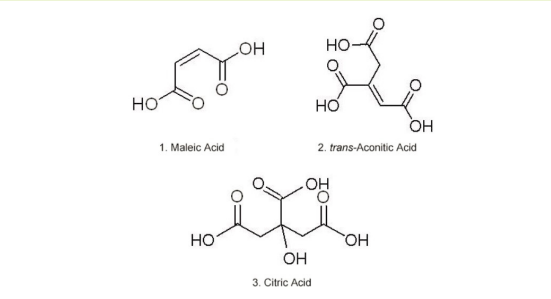
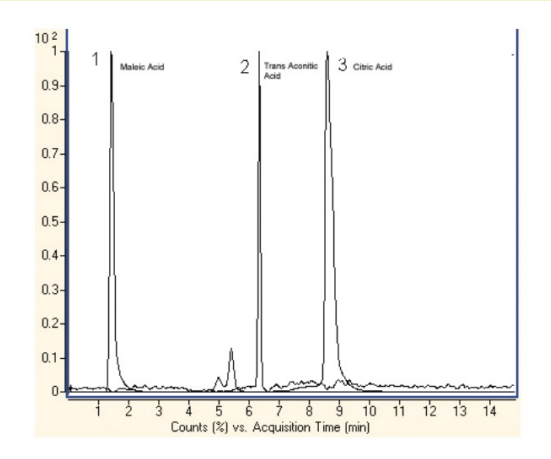
Citric Acid by ANP

Low Molecular Weight Organic Acids





Notes: ANP Chromatography with MS Detection (ANP-LCMS) has become more and more popular for analysis of certain mixtures of organic acids because of the simplicity, rapidity and stability of the method. The statutory methods for the determination of low molecular mass organic acids are turbidimetric and colorimetric methods and ion-exchange chromatography. "Turbidimetry by means of calcium oxalate precipitation and colorimetry by means of zinc ferricyanide color development are time-consuming and only achieve limited rather than exact results".

Method Conditions

Column: **Cogent Diamond Hydride™**, 4µm, 100Å

Catalog No.: 70000-15P-2

Dimensions: 2.1 x 150 mm

Solvents: A: DI H_2O/ 0.1% ammonium acetate
B: Acetonitrile/ 0.1% ammonium acetate

Gradient:

time (min.)	%B
0	90
2	90
5	70
6	70
6.1	30
7	30
7.1	30
10	90

Flow rate: 400µL/min

Detection: ESI – neg - Agilent 6210 MSD TOF mass spectrometer

Sample: Sample mixture was prepared in 50% DI H_2O/ 50% acetonitrile

Peaks: 1. Maleic Acid 115.0031 m/z $(M-H)^-$
2. Trans- Aconitic Acid 173.0086 m/z $(M-H)^-$
3. Citric Acid 191.0192 m/z $(M-H)^-$

Discussion

Low molecular mass acids were retained and separated using a Cogent Diamond Hydride column in the Aqueous Normal Phase mode of HPLC LC-MS chromatography (ANP-LC-MS- HPLC). The method described above was able to resolve three acids in 10 minutes.
Limits of detection (LOD) for the 3 acids ranged from 0.05 to 24 microM. The disadvantages of current ion-exchange chromatography methods are the use of a strongly acidic cation exchanger which has low exchange capacity, the long time required for equilibrium, separation and re-equilibrium.

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