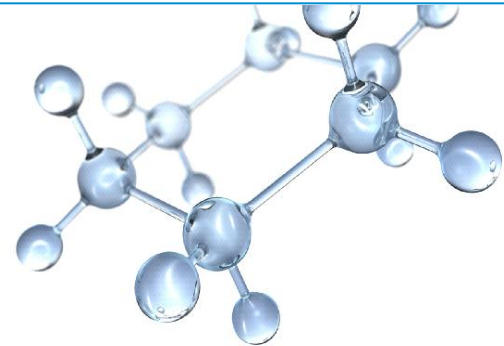


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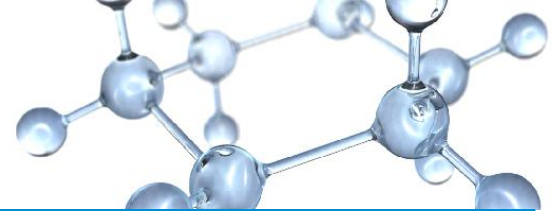


The Big Picture: Microbial Growth and the Fuel Supply and Distribution System

David Pullinger

European S&D Product Quality Adviser - ExxonMobil

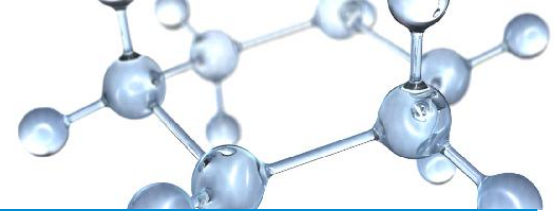
History



“Growth of bacteria, yeasts and moulds has been identified in hydrocarbon distillate fuels and fuel components in refinery blend and product storage tanks, terminal storage tanks and distribution facilities....This is not a new phenomenon as it was first recorded in the international literature in 1895”*

- * The Energy Institute – Guidelines for the investigation of the microbial content of petroleum fuels and for the implementation of avoidance and remedial strategies – January 2005

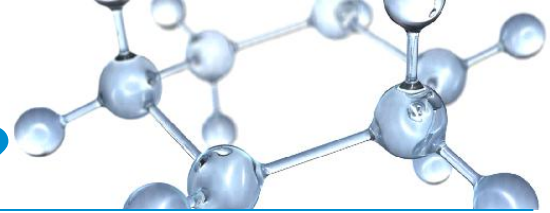
Why The Renewed Interest?



- The occurrence of Microbial Growth has increased in diesel fuels
- This increase coincides with the introduction of FAME blending into ADO
 - ADO containing FAME is more susceptible to microbial growth
 - FAME levels in ADO will continue to rise due to FQD/RED



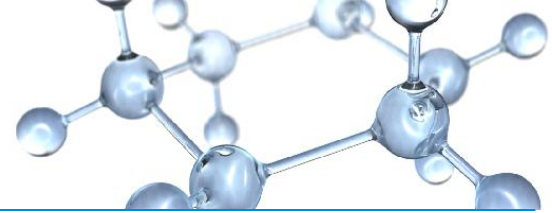
What Does This Mean In Practice?



My Own Experience;

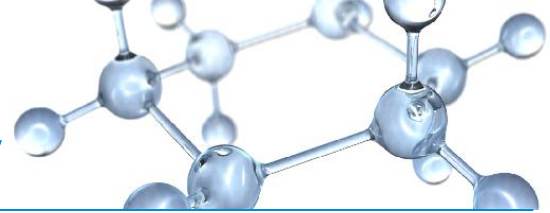
- An increase in service station pump filters blocking with microbial growth
 - No customer complaints – pump filters are protecting vehicles
 - An increase in pump outage and maintenance costs
 - Occurring more frequently in some areas than others
- Terminal and refinery tanks often testing higher in microbial growth than previously
 - No operational issues at these terminals
- Have introduced improved housekeeping practices across the region
 - At all our service stations, terminals and refineries
 - Including regular testing through the manufacturing and distribution chain to monitor microbial growth

Why the ongoing concern?



- This may spread to currently unaffected areas
 - Increased susceptibility as FAME levels increase
 - Good housekeeping can prevent infection, proven to contain microbial growth when properly applied
 - Less effective as a cure once infection established
- The cost, particularly at service station level
 - Filter replacement, tank cleans = lost sales
 - Additional cost and disruption if cleaning is also required upstream
- Testing can take several days, depending upon method, and lack precision
- We often commingling stocks at shared storage facilities
 - What action is required on an Industry basis?

My Desired Outcome From Today



- An increased understanding of the fundamental causes of this problem
- Knowledge of the range of tests available
- Discussion of the effectiveness of the remedial measures available;
 - Acceptable microbial growth levels
 - Housekeeping practices
 - Biocides
 - Tank Cleaning
- A discussion on what items are best addressed at an Industry level?