

ABSTRACT

THESIS: SCREENING OF GRASSES AND LEGUMES FOR PHYTOREMEDIATION
OF NITROGLYCERIN IN SOIL

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Six plant species were screened to determine potential suitability for phytoremediation of nitroglycerin (NG), a component in smokeless powders (SP). Seeds of *Zea mays* (corn), *Triticum aestivum* (wheat), *Medicago sativa* (alfalfa), *Poa pratensis* (Kentucky bluegrass), *Trifolium pratense* (red clover), and *Phaseolus vulgaris* (common bean) were sown into greenhouse mesocosms containing commercially prepared soil spiked with 0, 1, and 5% SP (w/w). Soil samples were collected 7, 60, and 90 days after seeding, extracted with ethanol, and analyzed for NG using a gas chromatograph with an electron capture detector. Plant growth observations were recorded using a simple scoring metric at 7, 14, 30, and 60 days after seeding. Soil nitrate and ammonium, potential by-products of NG decomposition, were quantified 90 days after seeding. NG disappearance in plant treatments was markedly, although not significantly ($p > 0.05$), higher than control at 1% SP, with legumes being the most successful treatment. Nitrate concentrations were significantly ($p < 0.05$) higher in legume than grass treatments. Soil ammonium was not correlated to any plant or SP treatment. Plant uptake of NG was

minimal, suggesting a soil microbial effect in NG disappearance. More extensive screening studies are needed to determine which plants are the most successful remediators of NG.