

*IASH 2007, the 10th International Conference on
Stability, Handling and Use of Liquid Fuels
Tucson, Arizona
October 5-11, 2007*

**IMPROVEMENT IN STORAGE STABILITY OF BIODIESEL WITH
SYNTHETIC ANTIOXIDANTS**

Dr. Axel Ingendoh

Lanxess Deutschland GmbH, Building B 108, D- 51369 Leverkusen, Germany

Biodiesel without antioxidants is unstable and quickly becomes rancid. Rancidity is a type of oxidation by air in which short-chain fatty acids and insoluble polymers are formed. Both side products can cause engine damage by corrosion or through the formation of deposits. It has been shown that the content of natural antioxidant Vitamin E in rape seed oil biodiesel is mostly insufficient to ensure that the level specified in the EU standard of 6 h in the rancimat test at the filling station can be maintained. Test results are presented which show the correlation of rancimat value, Vitamin E concentration and shelf life of biodiesel.

The new Baynox[®] synthetic antioxidants for rape seed biodiesel, palm biodiesel and animal fats show a dramatic increase in rancimat values and increase in shelf life accordingly.

Biodiesel produced from soybean oil shows less effects on Baynox[®] as expected. The course was investigated and attributed to the higher content of multiple unsaturated fatty acid methyl ester in soybean biodiesel. This was proved by testing rancimat values on pure Palmitic-, oleic-, linolic- and linoleic methyl esters.

Screening of highly active antioxidants led to the development of Baynox[®] plus, a second biodiesel antioxidant with strong activity in soybean and sunflower biodiesel.

Test results in soybean biodiesel from the market and vitamin E free biodiesel produced by distillation are shown and prove the superior activity of Baynox[®] plus.

In the presentation the mechanism of oxidation and the mode of action of antioxidants is discussed. Additionally some examples are presented which show, where the yellow color of biodiesel really comes from and how one can actually visualize the oxidation leading to rancidity and gum formation.