Mary Kay O'Connor
Process Safety Center
2010 International Symposium
http://process-safety.tamu.edu

Study on Fire Hazard of Biodiesel (BDF)

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ABSTRACT

Hazard of Biodiesel (BDF) is studied. BDF is a name for a variety of ester-based fuel made from vegetable oils, such as soybean, rapeseed or sunflower oil. BDF is now used for fuel of automobile. 20 % (in volume) or more BDF is added to (petroleum) diesel. Recently importance of BDF is increasing due to increase of crude oil price and environmental aspect, and its fires were sometimes reported. Therefore we studied on hazard of BDF comparing (petroleum) diesel oil and vegetable oil, raw materials of BDF. We found that BDF is auto-oxidized easily and ignites. In Japan causes of fires of BDF might be auto-ignition of BDF. The flash point of pure BDF is very high, around 120 to 190 C. However its flash point decreases to around 20-30 C when even small amount of methanol exists. The flash point of pure methanol is 11 C with the Tag-close cup method. Methanol is one of the raw materials for making BDF and it sometimes existed in the production, BDF. And then we did pool fire tests with BDF and vegetable oil, (petroleum) diesel in various size steel pans. Diameter of pans was up to 1m. BDF made violent combustion, splashing water and increasing external radiation like to boilover after long burning, even its distillation curve is very flat compared with (petroleum) diesel or crude oil. Therefore we have to take care of BDF when we treat it, though its flash point is very high.

Keywords: Biodiesel, oxidation, flash point, boilover