

# Enhancement of an Industrial Landfarm Operation Using Phytotechnologies



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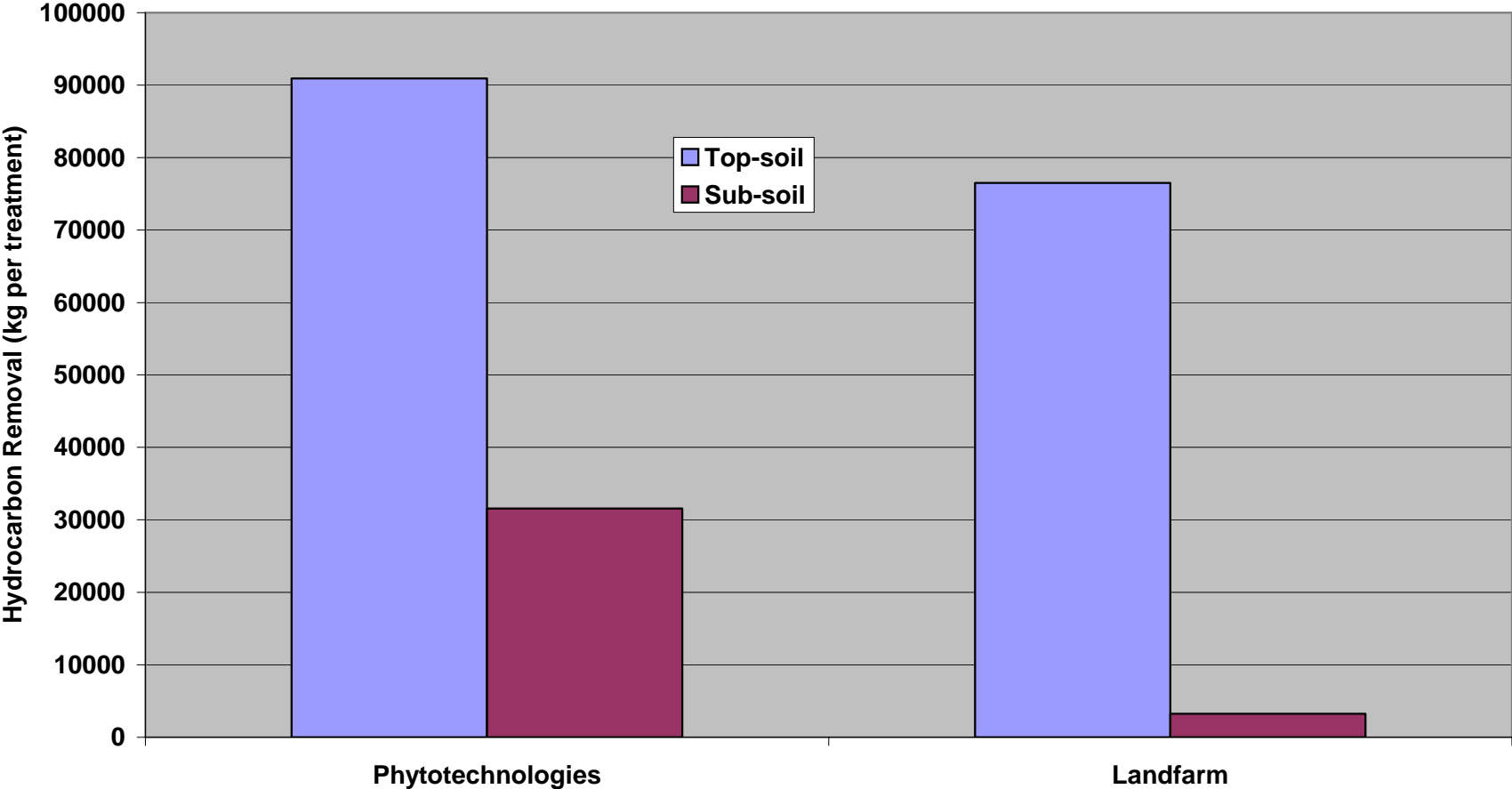
***Les Stehmeier, Frank VanDelft***  
**(NOVA Chemicals, Canada)**

# Phytotechnologies – It is more than just a pretty picture!



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# Hydrocarbon Removal from the Landfarm and Enhanced Landfarm





