One of the major scientific concerns of our time is environmental conservation. This discipline is the search for ways to mitigate or reverse damage done in the past. Earlier generations did not understand the full magnitude of their actions and in consequence, a lot of undue damage was done. This left behind such things as ‘geohazard permanent supersites’, areas that are considered permanently off-limits to human development because the cost necessary to make them safe again is untenably high. One option that scientists are now looking at as a way to help clean sites is microorganisms. Amazingly, some bacteria live off of the dangerous compounds left behind in these toxic sites. One such bacteria is a species called Arhodomonas. It breaks down carbon compounds that are considered hazardous to humans and the environment. Also, it is able to live in highly saline environment such as oil spills.

 Doctor Patricia Canaan is a professor and researcher in Biochemistry and Molecular Biology at Oklahoma State University. She has studied a wide variety of things, such as the little studied bacteria Elizabethkingia, and has had many papers published in various journals. One paper was on the Arhodomonas bacteria and its ability to break down carbon compounds like those found at oil spill sites. The paper is entitled “Arhodomonas sp. Strain Seminole and Its Genetic Potential to Degrade Aromatic Compounds under High-Salinity Conditions”. Her and her colleagues studied what genes coded for the ability to break down varied compounds and by what mechanisms it accomplishes these tasks. When interviewed, she said that the biggest hurdle they had to get over was the fact that the genome for this particular strain was very choppy and largely incomplete. This made their research much more difficult. She said that the biggest take-away, despite these difficulties, was “Pathway reconstruction from genomic sequence that we could relate to the phenotype and original habitat. This is always good to see.” In explanation, a phenotype is a visible expression of a gene. So, what she meant by that statement was that they were able to isolate specific genes and recreate the process the bacteria uses to breakdown the compounds for food. After this overview of the research, she laid out the results as they relate to the possible use of the bacteria in cleaning the environment. When asked if it was a practical option for this goal, she stated that the research often show that it is an impractical option. So why don’t the findings often work out, simply impracticality or the bacteria not doing what the researchers hoped it would? Dr. Canaan said it was a mix of both.

 Bacteria sound like a great option for environmental cleaning and therefore many research experiments are done on this topic. But, as Dr. Canaan stated, these experiments often show the impracticalities inherent in asking tiny organisms to fix a big problem. Even though the hypothesis of the original research is proven, the overarching goal is not met. As society advances, more options for environmental improvement surface and bring hope for a cleaner future.

Sources:

https://geo-gsnl.org/supersites/permanent-supersites/

https://aem.asm.org/content/80/21/6664