



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Joyce D.H. Kim	Project Number J1316
Project Title Assessment of Bacteria Growth in Backwashed Open and Pop-Up Cap Bottles	
Objectives/Goals The objective was to evaluate the bacteria growth in backwashed pop up and open cap bottles. My hypothesis was that the open cap bottles have a much higher amount of backwash than the pop up caps that introduce bacteria into the water bottles.	
Abstract Methods/Materials Eighteen students were participated and tested in a 50-minute period. They were noticed to take at least ten gulps, a rest in between each one, and to stop when they reached the line drawn at the bottom part of the label of a 251 mL water bottle. Then the water was left alone for seven or twenty-nine days, and then was put in the petri dishes with MacConkey agar for 3 days so that gram negative bacteria could grow in the MacConkey agar. Each day, the petri dishes were examined, taken pictures of, and the colonies were counted.	
Results For the results, the bacteria were divided into three categories: tiny (<1/16-inch), 1/16-inch, and 1/8-inch bacterium and the results were described in the average percentage of tiny colonies for covering per plate and the average number of 1/16-inch or 1/8-inch colonies per plate. On Day 2, there was a lot of colony growth. The first nine plates (open caps), the tiny bacteria covered 33% of the plate, while the back nine plates (pop up caps), the tiny bacteria covered only 20% of the whole plate. For the 1/16-inch category, there was an average number of 3.2 colonies in the first nine and none in the back nine. For the 1/8-inch category, the first nine had an average of 0.1 colony (1 of 9 plates with a single colony) but no colony was observed in the back nine. On Day 3, there was a bigger difference of colony appearance than Day 2. For the tiny category, the first nine had 45% of the plate covered by tiny colonies while the back had 29%. The 1/16-inch category had the average number of 86.9 colonies in the first nine, and the average number of 63 colonies in the back nine for the average. For the 1/8-inch category, the first nine had the average number of 0.2 colonies (2 of 9 plates with a single colony per plate) and the last nine had none.	
Conclusions/Discussion Collectively, the open caps had a much higher incidence of colony growth than the pop up caps indicating that open caps have a higher chance of introducing bacteria into the water bottle because of backwash.	
Summary Statement Assessment and comparison of bacteria growth in open cap and pop up cap water bottles after being drunken out of.	
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