

## Proposed Item for Biobased Designation

The following biobased product information has been collected to support item designation by USDA for the Federal Biobased Product Preferred Procurement Program (FB4P). This summary reflects data available as of September 15, 2005.

### **Title: Diesel Fuel Additives**

**Description:** Biobased diesel fuel additives represent that group of products formulated as the mono alkyl esters of long chain fatty acids derived from renewable lipid sources. Typically produced through the reaction of a vegetable oil or animal fat with methanol or ethanol in the presence of a catalyst to yield glycerin and biodiesel (chemically called methyl or ethyl esters). Biobased diesel fuel additives are blended with petroleum diesel for use in compression ignition (diesel) engines. Its physical and chemical properties as it relates to operation of diesel engines are similar to petroleum based diesel fuel.

**Manufacturers Identified:** 37 manufacturers producing Diesel Fuel Additives have been identified through internet searches, manufacturer's directories, trade associations, and company submissions.

**Industry Associations Investigated:** The following industry associations have been investigated for member companies producing Diesel Fuel Additives:

- Biobased Manufacturers Association
- United Soybean Board
- Engine Manufacturer's Association
- National Biodiesel Board
- Sustainable Energy Coalition
- Design for the Environment
- Green Seal
- National Biodiesel Board
- American Soybean Association
- American Chemical Society
- American Organic Chemist Society
- Consumer Specialty Products Association

**Commercially Available Products Identified:** Of the manufacturers identified, 52 Diesel Fuel Additives are commercially available on the market.

**Product Information Collected:** Specific product information including company contact, intended use, biobased content, and performance characteristics have been collected on 19 Diesel Fuel Additives.

**Industry Performance Standards:** Product information submitted by biobased manufacturers indicate that have typically been tested to the following industry standards:

- American Society for Testing and Materials #D1094-00 Standard Test Method for Water Reaction of Aviation Fuels

- American Society for Testing and Materials #D6078-04 Standard Test Method for Evaluating Lubricity of Diesel Fuels by the Scuffing Load Ball-on-Cylinder Lubricity Evaluator
- American Society for Testing and Materials #D665-03 Standard Test Method for Rust-Preventing Characteristics of Inhibited Mineral Oil in the Presence of Water
- American Society for Testing and Materials #D6751-03a Standard Specification for Biodiesel Fuel (B100) Blend Stock for Distillate Fuels
- American Society for Testing and Materials #D975-05 Standard Specification for Diesel Fuel Oils
- American Society for Testing and Materials #D-6468 Standard test method for is a test method that determines the relative instability of a fuel subjected to a thermal degradation process
- Cummins Engine Company #L10 Injector Depositing Test Detergency, used to indicate of the ability of a product to provide injector cleanliness and can be used to discriminate fuel/fuel additive quality

**Samples Tested for Biobased Content:** 6 samples of Diesel Fuel Additives have been submitted to independent laboratories for biobased content testing as specified by ASTM standard D6866-04.

