

Susceptibility to microbial growth during simulated storage of *Acrocomia aculeata* pulp oil and biodiesel and *Jatropha curcas* oil and biodiesel

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Abstract:

The search for renewable energy has been made possible the production of biofuels, from oil plants, animal fats, and waste oils, generating different composition of biodiesel,. As its composition has fatty acid esters, biodiesel has a higher degradability than diesel oil. Since 2008 the Brazilian diesel has been receiving addition of biodiesel. As it comes from renewable resources, it could be considered an advantage in case of environmental contamination, but a disadvantage during storage, due to the growth of deteriogenic microorganisms, which reduces the final product quality. With the growing consumption of biodiesel in Brazil, diverse raw materials are suggested to supply the demand. The objective of this work was to evaluate the susceptibility to the microbial growth of two kind of biodiesel: from *Acrocomia aculeata* pulp oil, and *Jatropha curcas* oil, during simulated storage. The experiment was carried out in glass bottles with 10 ml of oily phase and 20 ml of mineral minimum medium Bushnell and Haas (1941) as the aqueous phase. The levels of microbial contamination were evaluated: oil as received (treatment 1); oil with addition of fungal inoculum (treatment 2); and sterile oil (control). All flasks were incubated in an oven at 30 °C without stirring. Every 7 days we proceeded to the following tests: determination of pH and surface tension of the aqueous phase and determination of biomass formed in the oil / water interface. At 0 and 30 days *Acrocomia aculeata* pulp and *Acrocomia aculeata* biodiesels were evaluated for changes in chemical structures, using gas chromatography (GC). The results indicate that all oily phases analyzed promoted the growth of microorganisms. Most microbial biomass was found in the treatment two, in samples with *Acrocomia aculeata* pulp biodiesel and *Jatropha curcas* biodiesel (315,0 ± 5,1 and 235,3 ± 5,3 mg, respectively). It was observed a significant reduction in pH values - from 7,2 to 5,8 (p <0,05) - for the treatments with *Acrocomia aculeata* pulp biodiesel. The values of surface tension measurements of aqueous phase decreased immediately after 7 days of analysis for all treatments (p <0,05) and remained unchanged until the end of the experiment. There were no significant reductions in the total percentage of *Jatropha curcas* biodiesel esters, however, treatment of *Acrocomia aculeata* pulp biodiesel decreased 9% in the total esters, indicating consumption of biodiesel esters by microorganisms.

Key words: biodiesel, *Acrocomia aculeata*, *Jatropha curcas*, biodegradation, microorganisms, filamentous fungi.

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