E. Marker A/S
Okslundvej 8, Bov
DK-6330 Padborg

Tlf.: +45 74 67 08 08
info@emarker.dk
www.emarker.dk

E. MARKER A/S

Surfactant Interactions with the Soil Microbial Community: Summary Report

Introduction

There is currently little in the way of consistency in the scientific literature regarding surfactant effects on the soil organism community. The effects have been documented to vary depending on the product that is being used and the concentration of surfactant applied to the soil. We have conducted some basic analysis on surfactant treated soils to compare their bacterial and fungal populations with untreated soils.

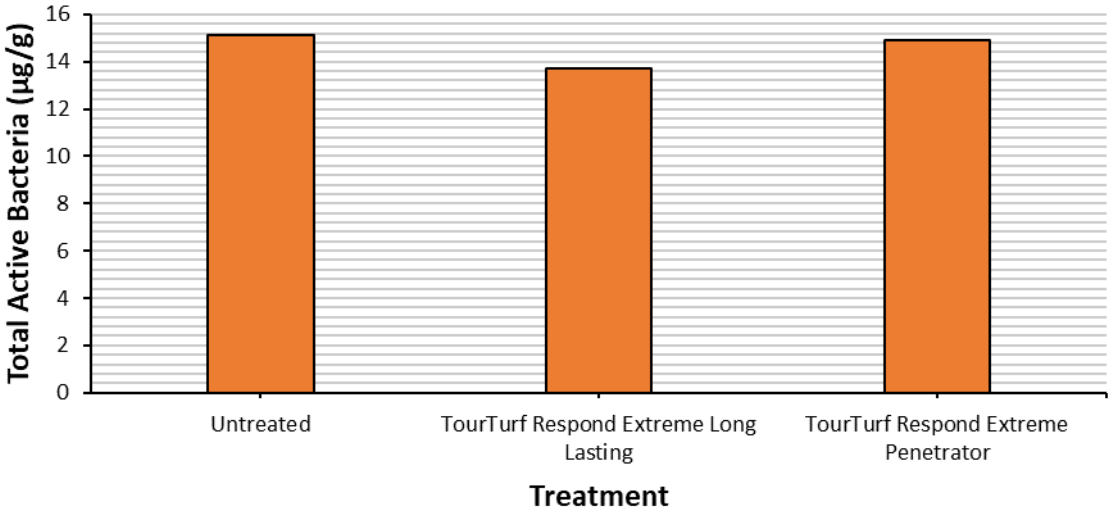
Treatments and Application Rates

Treatment
Untreated
TourTurf Respond Extreme Long Lasting
TourTurf Respond Extreme Penetrator

The treatments were applied at their field application rates to square based pots that were filled with soil collected from a links golf course. The soil was homogenised before being added to the pots and was well compacted. Treatments were applied at their reccommended field application rate and then watered in with 40 ml water. The untreated solution was composed of water only. After treatments were applied soils were left undisturbed for 1 week before being sent to the lab for analysis.

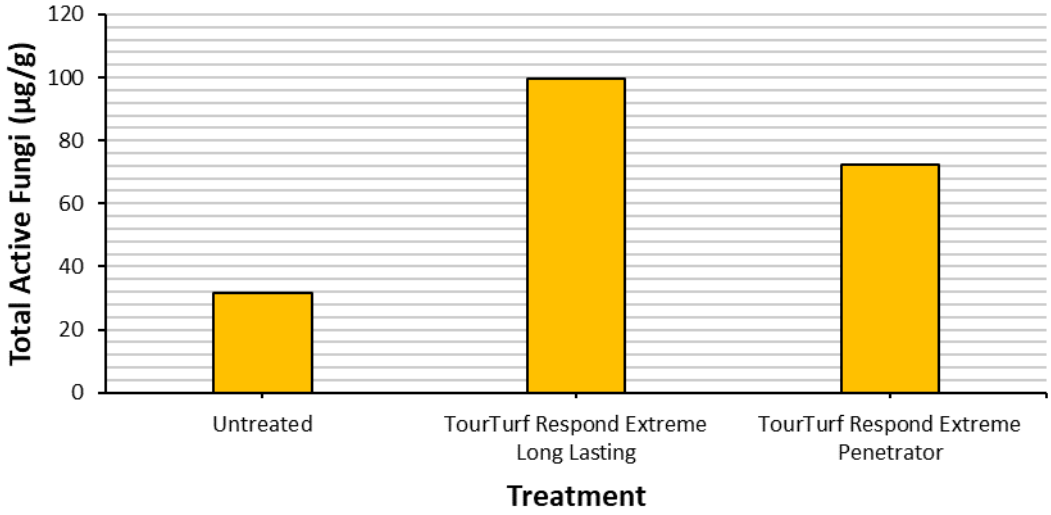
Results

Active Soil Bacteria



Active soil bacterial counts were very similar between treatments. Both surfactant treatments were within 2 µg of bacteria per gram of soil of the untreated soil. This is a good initial result to show that there appears to be a very small, if any effect, on soil bacteria caused by surfactant application.

