Investigating the Efficacy of Dye-Sensitized Solar Cells Utilizing Multiple Sources of Anthocyanin

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Greenhouse gases are causing mass climate change, and one of the largest emitters of greenhouse gasses is electricity powered by fossil fuels. Solar panels help reduce our dependence on this type of electricity, but the silicon utilized within them is far too expensive, inflating the costs of said solar panels. Silicon, however, is not the only material that can be used in solar panels. The aim of this experiment was to investigate the potential of using fruit dyes high in anthocyanins (a chemical with the unique ability to absorb and convert light into electrons), specifically blackberry, pomegranate, and chokeberry, in the production of lower cost, but highly efficient solar cells. By combining the aforementioned fruit dyes with certain compounds like titanium dioxide and indium-tin-oxide-coated glass, a new method of manufacturing solar cells can be developed. To test this hypothesis, I made six solar cells, two trials for each dye. After the cell's creation, I tested its conductivity with the millivolt setting on a multimeter while the cell was held up to artificial light. The blackberry dye conducted an average of 112.5 mV, while the pomegranate and chokeberry conducted an average of 165 mV. I made the conclusion that the higher the average anthocyanins within a fruit dye, the higher the mV, and with this, I also concluded that dye-sensitized solar cells are, in general, effective at conducting energy. This experiment's success could pave the way for a significant increase in the accessibility of solar energy and a reduction in the dependence on fossil fuels, thereby helping to mitigate the effects of climate change.

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