

CO-PROCESSING OF NON-EDIBLE OILS IN DHDS/DHDT UNIT

Introduction

Conventionally Biodiesel is produced by trans-esterification process which is very complex and capital intensive. Biodiesel has inferior properties in terms of oxidation stability, higher emission of NO_x, lower energy content and results in more deposits in the engine. To circumvent above disadvantages, IndianOil R&D has developed a technology for co-processing of non-edible oils in DHDS/ DHDT unit.

Process Description

Degummed/ de-metalled non-edible oil is mixed with diesel feed and fed into the DHDS/DHDT reactor along with recycle hydrogen. In the reactor, vegetable oil is converted to paraffins/ isoparaffins, water, CO, CO₂ and trace quantity of light gases. The buildup of CO & CO₂ concentration is controlled within the limit to avoid adverse effect on the catalyst system. The diesel product with co-processing has advantages mainly in terms of higher cetane, good oxidation stability and lower density.

For co-processing, total metal content in the non-edible oil needs to be reduced below 2 ppm since, metals are poisons to DHDS/DHDT catalysts. IndianOil R&D has developed a demetallation process for the same and filed patent in India, USA and Europe.

Further, for implementation of co-processing in existing DHDT/DHDS unit, IndianOil R&D has expertise to study the following on case to case basis:

- Metallurgy for storage & handling
- Chemical H₂ consumption
- Exothermicity of reactions
- Oxidation stability of non-edible oils
- CO/ CO₂ Inhibition

Salient Features

- Utilizes existing refinery infrastructure with minor modifications.
- Better quality product in terms of cetane, density, oxidation stability, NO_x emission etc.
- Can be transported in petroleum pipelines unlike biodiesel.
- The production cost is significantly lower by about 50% in comparison to Biodiesel plant.
- Fuel consumption is reduced compared to normal feed.

Commercialization

Co-processing trial run with degummed & demetalled Jatropha oil (6.5% of diesel feed) was successfully conducted in April, 2013 at DHDT unit of Manali Refinery of CPCL. Due to co-processing, the overall quality of treated diesel improved in terms of cetane number by around 2 units and density also reduced. Other properties of co-product remained almost unchanged as compared to product using neat diesel feed stock.