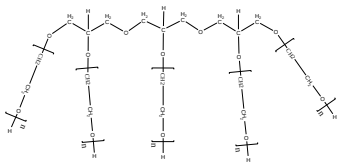
Sample Name: **Poly(ethylene oxide), hydroxy-terminated 5-arm star polymer / Core: triglycerol**

Sample #: **P9635B-5EOOH**

Structure:



Composition:

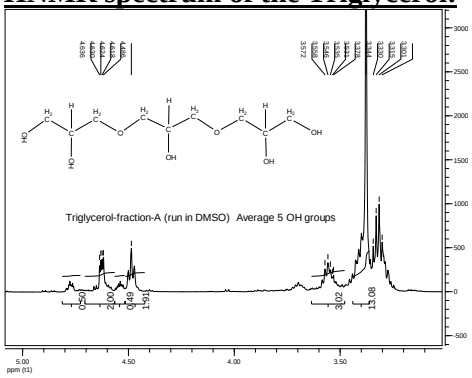
Mn x 10^3 (total)	PDI
15.0	1.12

Linaer PEG about 50%

Synthesis Procedure:

The polymer was prepared by anionic living polymerization of ethylene oxide using potassium salt of glycerol oligomer (triglycerol).

HNMR spectrum of the Triglycerol:



Characterization:

The product was characterized by Size exclusion chromatography (SEC): Varian liquid chromatograph equipped with UV and refractive detector. SEC columns from Supelco were used with THF containing 2 vol% $(Et)_3N$ as the eluent. The molecular weights were determined using light scattering detector and viscosity detector. The molecular weights and the polydispersity indice were calculated.

An aqueous GPC column from Supelco(G5000 PWXL) was also used with 0.5 M acetic acid and 0.8 M NaNO3 as the eluent. It was kept at a constant temperature of 50°C. The flow rate was 1.0 ml/min. The column was calibrated with monodisperse poly(ethylene oxide) standards. The molecular weights and the polydispersity index of polyethylene oxide were calculated by using a Visual Basic GPC software.

Purification:

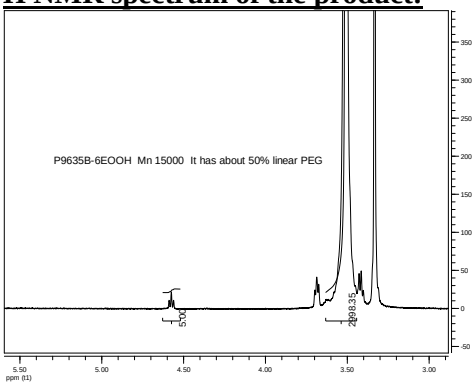
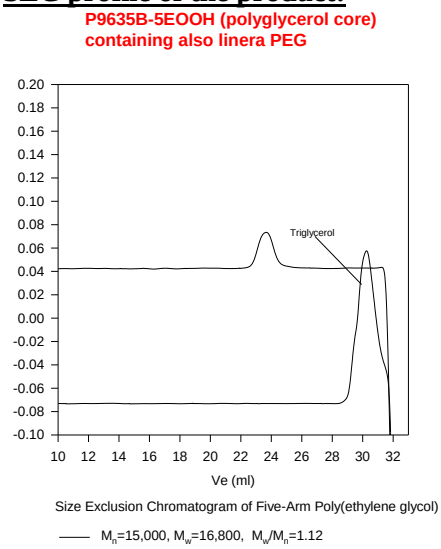
Purification of the obtained polymer was carried out rigorously as follows to ensure the removal of the catalyst side product:

1. Dissolved the polymer in de-ionized distilled water to remove the any insoluble organic catalyst side product.
2. Polymer extracted from water with dichloromethane.
3. Polymer solution in dichloromethane was dried over anhydrous sodium sulfate.
4. Solution filtered and than passed through a column packed with basic Al_2O_3.
5. Solution concentrated on rota-evaporator.
6. Solution precipitated in cold diethyl ether.
7. Dried under vacuum for 48h at 38 °C.

Solubility:

Polymer is soluble in toluene, THF, water and $CHCl_3$. The polymer is insoluble in hexane, ether, cold isopropanol, and ethanol.

H NMR spectrum of the product:



SEC profile of the product: