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EFFECT OF FAME ON SUSCEPTIBILITY OF MEROX-TREATED AND HYDRO-TREATED JET A-1 TO MICROBIOLOGICAL GROWTH

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Many countries now mandate that certain percentages of fuels for road transport use must be derived from renewable sources. This has resulted in widespread presence of Fatty Acid Methyl Esters (FAME) in fuel distribution systems with consequent logistical problems in ensuring aviation fuels in distribution remain FAME-free. There are opportunities for cross contamination of aviation fuel by diesel, particularly in pipeline distribution or transport by sea in non-dedicated tankers. Consequently, small amounts of FAME can be expected to be occasionally recovered in jet fuels. Aircraft engine OEM's have been canvassed to approve the use of jet fuels containing small quantities of FAME and a proposal to allow 100 ppm is currently tabled. Although a considerable amount of work has investigated the impact of FAME on the physical and chemical properties of aviation fuel, there is no available data on the influence on the fuel's susceptibility to microbiological growth. Field experience and laboratory investigation shows that automotive diesels with a FAME content of a few percent are significantly more prone to rapid microbial growth and there may be consequent quality and operational problems.

This paper reports work sponsored by the Energy Institute to investigate the influence of FAME on microbiological growth in MEROX treated and hydrotreated aviation fuel. Microcosms of each fuel type without FAME and with FAME at 100 ppm and 400 ppm were inoculated with a synthetic aqueous phase, containing a wide variety of fuel degrading micro-organisms, at a fuel water ratio of 1000:1. Microbiological growth was assessed over time by viable counts, ATP measurement and visible and microscope examination. The pH of aqueous phase was also monitored. At the end of the investigation the filterability of the fuel and the total dry weight of particulates present were also assessed. The types of microorganisms which developed in each microcosm were investigated by DNA profiling. It was found that FAME did influence the susceptibility of the fuel to growth by some microbial species; hydro treated Jet fuel was more susceptible to fungal growth when FAME was present. However, MEROX treated fuel was found to be equally susceptible to microbial growth even in the absence of FAME.