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**MICROBIAL CONTAMINATION STUDIES IN JP-8 FUELED AIRCRAFT**

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In 2003 the fuels laboratory at Wright Patterson AFB initiated a study to investigate the level diversity of microbes in Air Force fuel systems. Samples were taken along fuel distribution paths starting at several refineries and included pipeline samples, barge samples, truck tanker samples, base storage samples, and several aircraft to construct a representative contamination profile. Instead of finding a primary contamination site, bacteria and some fungi were found throughout the distribution system. In 2005 the program emphasis was changed to focus on contamination in aircraft fuel tanks. Samples were taken from civilian aircraft in long term storage as well as from Air Force line aircraft. Cargo and bomber aircraft were sampled across the continental US. Water bottoms were noted and DiEGME concentration was measured as well as ATP levels and Colony Forming Units. Microbes were cultured for identification using PCR and DNA sequencing. While many species historically associated with fuel contamination have been found, several species not previously reported have also been identified.

In recent years there has been mounting pressure to reduce fuel costs in the Air Force. DiEGME, the current FSII additive, is added to JP-8 at a maximum volume percentage of 0.18 and is an obvious candidate for cost reduction. In addition to its function as an anti-icing additive it also performs as an anti-microbial at high concentrations in water bottoms. This recent study has documented that measurable amounts of water can be found on many aircraft where fuel sumps are not drained with regularity. During the 2005-2007 period, one liter aircraft sump samples ranged from dry fuel only to samples with more than 200 ml of water / DiEGME. DiEGME concentration in water bottoms was typically more than 30%, (In fact it ranged from 32% to 50%.) While microbes were found in fuel without a measurable water phase, no evidence of microbial activity was found in water containing high concentrations of DiEGME. Measurements of ATP, (adenosine triphosphate), for the most part indicated minimal microbial activity while several tanks gave ATP readings normally associated with significant microbial populations. Since none of the line aircraft reported any evidence of noticeable contamination, it is still not evident what level of ATP is cause for concern.