

# Salinas student works to phase out pesticides

Natalie Jacewicz 10:30 a.m. PDT October 19, 2015



(Photo: Natalie Jacewicz/For The Salinas Californian)

Julio Martinez knows about potential. He knows that run-of-the-mill woodchips can strain pollutants from water and that tiny bacterial proteins may one day replace pesticides. And he knows about these agricultural advances because his teachers saw potential in him.

“As a first generation student, going to college is a challenge, but my mentors have been my strength,” Martinez said.

Martinez, who came to the U.S. from Mexico at age 11, will graduate this fall from California State University, Monterey Bay with a degree in biology. He plans to continue studying agricultural science as a Sally Casanova Pre-Doctoral Scholar.

Martinez will be the second in his family to graduate from college, after his older sister. If he completes his doctorate, he will be the first in his family.

“We didn’t have to come here, but my dad had this goal of getting a higher education for his children,” Martinez said. His father left a career as a baker in Mexico to become a fieldworker in California with Martinez’s mother. They still wake up at 5 a.m. every morning to pick lettuce and raspberries.

Science first intrigued Martinez as a teenager struggling with cosmic quandaries. “What’s the meaning of life?” he asks with a slight chuckle. “I became curious about biology because biology is the study of life.”

Abstract questions led Martinez to science, but the familiar lured him to agricultural biology.

“I just look at the community around me,” he says. “My parents are field workers. I’m giving back to the industry that created a lot of jobs.”

His older sister inspired him to attend college, but the first year challenged him. Because he had not studied chemistry in high school, the subject daunted him in college. Martinez considered changing majors, but a professor encouraged him to stay in science.

Martinez knew that to succeed in science, research experience was key. He took a microbiology class and received a grant from the California State University Program for Education and Research in Biotechnology.

The grant allowed Martinez to study how woodchips counteract water pollutants. Pesticides from agriculture can seep into groundwater and contaminate it with nitrates. These nitrates pose health risks in drinking water and can cause death in infants. With the help of a professor, Martinez studied if a “woodchip bioreactor” – a trench filled with woodchips – could address the problem.

When nitrate-rich water flows from a crop field, it flows into the woodchip trench. Soil bacteria that feed on the woodchips use the nitrate to breathe, ultimately converting the pollutant into nitrogen gas. The water flows out of the reactor with a lower concentration of nitrate. Martinez said his studies were promising enough that California State University is now building a new, more efficient woodchip bioreactor.

Today, Martinez studies how to replace pesticides altogether. Bacteria produce proteins that attack competing bacterial strains. With more study, humans might be able to use these proteins to combat bacterial diseases that threaten agriculture.

Outside the lab, Martinez helps educate his community about how to live safely with pesticides as a volunteer of the Center for the Health Assessment of Mothers and Children of Salinas (CHAMACOS). He explains basic tips that can make families like his safer: Field workers, for example, should wash their clothes separately from the rest of their laundry to prevent the spread of toxic chemicals.

Although he wants to share his story to encourage others, Martinez hopes that stories like his will be less of an anomaly in the future.

“That should be normal, not on the news,” he said of students like himself attending college.

Martinez got the chance last year to meet other scientists like himself through a scholarship from the Society for the Advancement of Chicanos / Hispanics and Native Americans in Science. He attended the society’s national conference in Los Angeles and shared his work on woodchips.

“I never thought someone would pay for me to go to a meeting and meet with scientists from around the country. It was a magnificent experience,” he said.

At the end of this month, Martinez will attend the conference again in Washington, D.C. and share his bacterial studies.

Martinez has received too many grants and awards to list. He plans to apply to U.C. Davis to continue his studies over the summer. Although he is grateful for his success, Martinez stressed that his achievements result from the support of his professors and family alike.

He advises other young people from his community to seek support wherever they can. "There are always people ... You have to open yourself to them and let them know that you need help."

Martinez counts himself among those ready to offer support.

"I just want to inspire others, because others have inspired me. I just want to give back."

**Julio Martinez**

**Age:** 23

**Occupation:** Sally Casanova Pre-Doctoral Scholar at California State University, Monterey Bay

**Work:** 2014, Science Instructional Lab Assistant, Science and Environmental Policy Division, California State University, Monterey Bay

**Education:** High school, current biology student at CSUMB

**Personal:** Lives in Salinas with his parents and younger brother

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