The Peru-Ready Method for Optimizing Bioavailable Iron in Water to Reduce Anemia Caused by Iron Deficiency in the Highlands of Peru

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Iron deficiency-caused anemia is prevalent in the Highlands of Peru because natural sources of iron have been removed from the Peruvian diet due to world economics. Instead of eating iron rich quinoa, locals export the cash crop to the United States and supplement their diet with imported non-fortified white rice. Iron supplement pills and the novel Lucky Iron Fish solution, which has been successful in Southeast Asia, have proven to be ineffective in Peru for cultural and economic reasons (Cantwell, 2016). In this project, I engineered the Peru-Ready apparatus using galvanic cells to dissolve bioavailable iron into drinking water to combat anemia. To form a galvanic cell, a plate (copper or stainless steel) was secured near an iron bar with nylon screws. This experiment showed a significant increase in the amount of iron released into the water by the treatment where the mild steel bar acted as the cathode (Bar Cathode), for both the copper and stainless steel galvanic cells. Assuming no other sources of dietary iron, only 160 mL of the Bar Cathode water would need to be consumed each day to receive 10 mg of iron, enough for an adult male's recommended daily allowance as specified by the National Institute of Health (Institute of Medicine, 2001). The results of this study show that the Bar Cathode treatment of the Peru-Ready system can generate sufficient bioavailable iron water that can be diluted and introduced into the Peruvian Highland water supply.

Awards Won:
Third Award of $1,000