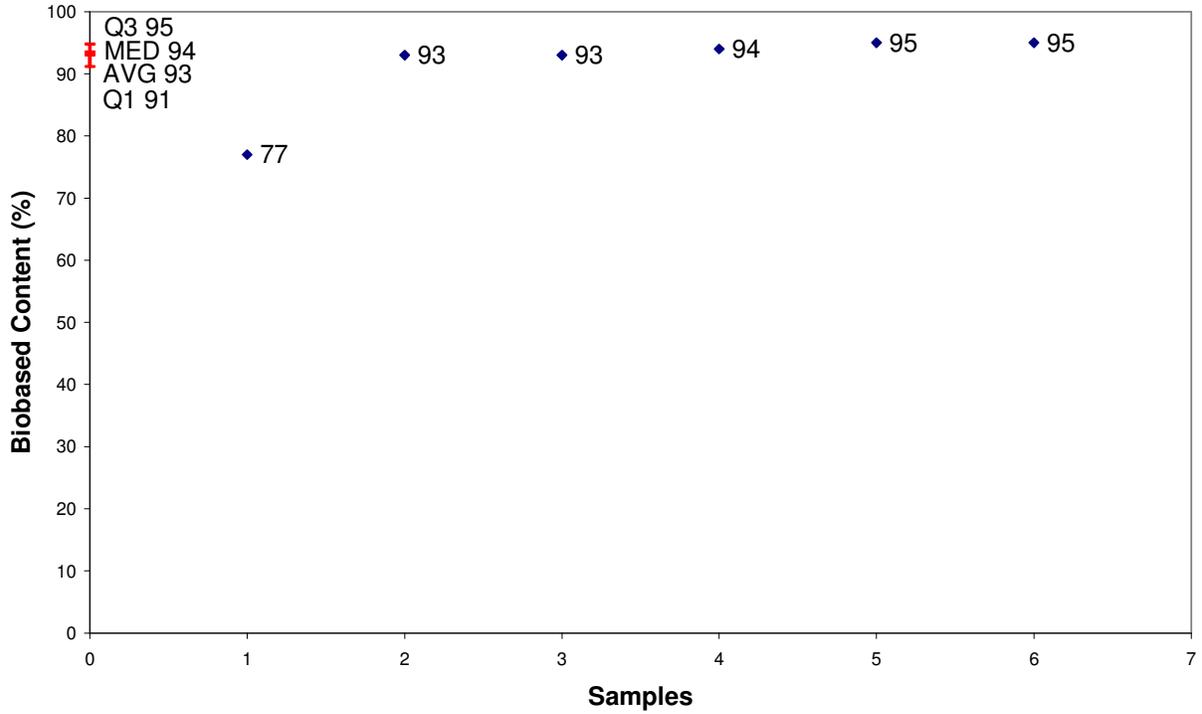
**Biobased Content Data:** Results from biobased content testing of Diesel Fuel Additives indicate a range of content percentages from 77% minimum to 95% maximum biobased content as defined by ASTM D 6866-04. A detailed distribution of biobased content levels is included as Appendix A.

**Products Submitted for BEES Analysis:** Life-cycle cost and environmental effect data for 2 Diesel Fuel Additives have been submitted to NIST for BEES analysis.

**BEES Analysis:** The life-cycle costs of the submitted Diesel Fuel Additives range from \$2.15 minimum to \$2.25 maximum per usage unit. The environmental scores range from 0.0231 minimum to 0.0287 maximum. A detailed summary of the BEES results is included as Appendix B.

## Appendix A - Biobased Content Data

### Diesel Fuel Additives

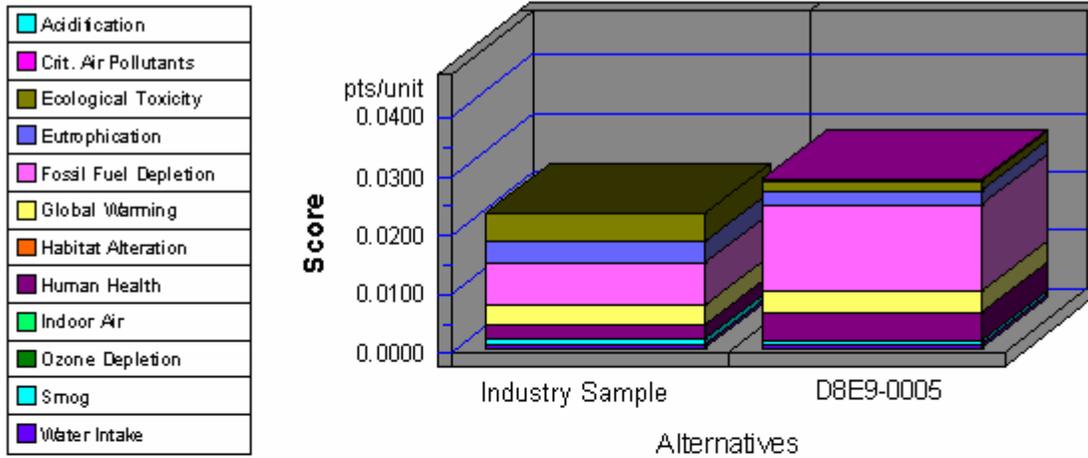


	Manufacturers Identified	Products Identified	C14	BEES
1	RGWJ	RGWJ-0076	77	
2	HP9P	HP9P-0007	93	
3	C7T2	C7T2-0002	93	
4	P9F3	P9F3-0001	94	
5	J3TP	J3TP-0015	95	
6	J3TP	J3TP-0028	95	
7	D8E9	D8E9-0005		yes
8		General Industry Sample		yes

