



**CALIFORNIA STATE SCIENCE FAIR  
2003 PROJECT SUMMARY**

<b>Name(s)</b> <b>Smita Mascharak</b>	<b>Project Number</b> <b>J0517</b>
<b>Project Title</b> <b>Chemically Probing the Legitimacy of Ancient Herbs as Alternative Medicine</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Cascara Sagrada and Senna are herbs that have been used as laxatives by ancient cultures. The purpose of this project was to establish the legitimacy of these two ancient herbs as alternative laxatives by detecting certain anthraquinones in them. Furthermore, the natural remedies were compared with allopathic over-the-counter cathartics.</p> <p><b>Methods/Materials</b> The contents of the herb capsules as well as PeriColace and Exlax pills were extracted individually with methanol/water mixtures. The yellow extracts were then individually subjected to HPLC separation on a SpectraPhysics HPLC setup connected to an Alltima "rocket" column. The relative amounts of the two active ingredients, emodin and rhein, were determined by their peak intensity (at 435 nm) and retention times. Both acidic and basic conditions were employed to check modulation of concentrations of these ingredients in the extracts.</p> <p><b>Results</b> My results showed that the two herbs did have substantial amounts of the active anthraquinones. In fact, after comparing their amounts with those of the over-the-counter pills, it became apparent that the herbs contained higher amounts of emodin and rhein. Alkaline conditions in general improved the extent of extraction of the active ingredients.</p> <p><b>Conclusions/Discussion</b> Since the natural herbs contain comparable or even greater amounts of the active ingredients emodin and rhein, they are legitimate alternatives as laxatives. Similar experiments can be performed to establish the legitimacy of other natural remedies. However, excessive use of laxatives should be avoided in general due to the carcinogenic properties of the anthraquinones.</p>	
<b>Summary Statement</b> The purpose of my project is to establish the legitimacy of two ancient herbs as laxatives by detecting certain anthraquinones in them by HPLC.	
<b>Help Received</b> I used equipment at UCSC under the supervision of Pilgrim Jackson, a graduate student. He also taught me how to run the HPLC setup. My father, Pradip Mascharak, helped in procuring all the nessecary materials (like emodin, rhein and the column).	