Title	Use of a spectrophotometer for biodiesel quality sensing
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Abstract

Biodiesel from different feedstocks have different properties. ASTM standard D6751 specifies the minimum biodiesel quality requirements and National Biodiesel Accreditation Committee has a BQ-9000 certification program for the manufacturers who maintains ASTM D6751 standard. Even after biodiesel meeting ASTM specifications, biodiesel from different feedstock shows different cold weather and emission properties. The test procedures to assure ASTM biodiesel quality are not being widely implemented because of the lengthy procedures and laboratory equipment requirements. A critical need in the increasingly emerging biodiesel industry right now is a reliable, affordable and rapid test method for determining the blends of biodiesel in diesel fuel. As an effort to explore a reliable and rapid method, a spectrophotometer was used to scan the blends of #2 fossil diesel and biodiesel for spectrums in the wavelength range of 190-1100 nm. Biodiesel from four different feedstocks: Rapeseed, soybean, mustard and waste vegetable oil were investigated. The shape of the spectrum curve was found to be different for different biodiesel feedstock where as relative absorbance and characteristic peaks of absorbance curve was attenuated with increasing amount of diesel in the blend. Shape characteristics were fed into neural network to predict the biodiesel feedstock and blend level in biodiesel-diesel mixture. Different level of coloring pigmentation showed a promise in characterizing biodiesel with this approach.