# Source of spreadable material



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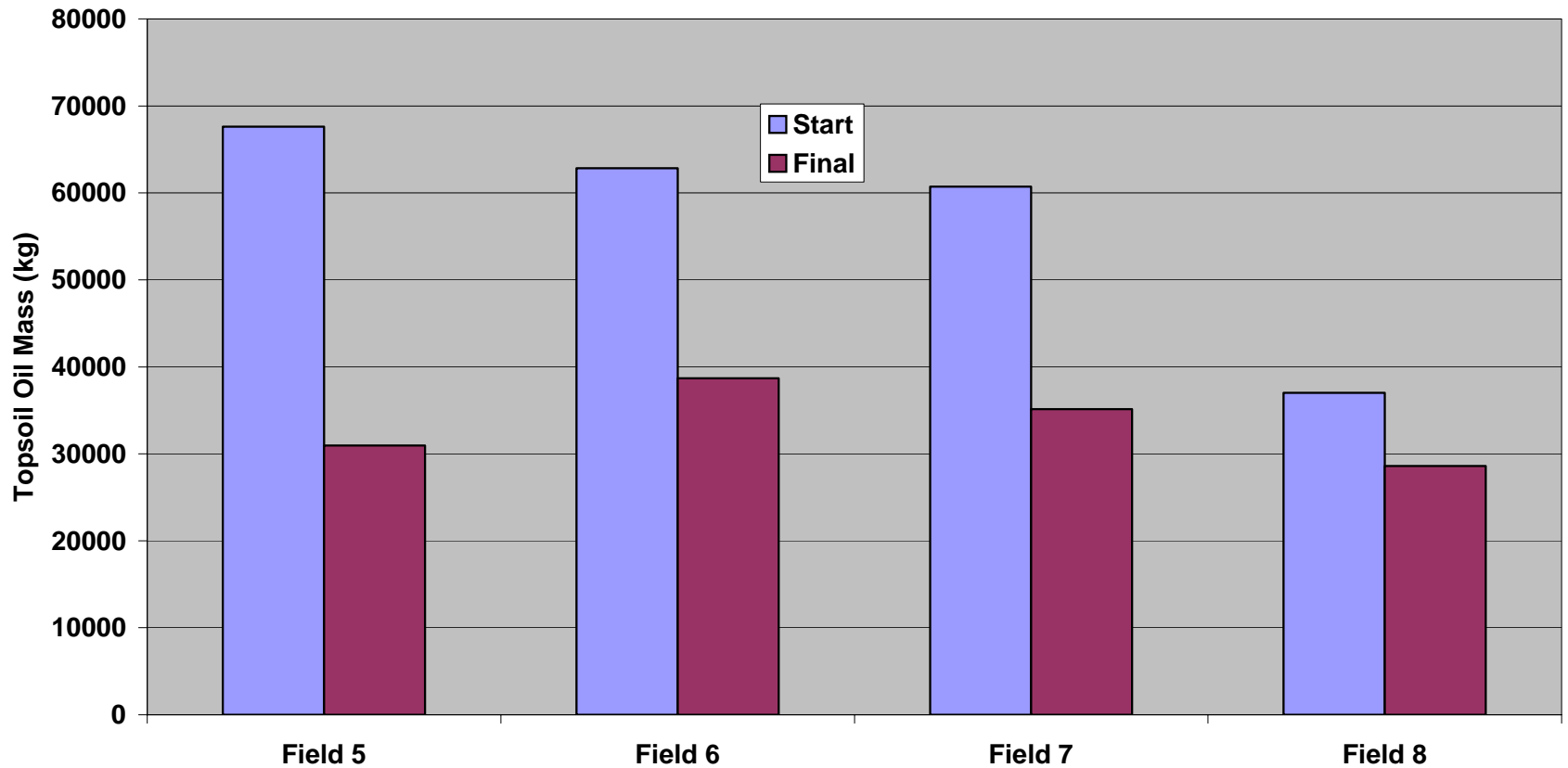