## Appendix B - BEES Analysis Results

Units: One gallon

### Environmental Performance

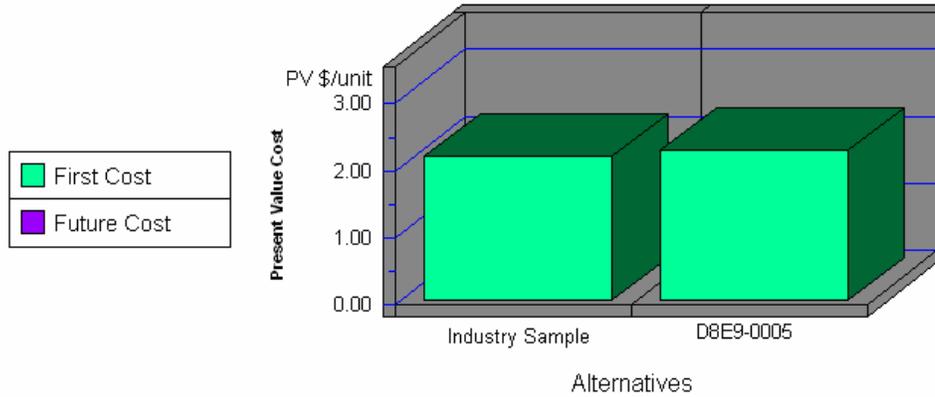


**Note: Lower values are better**

Category	Ind. Sample	D8E9-0005
Acidification-5%	0.0000	0.0000
Crit. Air Pollutants-6%	0.0002	0.0003
Ecolog. Toxicity-11%	0.0047	0.0014
Eutrophication-5%	0.0035	0.0026
Fossil Fuel Depl.-5%	0.0072	0.0145
Global Warming-16%	0.0035	0.0038
Habitat Alteration-16%	0.0000	0.0000
Human Health-11%	0.0023	0.0048
Indoor Air-11%	0.0000	0.0000
Ozone Depletion-5%	0.0000	0.0000
Smog-6%	0.0008	0.0006
Water Intake-3%	0.0009	0.0007
<b>Sum</b>	<b>0.0231</b>	<b>0.0287</b>

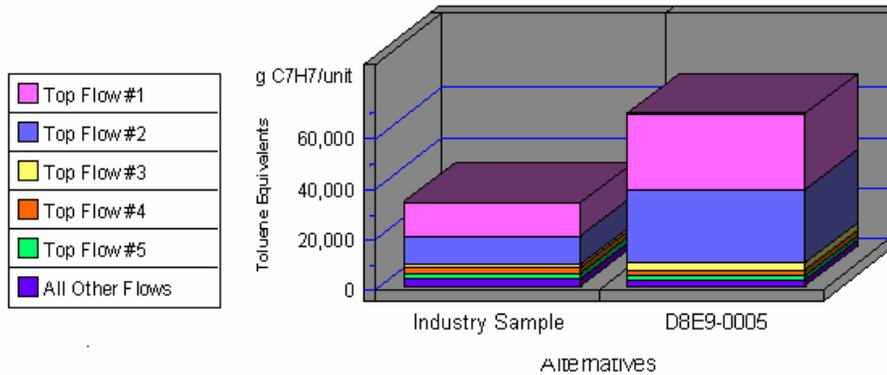
## Appendix B (continued)

### Economic Performance



Category	Ind. Sample	D8E9-0005
First Cost	2.15	2.25
Future Cost-- 3.9%	0.00	0.00
<b>Sum</b>	<b>2.15</b>	<b>2.25</b>

### Human Health by Sorted Flows\*



**Note: Lower values are better**

Category	Ind. Sample	D8E9-0005
Cancer--(w) Arsenic (As3+, As5+)	13,252.04	30,634.59
Cancer--(w) Phenol (C6H5OH)	11,465.74	28,704.44
Cancer--(a) Benzene (C6H6)	993.81	3,101.70
Cancer--(a) Arsenic (As)	2,112.45	1,916.59
Cancer--(a) Dioxins (unspecific)	2,389.46	1,864.85
All Others	3,169.39	2,577.31
<b>Sum</b>	<b>33,382.90</b>	<b>68,799.49</b>

\*Sorted by five topmost flows for worst-scoring product