Creating a Model System for Micronutrient Fortification

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1.5 million children die every year due to micronutrient deficiencies (CDC, 2015). The purpose of this research is to alter an existing technique to create a simple, cost-effective, and long-lasting method to fortify rice with micronutrients. Malnutrition can be eliminated if key micronutrients are provided to children and adults alike; in this experiment rice, a staple crop, is being fortified with iron and folic acid to help end this global epidemic. In Stage 1, 100 g of brown rice was soaked and boiled in water, as the rice began to gelatinize, varying combinations of micronutrients, 25-100 and 100-600 mg of iron and folic acid, respectively, were added. The rice was then steamed, cooked, and dried which was then crushed into a powder to analyze for the retention concentrations of both micronutrients qualitatively and quantitatively. In Stage 1, the concentrations of iron were found, using a standard solution curve. However, these concentrations were very low, and a redesign was necessary. In Stage 2, the amount of micronutrients increased, while the quantity of rice decreased. The procedure for fortification and analysis was repeated for 4 trials and an additional color test was conducted. In Stage 3, the micronutrients were extracted from natural sources. The addition of the highest combination of micronutrients yielded a final iron concentration of 4.08 mg/L that is safe for humans and children to consume. As climate change increases, CO2 levels have been rising, robbing staple crops of mineral and protein content. The decline of micronutrients is causing deficiencies around the globe, even in the US, to grow at rapid rates. It is imperative to discover alternate methods to provide people with key micronutrients, such as fortification done in this project.

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