# Spreading bottom sludge

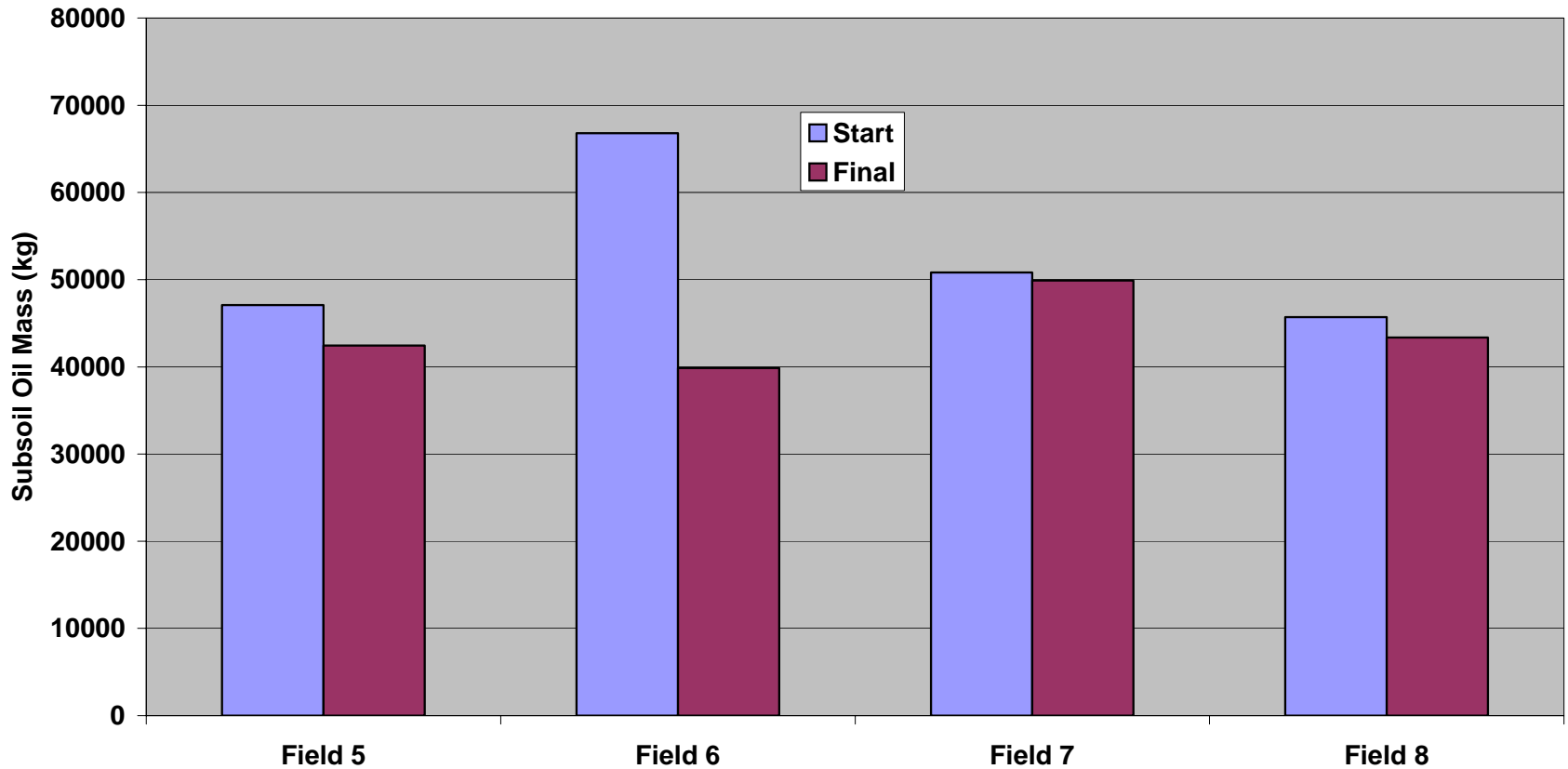


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# Hydrocarbon Removal in the Topsoil by Field

