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Removing Copper with Fruit Peels and Seaweed

The purpose of this experiment was to discover which type of material (banana peel, plantain peel, or arame seaweed) removed the most amount of copper from a solution. These experiments were completed because there was an interest in the ability of everyday food waste and seaweed to remove dangerous contaminants from water. Banana and plantain peels were dried at 50° C and sieved into two sizes: less than 1.18 mm and more than 0.8 mm, and less than 0.8 mm; seaweed was purchased in dry form and sieved in the same manner. Mixtures of 0.1 grams of the three materials and 1, 2.5, 5, 10, and 50 mg/L copper were placed in test tubes on a rotary shaker for one hour; triplicates of each mixture were run. A copper color reagent was added, and the absorbance was measured at 551 nm on a spectrophotometer. The hypothesis stated that the banana peel would remove the most copper from the solution. Previous studies by other scientists had found that banana peel removed more copper from a solution another food wastes. This hypothesis was rejected because the arame seaweed removed the highest amount of copper from the solutions in the experiments. The arame seaweed removed the most copper from the solutions because it has the highest adsorption capacity for copper of the materials tested. Adsorption capacity is the amount of copper in milligrams that can get stuck to a gram of material. At a copper concentration of 50 mg/L, arame seaweed removed 90% of the copper, while banana removed 25%, and plantain removed 16%. The results from these experiments could help people in poor countries that harvest bananas, plantains, or seaweed and do not have easy access to clean drinking water to have safer drinking water. This discovery could help people in countries such as Malaysia, Argentina, or Guinea have clean drinking water.