

The Mechanism of Metallic Flavor from Drinking Water

Metal in drinking water can provide an important source of micronutrients to the human diet, such as iron, copper, calcium, and magnesium. But certain metals, noticeably iron and copper, can cause an annoying metallic “taste” that results in consumer dissatisfaction, loss of trust in water safety, reduced consumption of this needed beverage, and possibly a health threat due to too little or too much of a metal. Although the “metallic” descriptor is prominent on the drinking water taste and odor wheel, the biochemical mechanisms that produce the metallic taste, odor, or flavor have been little studied and are poorly understood.

Our research aim is elucidate mechanisms that explain the metallic flavor. Our research hypothesis states that there are two components to metallic flavor: 1) the taste of metal ions on the tongue; 2) an odor component due to metal-catalyzed lipid oxidation of the oral tissues that produces odorous aldehydes and ketones. To fully understand the metallic sensation, its prevention, and application to human health we developed four specific objectives that are: 1) to determine the mechanisms that causes metallic flavor in mouth when drinking water containing metal ions, specifically iron and copper; 2) to determine ways to prevent metallic flavor generation in mouth; 3) to compare the sensory thresholds, recommended nutritional levels, and adverse health effects levels of iron and copper in water and evaluate with respect to health-based problems such as persistent metallic tastes in patients receiving chemotherapy.