EVALUATING TRACE METALS IN LOCAL HONEY USING ICP-MS

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Honey is an increasingly important commodity in America, not only because of its value to the American economy but also for its use in everyday life. When evaluating the concentration of trace elements in honey, it can reveal pertinent information such as environmental conditions of the region it was grown in. Additionally, with the rise of "fake foods", positively linking a food product to its source is paramount for quality and legal implications. While the country of origin is required by law on the packaging, most honey is declared as a blend of several honeys from different countries. Since demand has increased for the sweeter, more aromatic monofloral honey, it has become susceptible to adulteration. A jar of supermarket honey most likely contains a blend of honeys from around the world that contain illegal antibiotics, trace elements, and artificial sweeteners. How, then, can we determine where our honey comes from and if it is safe and unadulterated?

My project's goal is to use discriminant function analysis (DFA) to match east coast American honey samples with high probability to a specific region of origin using their trace elemental profile. My goal is to use DFA to determine the most discriminatory elements and regions while evaluating its relationship to the region's unique environmental condition. I have taken samples from six states: North Carolina, Virginia, Pennsylvania, Maryland, New York, and New Jersey. I am analyzing six samples from each state for a total of thirty-six samples. To digest the organic matter, I am using 70% Trace Metal Grade Nitric Acid and a 70°C hot water bath to fully evaporate and concentrate each sample for analysis on the ICP-MS.

After thorough DFA analysis, I aim to create a robust DFA model that serves as the stepping stone for future, comprehensive honey individualization.