.N / m; 19.7 m.N / m and 18 m.N / m. The three PDMS that have been successfully synthesized resemble all functional groups such as those possessed by the standard PDMS, namely absorption that comes from the vibrations of Si – O – Si, Si(CH₃)₂, Si(CH₃)₃, SiCH₃., Si – C dan C – H bonds .

Keyword: Polydimethylsiloxane (PDMS); vitreous humour; PDMS stability; octamethylcyclotetrasiloxane (D4); hexamethyldisiloxane (MM)