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## Microbial contamination during storage time of diesel, biodiesel and blends (Bx): Detection, monitoring and control

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**Statement of the Problem:** Microbial contamination in fuels has been reported since 1895 and it is considered one of the main problems related to the maintenance of stored fuel's quality. The impact of this contamination in the system depends mainly on the fuel grade, storage time and housekeeping schedules. Among the fuels, the diesel fuel formulation has changed a lot over time, mainly by the reduction of sulfur and addition of biodiesel. The purpose of this study is to describe the steps of detection, monitoring and control to avoid the installation of deteriogenic process during storage time by microbial contamination.

**Methodology & Theoretical Orientation:** Many studies were conducted to determine the microbial population (composition and growth capabilities) in diesel, blends Bx and biodiesel in lab conditions simulating the storage conditions. Biomass produced at interface oil-water in microcosms is a good indication of deteriogenic process in course, acidic conditions from the water phase; infrared and chromatographic analysis results to oily phase as well.

**Findings:** Our results have demonstrated that diesel/biodiesel blends are more susceptible to biodegradation and biomass formation during storage. The microbial composition was characterized and monitored by culture and non-culture methods (Illumina high throughput sequencing) and more than 800 genera were identified including Archea. We showed that fuel degradation, as evaluated by HATR-FTIR, was related to interfacial biofilm formation. After 60 days storage, the system treated with a multifunctional biocide package yielded more interfacial biomass, indicating that sub-effective doses may lead to increased microbial growth.

**Conclusion & Significance:** The determination of the level of microbial contamination is crucial to understand the vulnerability of fuel storage systems. Our results has revealed that microbial contamination is very diverse and that the use of biocide affects microbial community structure in the fuel but that some microorganisms are resistant to the biocide.



## Biography

Fatima Menezes Bento has her expertise in petroleum microbiology and fuels biodeterioration. Her approach and evaluation model is based mainly on microbial prospection, involving knowing of the composition of deteriogenic microbial population, monitoring aspects and control possibility during storage time of diesel, blends of diesel and biodiesel. She has been involved with research, teaching and consulting at UFRGS since 25 years.

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