



**CALIFORNIA STATE SCIENCE FAIR  
2002 PROJECT SUMMARY**

<b>Name(s)</b> <b>Smita Mascharak</b>	<b>Project Number</b> <b>J0511</b>
<b>Project Title</b> <b>Acidic Foods in Contact with Aluminum Foil: A Cause of Parkinson's/Alzheimer's Disease?</b>	
<b>Abstract</b> <b>Objectives/Goals</b> Aluminum has recently been implicated in neurodegenerative disorders such as Parkinson's and Alzheimer's Disease. The objective of my project was to find whether a substantial amount of aluminum dissolves when aluminum foil comes in contact with acidic foods. My hypothesis was that aluminum does leach out of the foil. <b>Methods/Materials</b> Three common acidic ingredients, vinegar, lemon juice and ketchup, were tested on aluminum foil. Strips of aluminum foil were kept in contact with the acidic material in a kitchen tray at room temperature and at 50° C for various time intervals. Samples were taken out of the tray and mixed with Aluver3 reagent, which gives a red color in presence of aluminum. The intensity of the color was measured in a spectrophotometer. Using the "Standard Curve" technique, the concentration of aluminum in each sample was determined. <b>Results</b> My results showed that under my experimental conditions, up to 25 ppm of aluminum leached out when vinegar was used for 60 min at 50° C. Little aluminum was detected when ketchup was used. Leaching in case of lemon juice was moderate (max 14.4 ppm). Heating definitely increased the rate of dissolution. At room temperature, the rate of leaching was modest. <b>Conclusions/Discussion</b> Collectively, the results show that aluminum does dissolve in acidic foods and heating accelerates the process of dissolution. Therefore, precautions must be taken when acidic foods are cooked in aluminum foil, pots, pans and utensils. Ingestion of dissolved aluminum could lead to brain disorders.	
<b>Summary Statement</b> My project is to find out whether aluminum is leached out when acidic foods are handled in contact with aluminum foil.	
<b>Help Received</b> I used equipment at UCSC under the supervision of Mr. Raman Afshar. Dr. John Rowland explained how the equipment worked. My father, Prof. Pradip Mascharak, explained some of the chemistry involved in the project.	