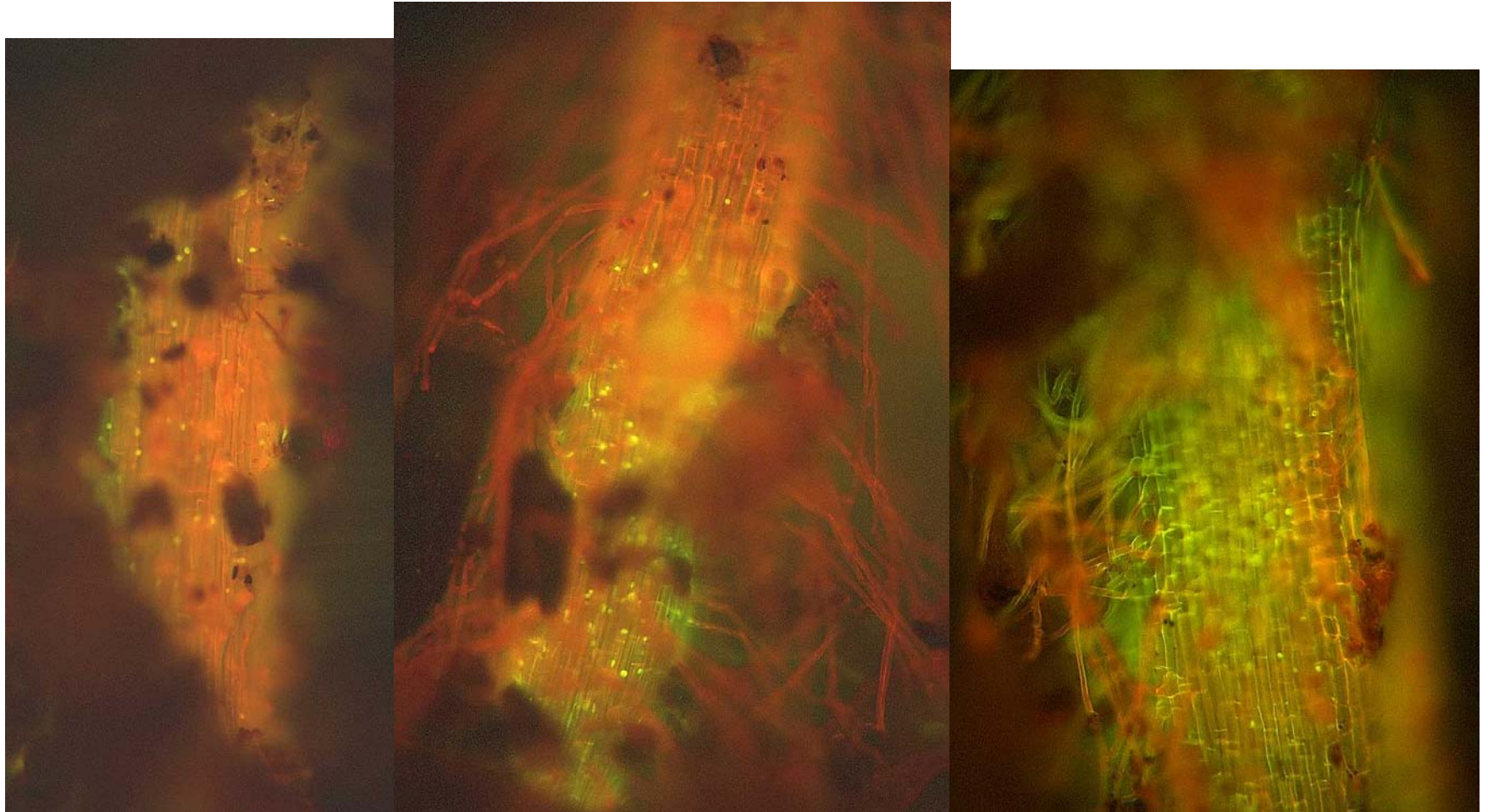


# Hydrocarbon Removal in the Subsoil by Field





# Reason for Hydrocarbon Removal in the Subsoil



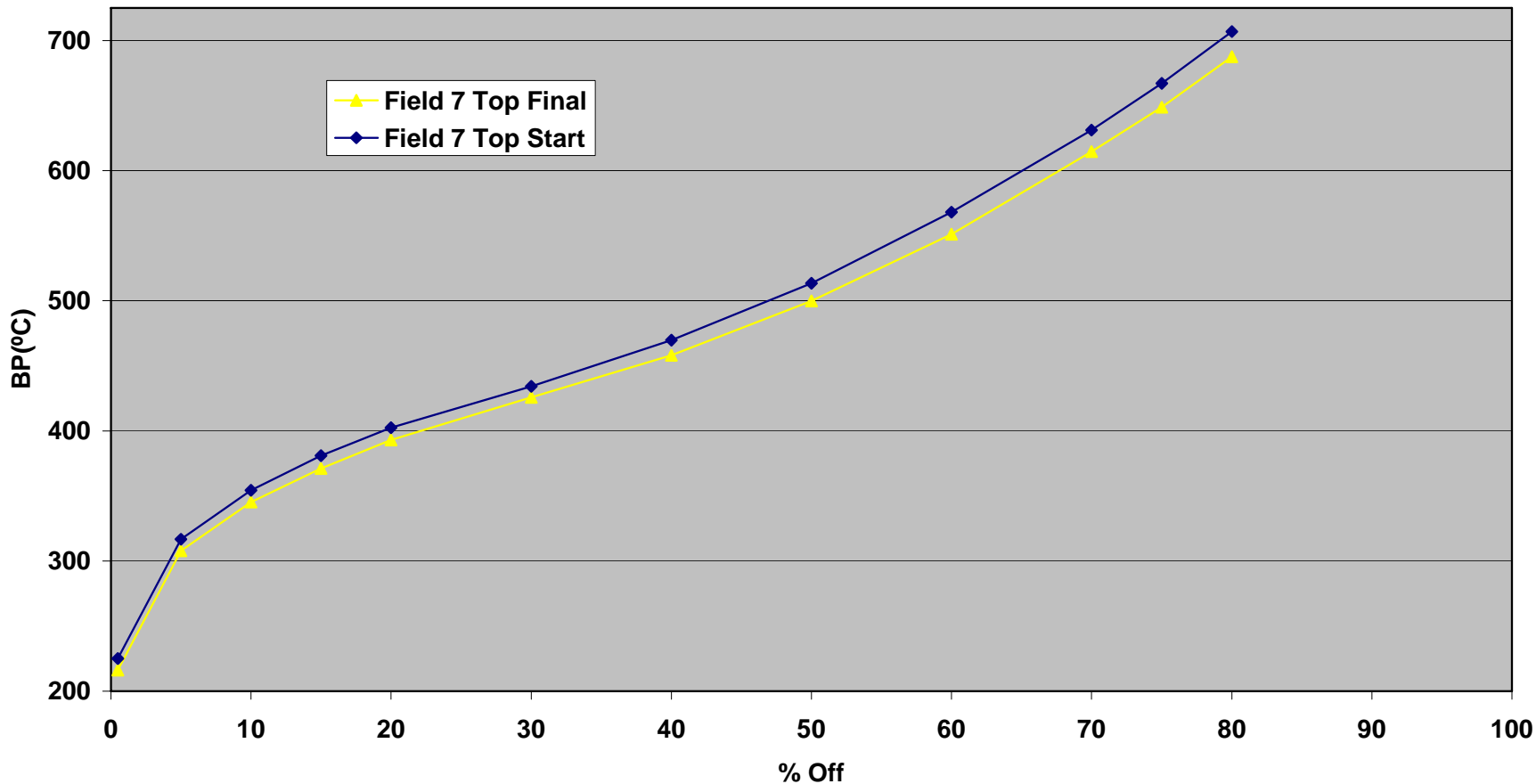


# Reason for Hydrocarbon Removal in the Subsoil



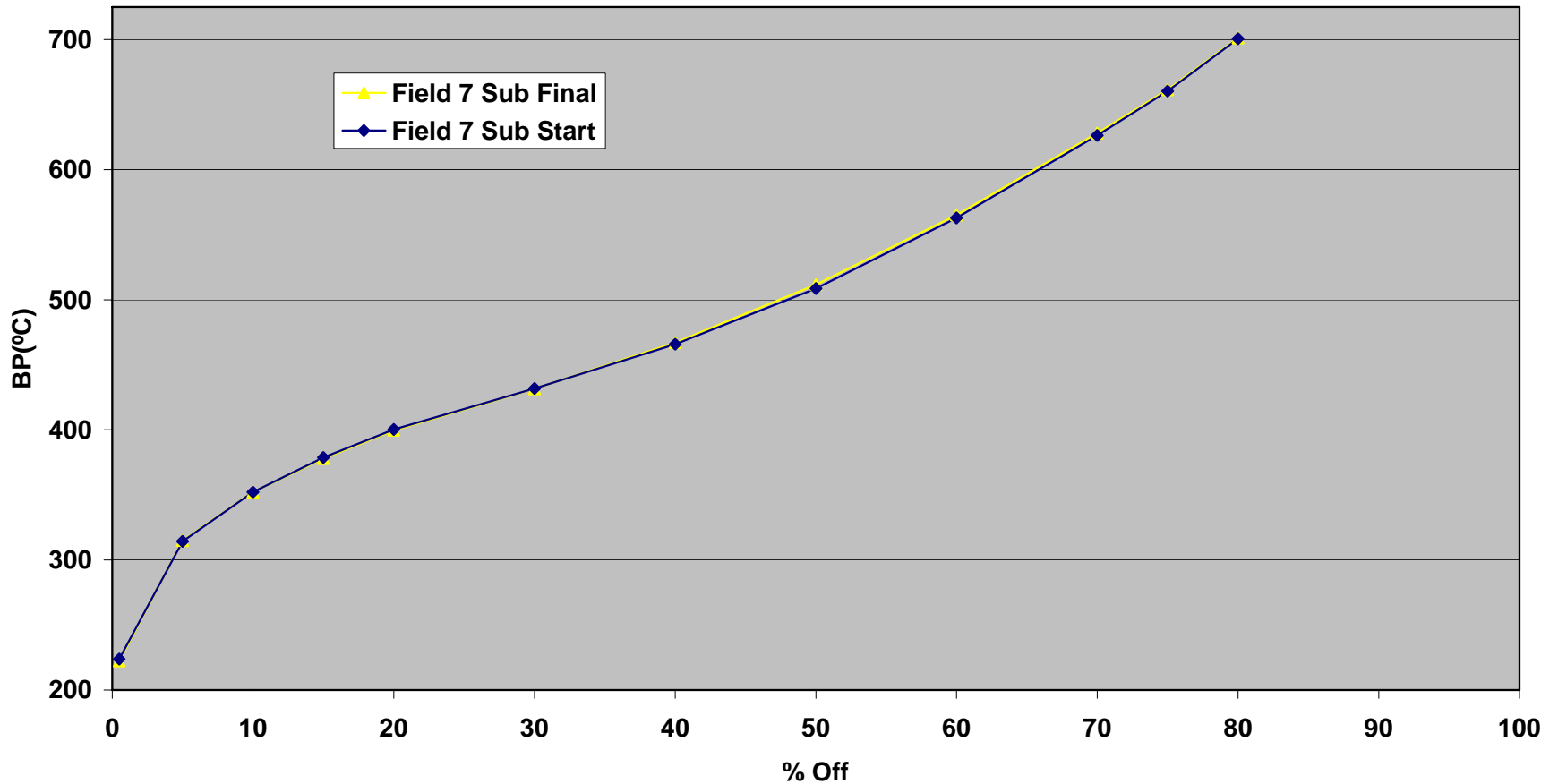
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# Changes in Oil Composition – Field 7 Topsoil



