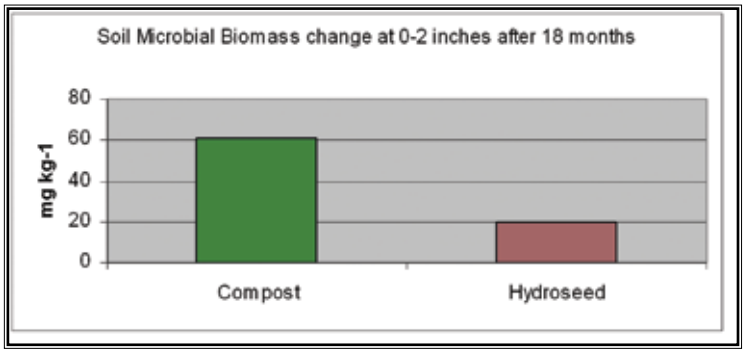
TechLink Research Summary #3316

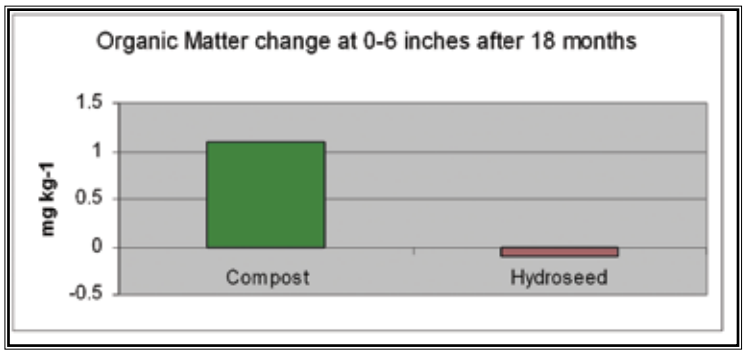
Soil Quality: A Comparison of Filtrexx® Slope Protection vs Hydroseed Applications

Change in Soil Microbes and Organic Matter

The application of the Filtrexx® Slope protection increased soil microbial biomass over 3x that of hydroseed at a depth of 0-2 inches after 18 Months.

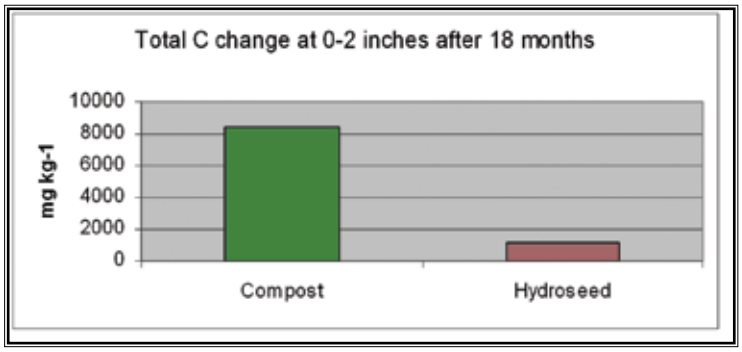


The application of Filtrexx® Slope protection increased soil organic matter by 0.1% while hydroseed applications showed a net loss in soil organic matter at a soil depth of 0 to 6 inches. Increasing soil organic matter is critical to improving soil structure and fertility, ensuring long-term healthy vegetation, and reducing runoff and erosion.

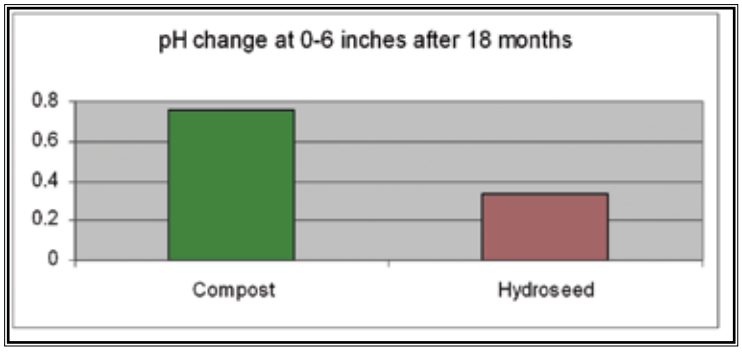


Change in Soil Carbon and pH

The application of Filtrexx® Slope protection increased soil carbon over 7x that of hydroseed over an 18 month period at a soil depth of 0 to 2 inches. Returning carbon to soil increases soil quality and reduces greenhouse gas emissions.

