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*Synthetic vs Natural Vitamin E: Optical Isomerism, Synergy, And Antioxidant Testing Problems*

The overall purpose of my project is to determine whether synthetic vitamin E has inherent problems in optical isomerism, synergy, and Antioxidant Potential testing that cause it to function less efficiently as an antioxidant than previously believed. Thus, the project may provide clues as to the failure of recent antioxidant clinical trials involving synthetic vitamin E. To do this, I conducted an experiment where I ran samples of synthetic vitamin E in a polarimeter to determine their chirality. I also conducted an antioxidant potential test with copper (II) ions to see if a typical antioxidant potential test differentiated between the less potent dl vitamin E and d vitamin E. Finally, I engaged in research to determine how vitamin E work synergistically in the body to provide antioxidant protection. My results showed that synthetic vitamin E is about 50% d-enantiomer and 50% l-enantiomer, with a slight preference towards the l-enantiomer. The results demonstrate that the common form of synthetic vitamin E is about half of the biologically useless l-enantiomer. I also found that the Antioxidant Potential Test did not differentiate between the dl and d vitamin E, even though the two do not have the same potency biologically. Thus, results from antioxidant potency test that led to recent clinical trials may have been misleading, according to my result. Also, my research into the synergy of vitamin E demonstrated how vitamin E cannot function effectively without the presence of other molecules like vitamin C. Clearly, synthetic vitamin E demonstrated several flaws which should be addressed in coming years, at least with some more research into synthetic's flaws. My project can be used to improve vitamin E supplementation and provide a possible explanation for the failure of recent clinical trials involving vitamin E.