Clean Water in Ecuador
Perceptions of Chlorine Flavor

Jacob Stout
Prof. Don Tellinghuisen
Prof. David Wunder

Waterborne illness, especially diarrhea, remains a significant problem in large parts of the world, especially in rural and underdeveloped regions. Millions of people still lack access to improved water supplies, putting them, and especially their children, at greater risk of preventable waterborne illness. Chlorination of drinking water is one of the cheapest, most effective, and most widely used methods to remove drinking water contaminants. At the same time, however, many people object to its use because of its ability to introduce an unfamiliar and unwelcome taste and odor. Little research has been done to systematically study the perceptions of chlorine flavor among those implementing chlorine treatment for the first time. To begin filling that gap, this research project took us to rural Ecuador to carry out taste tests of chlorinated water.

In May, we performed taste tests of water chlorinated to various levels with community members of five Quichua communities in Ecuador. Each individual participant tasted the water in sample pairs, always comparing an unchlorinated sample with a chlorine treated sample. After each tasting, participants were asked to indicate which flavor they preferred, if they tasted chlorine, and if they would drink the water if it was delivered to their home via tap. The responses were coded, and the initial findings were presented to the local government and community leaders.

Since returning from Ecuador, taste tests have been also performed with Calvin students, faculty, and staff in order to have a comparison group. Chemical tests have been done on the water from both Ecuador and Grand Rapids, and the results have shown that the two waters are chemically highly similar, suggesting that their flavors are nearly identical. As such, we can compare flavor perceptions across countries and cultures by comparing the two groups of participants that we have tested.

While the story of the results has yet to be determined, we can make some observations about what has happened so far. As a whole, rejection rates for chlorinated water are low, never reaching a rejection threshold. Also, people in Ecuador were more sensitive to chlorine at higher levels. This agrees with past literature findings that show that those with exposure to lower levels of chlorine tend to detect chlorine better.

Additionally, while data were being collected in the US, a review paper was written and submitted to the Journal for Water, Sanitation, and Hygiene for Development. The paper reviews the factors contributing to the acceptance of a chlorine based water treatment system in developing countries, focusing on taste and odor concerns. A paper is also being written about Water Safety Plans, summarizing findings (in Psychology and Chemistry) in Ecuador to help guide management of water safety plans in developing regions.

This research has given me valuable firsthand experience in the production of research literature. It has taught me about the development of research, and it makes me a better consumer of research so that I can be prepared for a career in the sciences. It is also a great international experience in research that I have been able to draw on for the medical school application process.