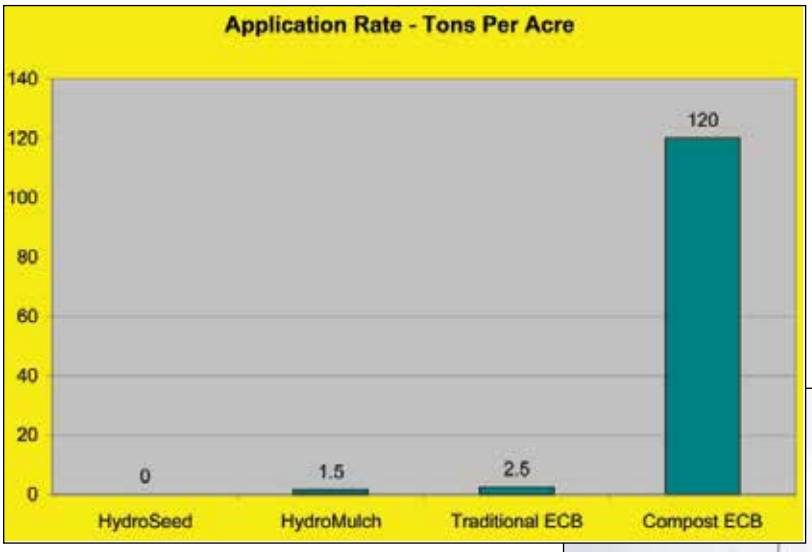


The application of Filtrexx® Slope protection increased soil pH (originally 4.7) over 2x that of hydroseed over 18 months - even though hydroseeding includes lime. Buffering soil pH to near neutral levels (6.0 - 7.0) can increase beneficial soil biota and availability of nutrients.



Summarized From: Faucette, L. Britt, Carl F. Jordan, L. Mark Risse, Miguel L. Cabrera, David C. Coleman, and Larry T. West. 2006. Vegetation and soil quality effects from hydroseed and compost blankets used for erosion control in construction activities. Journal of Soil and Water Conservation. 61:6:355-362.

Filtrexx® Slope protection significantly increased soil microbial carbon, relative to bare soil between 6 months and 18 months after applications. Similarly, Fraser et al. (1988) reported that organic amendments increased soil microbial biomass and total organic C. This gives evidence that unincorporated Slope protection may increase soil quality relative to erosion control measures that do not add organic matter to the soil. Soil microorganisms can increase nutrient cycling, increase nutrient availability to plants, improve soil structure through aggregate stability (Sylvia et al., 1999), increase overall soil biodiversity (Wardle, 2002), and degrade petroleum hydrocarbons (Alexander, 1994) commonly spilled during construction activities.



In addition to the differences in soil microbial carbon near the soil surface, the control showed a net loss of total carbon over the 18-month study period, whereas, all of the treatments showed a net increase. This is similar to Fraser et al (1988) findings, where increases in soil total organic C paralleled increases in soil microbial biomass. Furthermore, at 0 to 15 cm (0-6 in) soil depths, organic matter in the hydroseed and bare soil plots had net losses over the 18 month sampling period whereas, the Filtrexx® Slope protection all showed a net increase. Similarly, Sommerfeldt and Chang (1985) reported an increase in soil organic matter from 0-15 cm in a clay loam soil with addition of organic amendments. These slight differences may be the result of organic matter and C from the Filtrexx® Slope protection slowly being incorporated into the soil via microbial migration from the soil surface into the soil profile (Wardle, 2002). Soil quality improvements resulting from an erosion control application is a step forward to sustainably managing vegetation, storm water, and soil erosion.

References

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