



**CALIFORNIA STATE SCIENCE FAIR  
2002 PROJECT SUMMARY**

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<b>Project Title</b> Vitamin C Supplements: A Flush of Your Money?	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of this project is to test the efficacy of vitamin C supplements in 3 forms: Chewable tablets, TimeRelease capsules, and EsterC with bioflavonoids. Megadoses of vitamin C can increase the risk of tolerance building which can require more to maintain health and increase risk of kidney stones. Saving money and explaining benefits and risks to others are the benefits to society that this project may bring.</p> <p><b>Methods/Materials</b> We first dissolved all 3 supplements in water and a low pH solution measuring the how fast supplements released the ascorbic acid. We titrated 2,6 dichloro-indophenol into the samples taken at different time intervals. Four mL of the solution was pipetted into an Erlenmeyer flask, to which was added 10 mL of metaphosphoric acid. We then titrated as much blue dye until the first faint rose pink endpoint was reached. A series of formulas were then used to determine the amount of ascorbic acid. Urine samples were taken from 38 college students at 24 hrs, (control), 2, 4, and 6 hours after ingesting the supplements. In titrating the urine with dye, we were not aware which supplement the subject had taken, nor the subjects knew which supplement they were taking. Therefore, this was a double-blind study.</p> <p><b>Results</b> At 15, 30, and 45 minutes, EsterC dissolved more quickly and had a higher concentration in water and acid than both Chewables and Time-Release. Baseline means of the 3 groups ranged from 31-34 mg a day, and there was no statistical difference among the three groups. Excess vitamin C was apparent in the urine 2 hrs after ingestion, with the mean 0-4th hour exceeding the mean daily excretion. At 2, 4, 6 hours after ingestion, vitamin C excess from Chewables were excreted in the greatest amounts, followed by the TimeRelease tablets, and lastly by the EsterC tablets.</p> <p><b>Conclusions/Discussion</b> EsterC was the most easily dissolved, and TimeRelease the least. Although Ester C dissolved the quickest, it appears to be the least effective in saturating tissues and excess excreted. The chewable tablet has shown to be the most efficient. However, there were significant differences between the mean percent excreted in chewable and Ester-C subjects in 2, 4, and 6 hours compared to 24 hour values.</p>	
<b>Summary Statement</b> We tested the efficacy of vitamin C in three supplements to benefit society by saving them money and explaining potential benefits and risks.	
<b>Help Received</b> used lab, equipment, chemicals supplied by Cal State University of LA nutritional science lab; supervised by college student and advisor in lab	