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APPENDICES

Appendix A The Glycerol Conversion, Di- and Triglycerol Selectivity of the Studied in Etherification Step

| Time (H) | % Glycerol Conversion | % Diglycerol Selectivity | % Triglycerol Selectivity |
|----------|-----------------------|--------------------------|---------------------------|
| 1 | 23.38 | 13.73 | 2.97 |
| 2 | 41.70 | 22.34 | 5.27 |
| 3 | 66.57 | 29.86 | 13.27 |
| 4 | 68.44 | 31.66 | 15.40 |
| 5 | 73.23 | 29.50 | 15.47 |
| 6 | 75.42 | 28.87 | 15.74 |
| 7 | 80.25 | 24.59 | 14.41 |
| 8 | 23.38 | 13.73 | 2.97 |

Appendix B The Triglycerol Conversion of the studied in Esterification Step

| Temperature (°C) | % Triglycerol conversion | | |
|------------------|--------------------------|----------|--------|
| | r = 0.1* | r = 0.5* | r = 1* |
| 140 | 5.9 | 10.2 | 20.0 |
| 160 | 7.6 | 16.0 | 36.6 |
| 180 | 7.9 | 27.4 | 52.6 |
| 200 | 9.5 | 34.2 | 82.1 |
| 220 | 9.6 | 50.7 | 100.0 |

*r = oleic acid-triglycerol molar ration

Appendix C The Viscosity and Shear Rate of TriglycerolOleate By Brookfield Viscosity Meter, Model DV-III with Spindle no. 27 at 24°C

| r* | Shear rate (s⁻¹) | Viscosity (cP) |
|------------|------------------------------------|-----------------------|
| 0.5 | 0.34 | 30500.0 |
| | 0.68 | 30750.0 |
| | 1.02 | 30583.0 |
| | 1.36 | 30812.5 |
| | 1.7 | 30800.0 |
| | 2.04 | 30791.5 |
| | 2.34 | 30750.0 |
| | 2.72 | 30656.0 |
| | 0.34 | 30500.0 |
| 1 | 0.68 | 10125.0 |
| | 1.02 | 13958.5 |
| | 1.36 | 15875.0 |
| | 1.70 | 16975.0 |
| | 2.04 | 17708.0 |
| | 2.38 | 18214.5 |
| | 2.72 | 18562.5 |
| | 3.06 | 18833.5 |
| | 3.40 | 19037.5 |
| | 3.74 | 19136.0 |
| | 4.08 | 19239.5 |

*r = oleic acid-triglycerol molar ration

CURRICULUM VITAE

Name: Mr. NateeBoontaveeroj

Date of Birth: August 30, 1985

Nationality: Thai

University Education:

2004-2008 Bachelor Degree of Chemical Engineering, Faculty of Engineering, Prince of Songkla University, Songkla, Thailand

Proceedings:

1. Boontaveeroj, B., and Kitiyanan, B. (2012, April 24)Synthesis of Polyglycerol Ester from Glycerol for Development in Lubrication Application.Proceedings of the 3rdResearch Suymposium on Petrochemical and Materials Technology and The 18th PPC Symposium on Petroleum, Petrochemical, and Polymer,Bangkok, Thailand.

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