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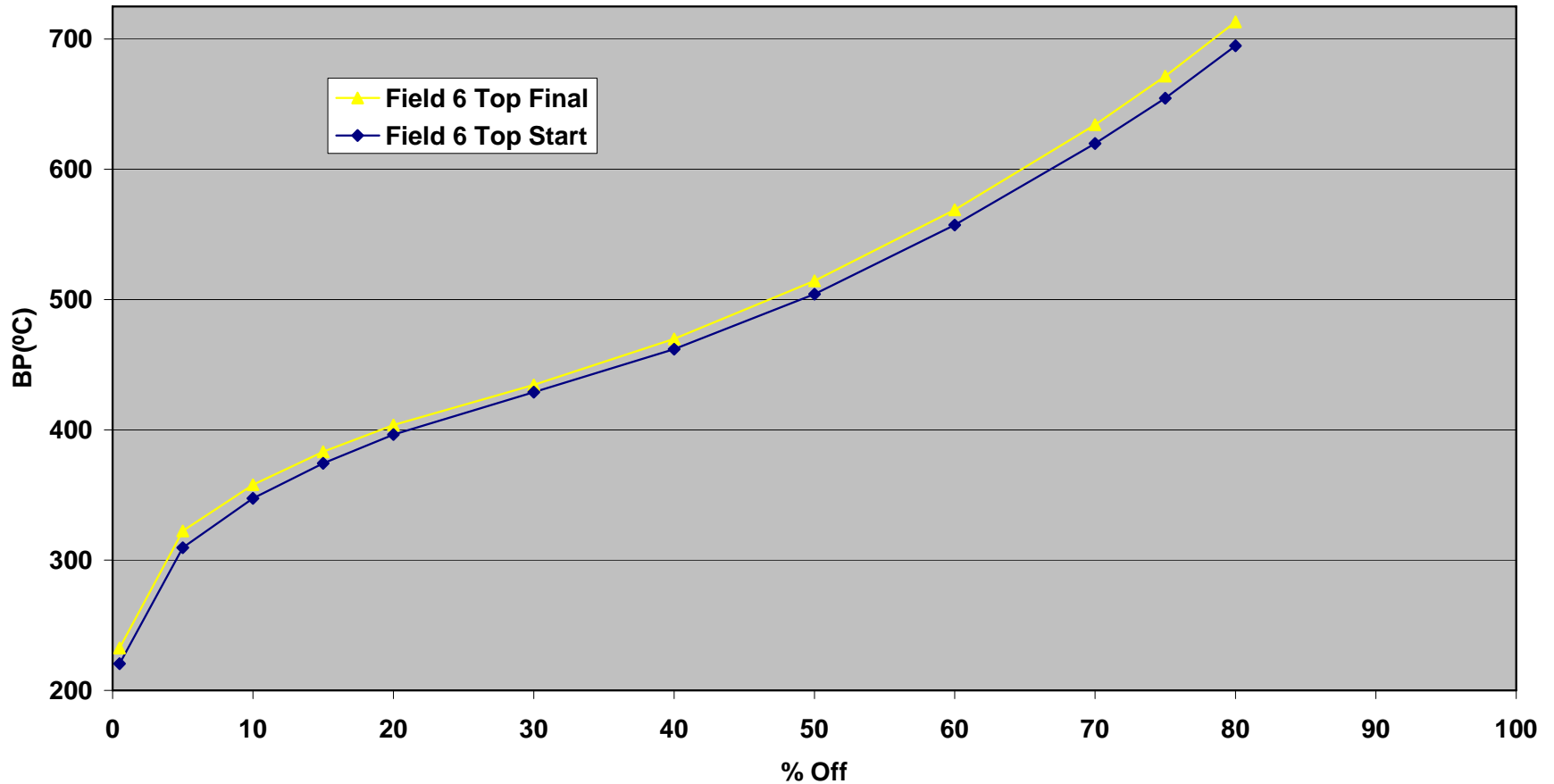
# Changes in Oil Composition – Field 7 Subsoil



