

This essay is based on a biological research question with a clear biological focus and strong application to real-world problems. The significance of the topic is clearly established in a clearly set out introduction and a thorough literature review.

In the introduction the student is careful to define major terms such as pesticide and to establish the exact chemical nature and mode of action, at a biological level, of the pesticides. The treatment carefully avoids straying off into a more chemical emphasis and the biological focus is maintained by reference to basic biological processes such as the nature of the light dependent reactions and the mechanism of action of photo system II. In this section the student is also careful to justify the choice of the plant used in the experiment on the basis of its biological characteristics.

What follows is an investigation that could be carried out in any well-equipped school laboratory, the spectrophotometer being the only piece of technical equipment required. A straightforward experimental design that directly addresses the research question is followed by a well documented and carefully controlled set of experiments. The data are laid out in a way that is easy to interpret and which directly address the research question. These features of the essay, together with the careful presentation of basic calculations and other approaches of data analysis, elucidate the argument and make it easy to follow the line of reasoning of the student.

The discussion is thorough and easy to follow. It is made particularly effective by the fact that the student identifies the main findings and bases this analysis firmly on the data presented. This analysis is made more plausible through the simple and effective connections made to the biological theory and the ideas presented on possible mechanisms to explain the observed effects.

Perhaps the only weakness in this essay is the brief and somewhat superficial evaluation in which only some of the obvious limitations are presented. There is no attempt to quantify the effects of the limitations or to prioritize them in any meaningful way.

A clear and fully justified conclusion identifying the toxic effect of all three pesticides investigated rounds off this excellent piece of work. The significance of the investigation for agriculture is identified and is fully supported by the data and this is made clear in the closing sections of the essay.