

Mitigating the harmful effects of metals on biodiesel quality is critical in order to produce a stable product for storage and distribution

Metal contamination

Biodiesel and traditionally refined fuels begin to oxidise as soon as they are produced.

Once the oxidation reaction begins and insoluble by-products (gum) are formed, it is not possible to reverse the reaction nor will a stabiliser dissolve the gum.

Therefore stabilisers should be added as early as possible to slow down or prevent fuel degradation.

Test data indicates that extremely low metal contamination of copper can result in catastrophic acceleration of oxidation.

The fatty acid profile of a feedstock has an important effect on overall stability with feedstocks high in polyunsaturates typically being less stable, such as animal fats, soyabeans, cottonseed and jatropha.

Distilled seed based biodiesel has fewer tocopherols (natural occurring antioxidants) retained in the product than biodiesel produced in other processes and tend to be less stable. Biodiesel produced from

hydrogenated feedstocks tend to be more stable.

Bio-based fuels are very susceptible to destabilisation from low level metal contamination - less than 1 part per million of these metals is sufficient to have an effect and such low levels are difficult to control through the supply chain.

Metal deactivators inhibit the catalytic effects of such ions, especially copper, retarding the formation of gummy residues (eg. gels containing copper mercaptide). Even

concentrations of copper as low as 0.1 ppm can have detrimental effects.

Metal deactivators also function to prevent corrosion in pipelines, storage tanks and vehicles. They attach to the metal surface, preventing corrosive agents from interacting with surface.

Sources of contamination

- Copper fuel pumps and some materials of construction

- Silver fuel sending units (fuel tank level sensors)
- Iron throughout fuel refining, delivery and use.

This degradation can be prevented through the use of antioxidants such as phenylenediamines, alkylenediamines (diethylenetriamine, triethylenetetramine, etc), and alkylamines (diethylamine, tributylamine, ethylamine). Other useful additives include gum inhibitors such as N-substituted alkylaminophenols.

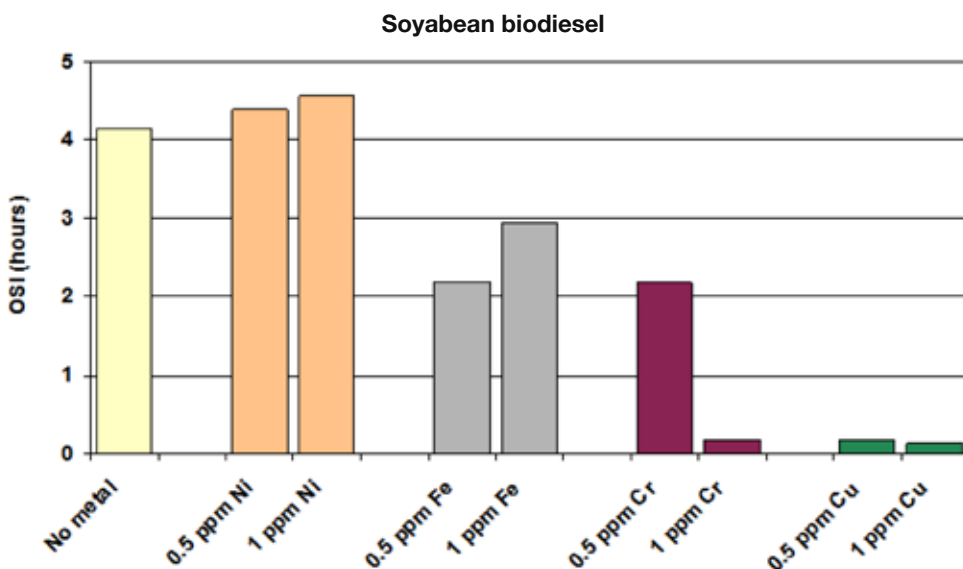
Fuel stability additives are available in a variety of blends and dilutions, from blends of phenolic and aminic antioxidants and sweetening agents for petroleum, to blends of antioxidants and metal deactivators.

Fuel additives can and do impact the rate of reaction and when used properly will result in a very stable fuel. ●

For more information:

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Bio-based fuels are very susceptible to destabilisation from low level metal contamination - something which is very difficult to control in the distribution supply chain