The Use of a Biological Assay to Quantify the Amount of Residual Pesticides after Various Washing Processes

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The purpose of this project was to determine the magnitude and the nature of the effects that certain commercial pesticides, namely elemental sulfur and carbaryl (1-naphthyl N-methylcarbamate), on the flora and fauna of the area to which the pesticides are applied, as well as the difficulty of removing the pesticides from the affected area. The effects of the pesticides on the area was tested last year by introducing pesticides into a culture of respiring S. cerevisiae yeast and observing changes in respiration rate with an ethanol sensing probe. The difficulty of removal of the pesticides was tested this year by separating grapes into groups. All but one of the groups were exposed to the pesticide and then washed with varying degrees of thoroughness. The unexposed group acted as the negative control, and an exposed but unwashed group acted as a positive control. Each group was thoroughly emulsified into a thick fluid using a blender. A sample of respiring yeast was added to each of the groups and ethanol production rates were measured using a Vernier ethanol probe in conjunction with a LabQuest 2 handheld computer. Linear regression was performed on the data sets to determine the slope of the best-fitting line, which is the mean rate of ethanol production in that sample. Higher ethanol production rates in certain samples indicated what washing techniques and/or degrees of thoroughness may be effective methods of removing the pesticides from an ecosystem.

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