

## SELECTED METALWORKING FLUIDS BIODEGRADABILITY AND ECOTOXICITY EVALUATION

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### ABSTRACT

Metalworking fluids (MWFs) have been introduced into the cutting process with the purpose to improve the characteristics of the tribological processes which are always present on the contact surfaces between the tool and the workpiece. Significant amounts of lubricants are lost into environment, which potentially affects plants, animals and human life.

The main aims of this study were to evaluate the level of biodegradation of selected metalworking fluids standards and samples from the plant by Zahn-Wellens test (OECD 302B) for inherent biodegradability, evaluate potential adsorption after 3 hours of cultivating and assessment applicability of the test for measuring the biodegradability, evaluate potential of activated sludge from sewage treatment plant to degrade the selected MWFs and preliminary study to evaluate the ecotoxicity by *Lemna minor*.

Evaluated level of tested MWFs (Emulzin H, Ecocool, BC 25) standards biodegradation by Zahn-Wellens test achieved 80% in 10 days, so they have potential to ultimate degradation. Tested MWFs samples from the plant pass higher level of starting COD concentration instead of this, in the case of Emulzin H and Ecocool sample 2 the level of degradation pass 80% degree.

Preliminary study of ecotoxicity measuring by *Lemna minor* shows effective concentration of Emulzin H at the rate of 93 mg/L, for Ecocool 99 mg/L and for BC 25 about 150 mg/L. Small concentrations of testing fluids indicate hormetic effect. It is required to test Emulzin H, Ecocool and BC 25 by semi-static or flow-through condition.

**Key words:** metalworking fluids, biodegradation, EC<sub>50</sub>, machining