Comparison of Two Methods for the Analysis of Organic Acids

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Abstract
The detection of organic acids in fruit juice is a common method to assess the authenticity of the fruit. However, the process can also be used to determine the natural abundance of organic acids. The two methods used to assess organic acids are the AOAC (986.13) and the more recently published International Fruit Juice method (IFU 65). Both methods are used to determine the authenticity of fruit juices. The purpose of this study was to assess the AOAC method versus the IFU method for the determination of organic acids in fruit juices.

Materials and Methods
HPLC:
- Column: Waters BEH C18
- Mobile phase: A = 50mM potassium phosphate, pH 2.5, B = 1% Formic Acid in Water
- Gradient: % Mobile Phase C = Acetonitrile

UPLC-MS/MS:
- Column: 1.7µm, 2.1 x 100mm
- Mobile phase:
  - A = 1% Formic Acid in Water
  - B = Acetonitrile
- Gradient:
  - % Mobile Phase C = Acetonitrile

Sample Preparation
All samples used in the analysis were prepared in duplicate at ENAC. The duplicate set was obtained by shipping a sample overnight to Milford, MA and the original kept at ENAC. This was done to ensure accuracy and reproducibility.

Discussion
Overall, the results showed that the two methods can be used to determine the authenticity of fruit juices. However, the AOAC method has a smaller linear range than the UPLC-MS/MS method. This is due to the longer run times and higher detection limits of the AOAC method. The UPLC-MS/MS method also provides more specific and sensitive detection limits for organic acids.

Conclusions
The AOAC method is a well-established procedure and a recognized method, but it has a smaller linear range than the UPLC-MS/MS method. The UPLC-MS/MS method provides more specific and sensitive detection limits for organic acids, making it a preferred method for the analysis of organic acids in fruit juices.