



CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s) Derek J. Wong	Project Number S1734
Project Title Phytotoxicity of Two Glyphosate Formulations to Vigna radiata: Non-target Pesticide Exposure, Year 2	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Due to legally withheld ingredient information, formulation specific pesticide studies are often difficult to complete. Glyphosate, one of the most widely used herbicides in the US, is approved for both food and nonfood use and is registered for crop desiccation and pre-harvest application on the mung bean. The objectives of this project were to determine if two commercially available glyphosate based formulations were capable of inhibiting the growth of Vigna radiata at non-target levels and to determine if active ingredient concentration was indicative of phytotoxicity.</p> <p>Methods/Materials 720 Vigna radiata seeds were grown hydroponically and given one of three dilutions of Roundup (2% glyphosate) or Ortho Total Kill (1%): 10-1, 10-3, 10-5. A control was given distilled water and a separate group was given a 10-3 dilution of Roundup reduced to a 1% glyphosate concentration. From 3 trials, 720 germination counts were taken and 240 root lengths measured using the Grid Intersect Technique.</p> <p>Results Germination was generally reduced in both groups with increasing concentration. However, Roundup was more effective than Ortho in reducing germination at every concentration except 10-3. The greatest difference in count was at 10-1 (Roundup inhibited all germination, 9% more than Ortho). Root length was affected by Roundup and Ortho differently than germination. Even though it only contained half the amount of active ingredient (1% glyphosate), Ortho inhibited more growth at all concentrations except for 10-1. At equivalent amounts of glyphosate (1%), Ortho reduced germination by 13% and suppressed more root growth than Roundup.</p> <p>Conclusions/Discussion Active ingredient concentration does not necessarily reflect the phytotoxicity of a formulation. Residual levels of glyphosate can be harmful to mung bean seeds, possibly reducing their quality after harvest. If this response is similar in other plants and organisms, non-target exposure may pose a risk to the environment.</p>	
Summary Statement I tested dilutions of 2 glyphosate herbicides on the mung bean and found that very low levels inhibited growth and that the active ingredient concentration did not necessarily indicate the phytotoxicity of the products.	
Help Received Mr. Hunt, Ms. Corbett, and Dr. Gardiner gave me advice and supplies for the experiment. My mom helped me with excel and the display and my dad supervised me during experimentation.	