

Green Coffee Chemistry and Its Possible Application for Group Discrimination and Correlation with Cupping Quality

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SUMMARY

In a preliminary study, forty-three samples of *Coffea arabica* were harvested over two years. Samples from several locations in Hawaii and of several different cultivars were chosen. In addition, two drying methods (forced-air and sun) were examined. The green coffee samples were analyzed for organic acids, simple sugars and chlorogenic acids. A novel HPLC method was developed for simultaneous determination of simple sugars and organic acids. Using this method, typical recoveries of individual acids and sugars used to fortify green coffee samples were: malic acid 100.7%, quinic acid 86.7%, citric acid 112.8%, lactic acid 100.0%, sucrose 93.6%, fructose 109.3%, glucose 110.2%. Chlorogenic acids were determined using HPLC, based upon previously described methods with some modifications. All samples were cupped by a trained panel. The study attempted to discover a correlation between green coffee chemistry and cupping characteristics and the possibility of using the chemistry for sample discrimination. The data were analyzed using multivariate statistical techniques. With the data from the compounds analyzed, no correlation between green coffee chemistry and cupping quality could be elucidated. However, principal component analysis (PCA) showed a separation of coffee samples by drying method. The principal separating factors were lactic acid content and acidity in the cup. Discriminate analysis (DA) supported this result with classification rates greater than 85%. The PCA also showed some groupings of samples by location and cultivar. These results were also confirmed with DA. The corresponding DA suggests that use of these chemical and/or cupping characteristics may be able to accurately discriminate arabica coffee by varieties and locations. Limitations of this study included a low sample: variable ratio and too few samples. Further studies will be undertaken to expand sample size and the number of components analyzed.