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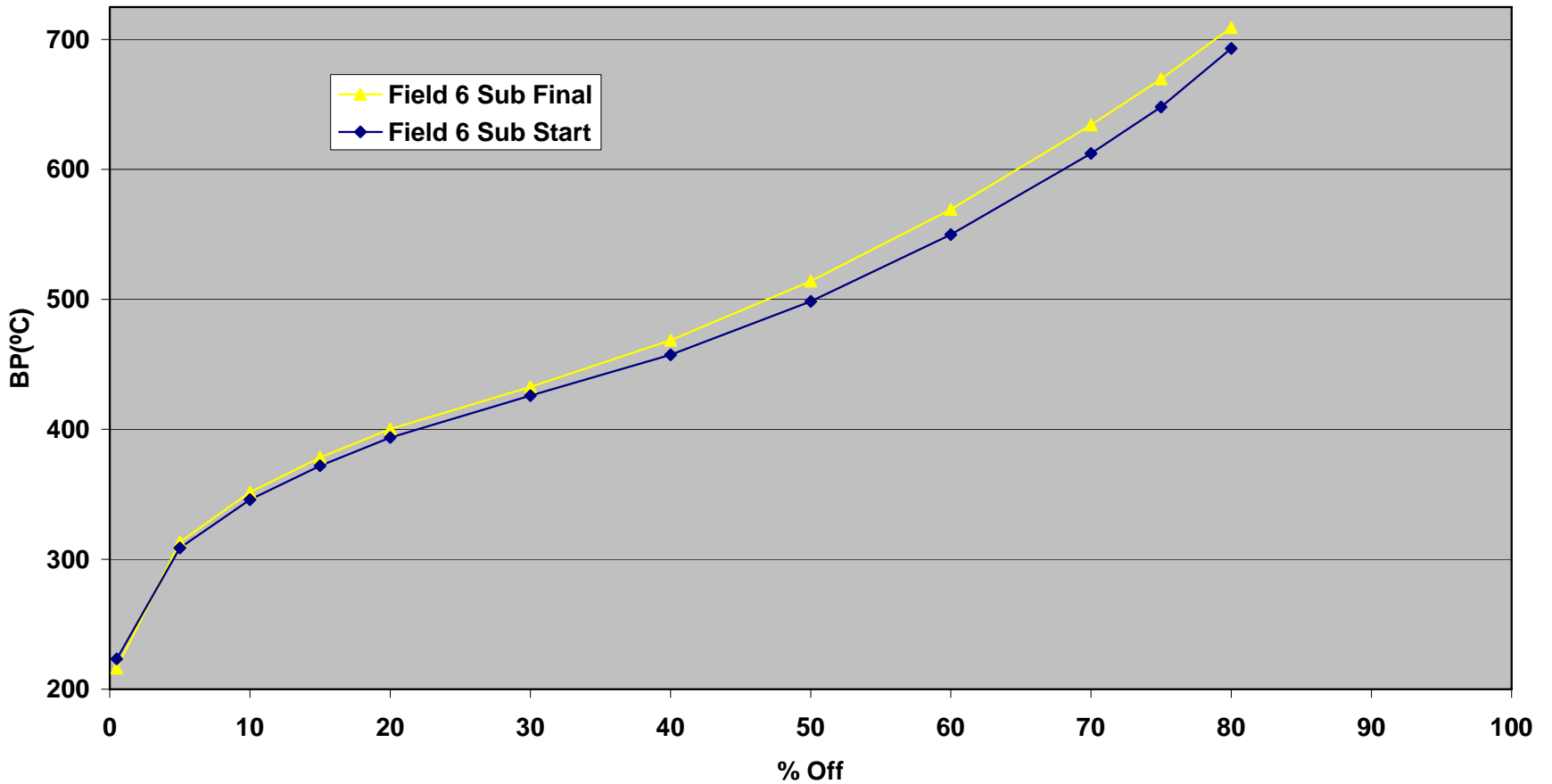


# Changes in Oil Composition – Field 6 Topsoil



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# Changes in Oil Composition – Field 6 Subsoil