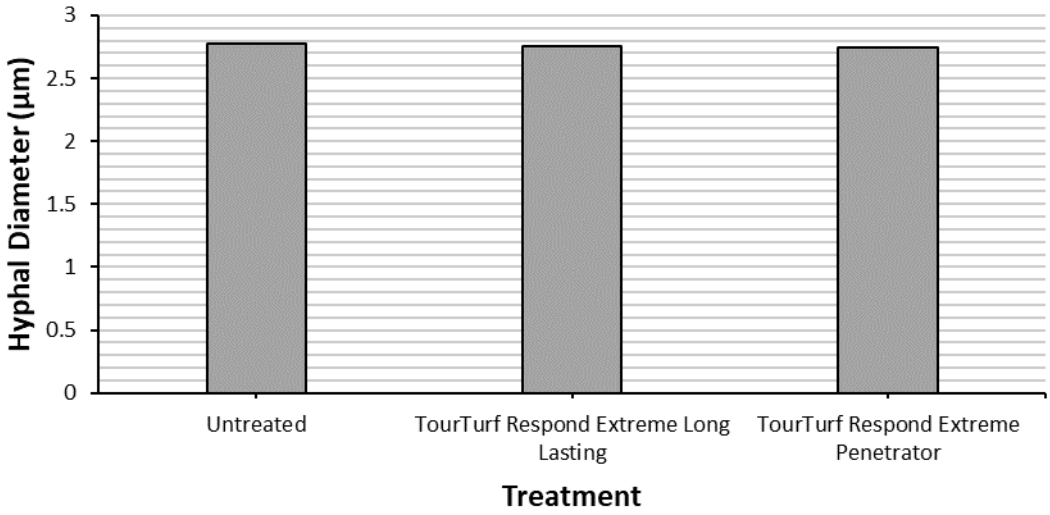
Active Soil Fungi



Active soil fungi analysis showed much more marked differences between treatments. Both surfactant treated soils had over double the mass of active soil fungi compared to the untreated soil. Fungi are a very important part of the soil microbial community. Most types of fungi decompose lignin and hard-to-digest soil organic matter. Fungi break down organic residues which allows other types of microbes to

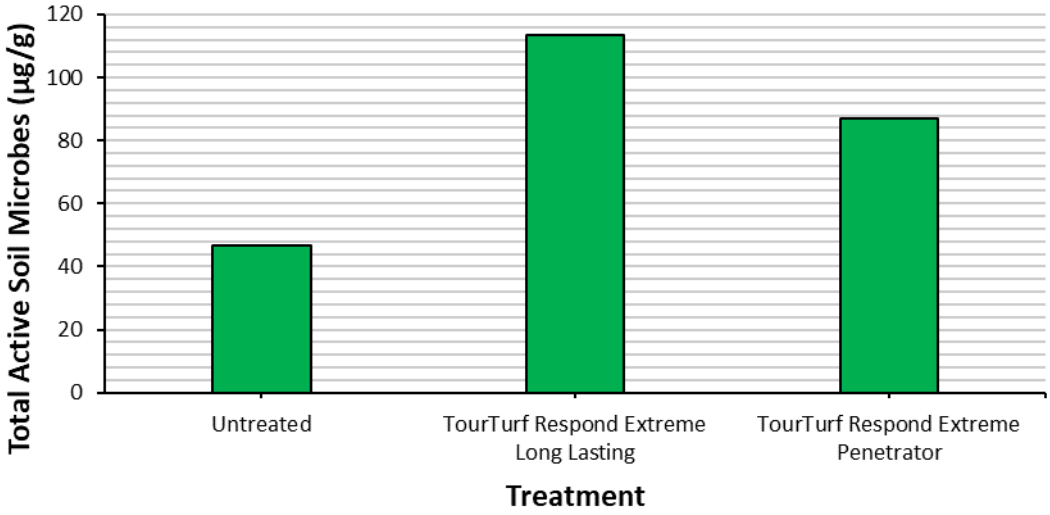
decompose and process these residues into usable products. There is potential that if surfactants are increasing soil fungi populations that this is contributing to the alleviation of soil water repellency by increasing the breakdown of hydrophobic organic coatings on sand particles.

Hyphal Diameter



Hyphae networks are formed via symbiotic mycorrhizae fungi relationships with plants. The hyphae are extremely important in assisting the plant in acquiring nitrogen, phosphorus, micronutrients and water. We measured hyphal diameter in order to give an indication of the health of these mycorrhizae networks. We found very little differences between untreated and surfactant treated soils.

Total Microbial Community



This graph shows the total microbial community (total active bacteria and total active fungi combined) for the soils analyzed. We accept that the large differences are caused by changes to the fungal

community rather than the bacterial community, but this gives us a good general overview of the effect of surfactants on microbial biomass in the soil.

Conclusions

Based on these initial findings, we have evidence to suggest that the use of surfactants at their recommended field application rates will have limited effects on the soil bacterial community. We also have some evidence that the effect on the fungal community is positive – increasing populations and in turn increasing the breakdown of organic matter. This could contribute to reduced problems associated with the formation of thatch under the turf and increase the longevity of water repellency alleviation in the soil. Our evidence also suggests surfactants will have limited effects on mycorrhizal networks in the soil. More replications of these tests are needed to prove that these effects do/do not exist, but for an initial investigation these results give a good indication of how surfactants may be affecting soil microbial communities.