

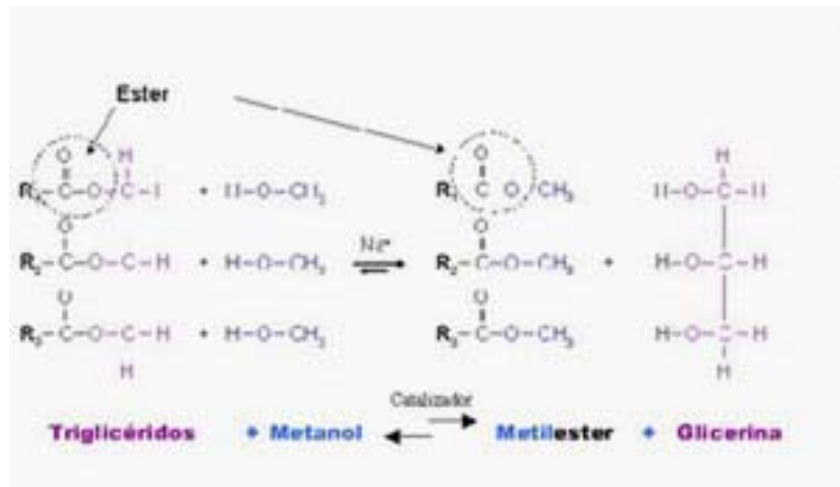
WHAT IS BIODIESEL?

Biodiesel is a biofuel for diesel engines derived from vegetable oils. The biodiesel chemistry includes methyl, ethyl and alkyl esters.

It has also been registered as a fuel additive in the Environmental Protection Agency (US EPA).

It may be used as 100% biodiesel (B100), as a petrodiesel blending fluid (B20) or as an additive in a lower concentration (1% to 5%). Thus biodiesel does not replace, but rather supplements petrodiesel.

CHEMICAL COMPOSITION OF BIODIESEL



THE BIODIESEL

Biodiesel is an alternative fuel to petrodiesel. It is obtained out of renewable natural resources, such as vegetable oil, tallow, and recyclable edible oil. Raw materials include: soybean, castor, cotton, sunflower, corn oil and tallow. Soybean oil was used for the ASA/USB/NBB biodiesel project.

Chemically, biodiesel is a fatty-acid mono-alkyl ester derived from long natural lipid chains. Biodiesel is typically obtained by mixing vegetable oil or tallow with methanol or ethanol as a catalyst, resulting in glycerin and biodiesel. Methanol is used in this project for vegetable oil esterification and is chemically known as methyl ester. It has been registered as pure fuel / additive with the United States Environmental Protection Agency and it has been authorized for business use.

Biodiesel is an alternative fuel that can be used as pure biodiesel, or mixed with petrodiesel in compression engines. Biodiesel chemistry and physical properties are similar to petrodiesel. Pure biodiesel (100%) specifications are described in Table 1. They are subject to approval by the United States ASMT as well as by the International Standard Organization (ISO). Similar biodiesel specs have been established by the German, Austrian and French authorities.

Biodiesel may be used as follows:

- pure (B100)
- mixed with petrodiesel (B20)
- as an additive (1% to 5%) to petrodiesel
- as alternative fuel to kerosene or diesel fuel (#1 / #2)

Biodiesel Specifications in the US (as from July 1996)

Propiedad	Método ASTM	Valor	Unidad
Punto de ignición	D93	100,0 mín.	°C
Sedimento & agua	D1796	0,050 máx.	Vol. %
Residuo carbónico (muestra 100 %)	D4530++	0,050 máx.	Wt %
Ceniza sulfatada	D874	0,020 máx.	Wt %
Viscosidad (40_C)	D445	1,9 – 6,5	Cst
Sulfuro	D2622	0,05 máx.	Wt %
Número cetano	D613	40 mín.	
Punto nube	D2500	Por cliente	°C
Corrosión cúprica	D130	Nº 3b máx.	
Número ácido	D664	0,80 máx.	Mg KOH/gm
Glicerina libre	G.C.#	0,020 máx.	Wt %
Glicerina total	G.C.#	0,240 máx.	Wt %

+ These specifications will be approved by ASTM. A number of tests have been undertaken on B20 mixed with 80% petrodiesel. Pure biodiesel can also be used. Blends containing >20% biodiesel should be evaluated on an individual basis.

++ Or the equivalent ASTM test method.

Australian update of USDA test method.