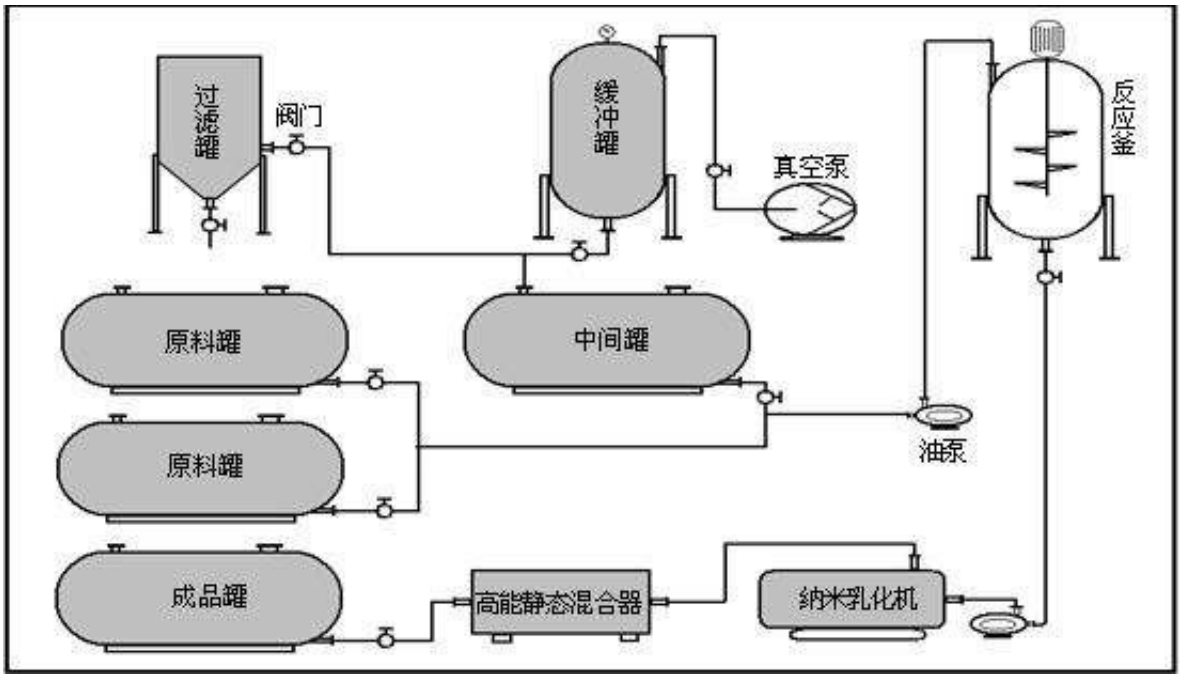
Influence of Biodiesel Engine on diesel engine performance and its development prospect



Biodiesel is a kind of clean oxygenated liquid fuel made from oil crops such as soybean and rapeseed, oil palm and pistachio, oil tree fruits, engineering microalgae, oil aquatic plants, animal oil or waste cooking oil.

The popularization of microwave drying technology makes the Biodiesel Engine known to more people.

Because of its abundant energy, renewable and less pollution, it has become the most ideal alternative fuel for diesel engine. The application of biodiesel can not only greatly save petroleum resources and reduce environmental pollution, but also promote the development of agriculture and other related industries.

At present, many countries have started the development and application of biodiesel engines. The development and application of biodiesel will be of far-reaching significance in alleviating the contradiction between supply and demand in China's diesel market.

1 Characteristics of biodiesel

The diesel molecule is made up of about 15 carbon chains.

Biodiesel is a new alternative fuel for diesel engines, which is composed of 14 to 18 carbon chains and has a similar carbon number to diesel. According to the chemical composition analysis, biodiesel fuel is a kind of high fatty acid methane, which is obtained by glycerol decomposition with unsaturated oleic acid C18 as the main component.

1.1 preparation of biodiesel

Biodiesel production can be divided into two categories: physical and chemical methods. At present, biodiesel is produced mainly by chemical method, that is, transesterification of animal or vegetable oil with methanol or ethanol and other low-carbon alcohols in acidic or alkaline catalysts and high temperature (230-250 C) to produce corresponding fatty acid methyl ester or ethyl ester, and then washed and dried to obtain biodiesel. Methanol or ethanol can be recycled in the production process, the production equipment is the same as the general oil-making equipment, the production process can produce about 10 by-product glycerol.

1.2 characteristics of biodiesel

Through analysis, it is found that biodiesel has the following characteristics compared with mineral diesel.

1.2.1 good combustion characteristics

Cetane number is an important index to characterize the spontaneous combustion of diesel oil. The higher cetane number, the better the spontaneous combustion of diesel oil, relatively speaking, the shorter the ignition delay of diesel oil, which can reduce the pressure rise rate in the combustion process of diesel engine, reduce the vibration and noise of diesel engine, and make the diesel engine work softly.

1.2.2 good environmental protection characteristics

Biodiesel has low sulfur content, so sulfur dioxide and sulphide emissions are low. Biodiesel contains no aromatic alkanes which pollute the environment, so the harm of exhaust gas to human body is lower than that of conventional diesel. In addition, the carbon dioxide emitted by biodiesel combustion is returned to the ecosphere for plants to absorb and grow, and there is no net increase in carbon dioxide, forming a closed carbon cycle, which is expected to improve the global warming caused by the large amount of carbon dioxide emissions.

1.2.3 good safety features

The flash point of biodiesel is above 100 degree, while that of mineral diesel is 60. Therefore, biodiesel is not a dangerous product, and has better safety in transportation, storage and use.

1.2.4 good lubrication characteristics

The wear rate of fuel injection pump, engine block and connecting rod is low.

1.2.5 reproducible performance

As a renewable source of energy, unlike oil reserves, it is abundant in resources that, through the efforts of agricultural and biological scientists, will not be exhausted.

1.2.6 has high viscosity and poor atomization performance.

Because of its high viscosity, the injector is easy to glue and plug; evaporation is poor, which makes it difficult to start cold and easy to accumulate carbon.

2 Application of biodiesel in diesel engine

Biodiesel can be added directly without changing the diesel engine. It is found that the power and economy of diesel engine can be slightly reduced by using biodiesel, but the emission of diesel engine will be greatly improved.