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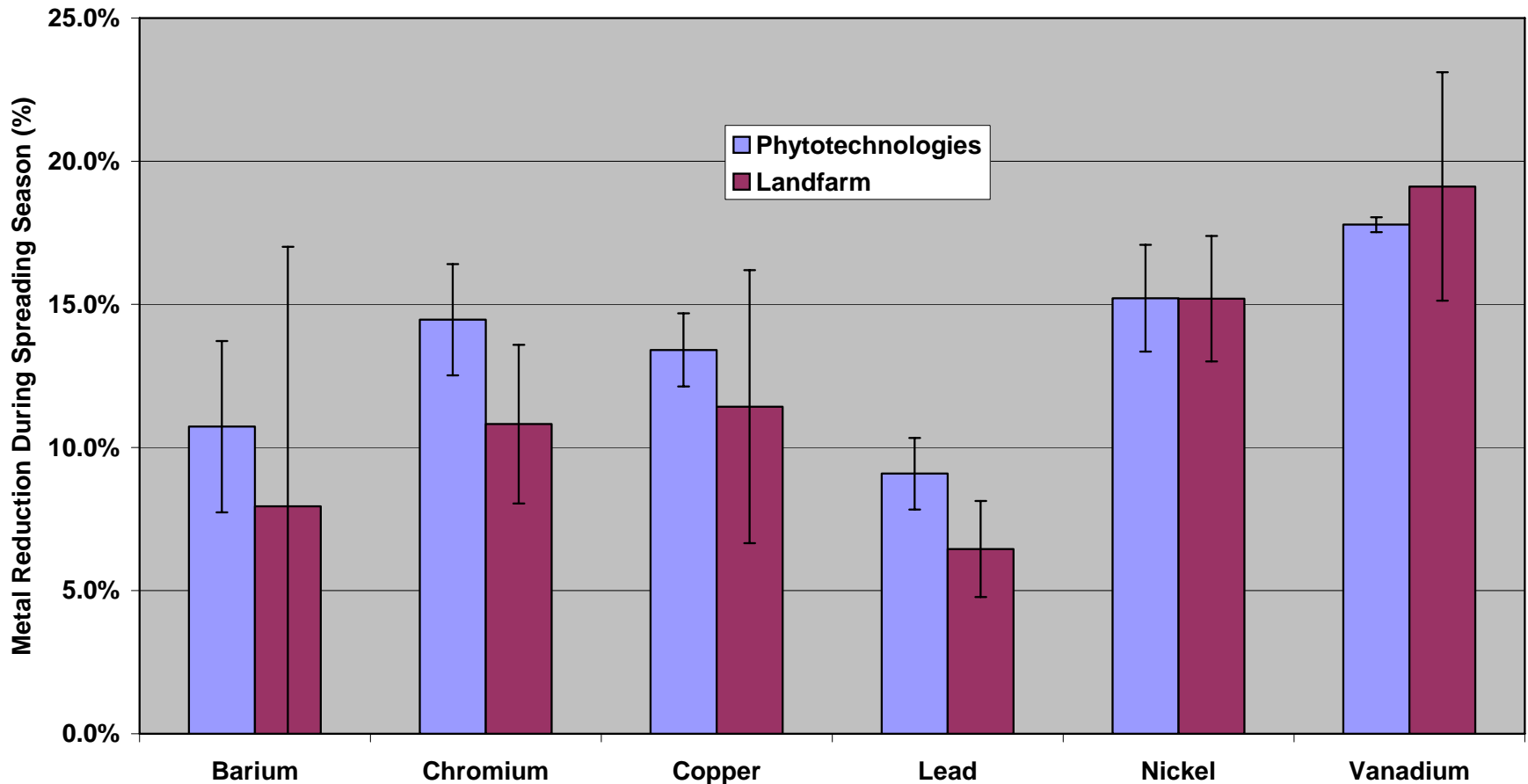
# Treated fields



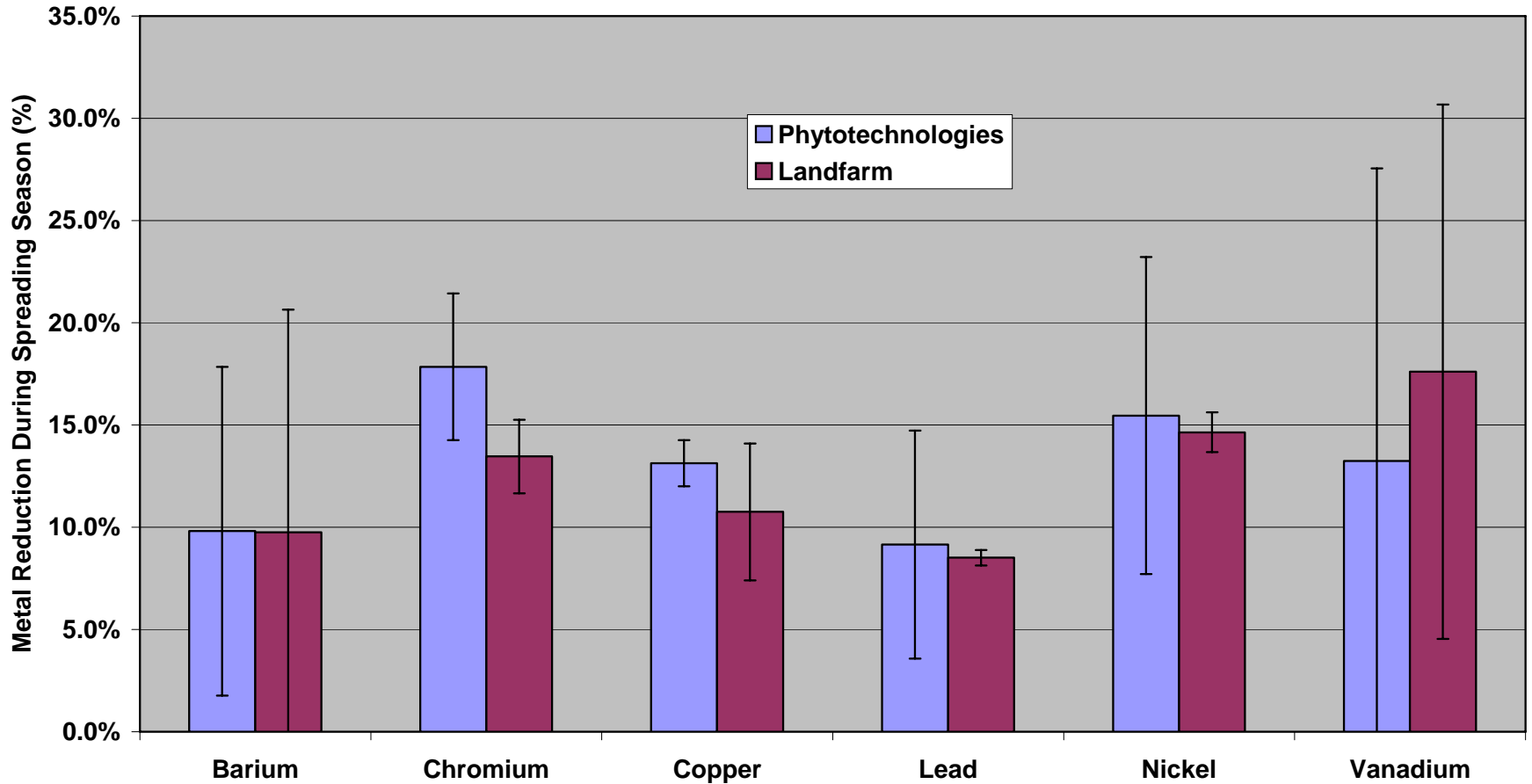
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# Changes in Selected Metals during the Spreading Season – Topsoil



