

Solubility Limitations of Saturated Monoglycerides (SMG) in Biodiesel During Cold Weather

**101ST Annual AOCS Meeting and EXPO
Phoenix, Arizona
May 17, 2010**

BY

***Richard W. Heiden, PH.D.
R. W. Heiden Associates, LLC
1026 New Holland Avenue
Lancaster, PA 17601 USA
PH: 717 299 6860
FAX: 717 299 6868
CELL: 717 940 0834
rwheidenphd@aol.com
www.supersleuthchemists.com***

***“If it cannot be measured, it cannot be improved”---
W. Edwards Deming***

Solubility Limitations of Saturated Monoglycerides (SMG) in Biodiesel During Cold Weather-ABSTRACT
101ST Annual AOCS Meeting and EXPO
May 17, 2010

Richard W. Heiden, Ph.D.

The formation of precipitates that block fuel filters above the cloud point represents an important challenge to the cold weather operability of biodiesel fueled vehicles. Normally, cold weather limitations of biodiesel fuels are predicted by standard cloud point/pour point, and cold soak filtration (CSFT), but these tests fail to predict the impact of the temperature on the solubility of some important impurities.

Saturated monoglycerides (SMG's) are identified in previously reported work^{1,2} as the prime factors in incidents of fuel filter blockages that struck fleets of maintenance vehicles using B-20 in the eastern part of the U.S. in 2006. Our initial studies of the temperature dependence of the solubilities of monopalmitin and monostearin in B100 and various blends are reported there. Now, two years later SMG's on filters are an important concern to the biodiesel industry and the solubility of SMG's has come to the forefront.

We present here data that defines the magnitude of the SMG challenge. We have systematically studied the effects of various conditions that determine the SMG solubility in B-100 and various blends. The results of these studies are discussed.

Previous RWH SMG Solubility Presentations at AOCS Meetings

- **¹ R. W. Heiden, “Impurities in B20 that Cause Filter Plugging in Cold Weather”, The International Congress on Biodiesel -The Science and Technology, Vienna, November 5-7, 2007.**
- **² R. W. Heiden, “The Solubility of Partial Glycerides (PG) as a Factor in the Blocking of Biodiesel Fuel Filters During Cold Weather” , Presented at the 99TH American Oil Chemists Society (AOCS) Meeting-Seattle, May 21, 2008.**
- **³ R. W. Heiden, “Cold Weather Limitations of Saturated Monoglycerides”, The International Congress on Biodiesel - The Science and Technology, Munich, November 5-7, 2009.**