# Changes in Selected Metals during the Spreading Season – Subsoil



# Cost Summary

Seeding rate: 110kg/ha

Landfarm cost: 2.6¢ to 3.2¢/L of sludge spread

Seed bed preparation: \$6,100/ha

Approximate 2006 Costs

Landfarm cost:  $3,001,832 \times \$0.03 = \$90,055$

Seed bed preparation costs for Fields 5 and 6:  
\$6,100

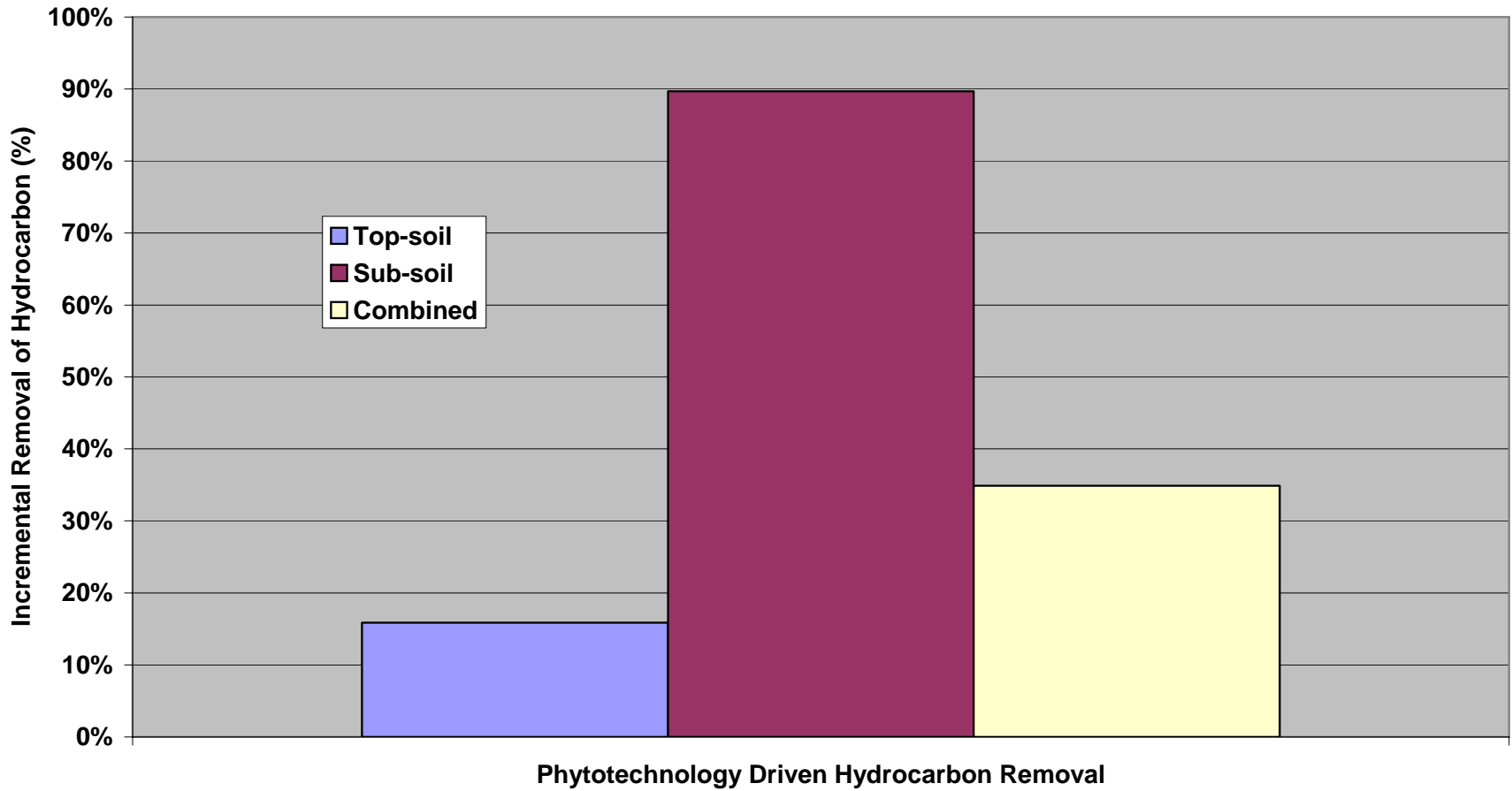
Incremental cost if phytotechnology carried out on all eight fields: \$22,800 (based on 3.74 ha spreadable landfarm)



# Conclusions

- Incremental hydrocarbon reduction with phytotechnologies is greater than the incremental cost.
- Landfarming and phytotechnologies reduce non-targeted compounds.
- Phytotechnologies enable hydrocarbon reduction at inaccessible, to normal landfarm technology, soil depths.
- Phytotechnologies do make a pretty picture.

# Incremental Hydrocarbon Removal in 2006



# Phytotechnologies – It is a pretty picture!



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