

Direct, Rapid Analysis of Orange Peel using the DART Ion Source



Objective

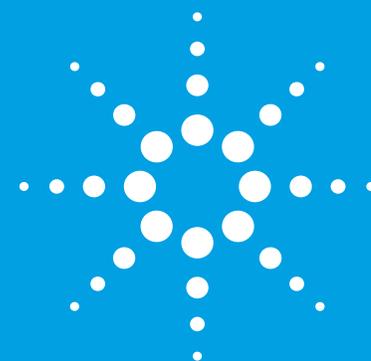
To directly and rapidly analyze contaminants from orange peel using an ambient desorption ionization technique, Direct Analysis in Real Time (DART), and an Agilent TOF or Q-TOF instrument.

Background

DART uses the interaction of excited state atoms and molecules with the sample and atmospheric air to cause ionization. In these analyses, metastable helium was used in the DART source for ionization. Analytes are ionized by proton transfer reactions from the ionized water clusters in the air.

This technique is fast, easy to use, and requires no sample preparation. It only takes a few minutes to set up and run. Using a high resolution instrument such as an Agilent TOF or a Q-TOF, it is possible to acquire high resolution accurate mass MS and MS/MS data in less than a minute.

This note describes the analysis of fungicides such as thiabendazole and imazalil from orange peel in less than a minute with no sample preparation using DART and an Agilent Q-TOF instrument.



Compounds

- Imazalil
- Thiabendazole

Key Benefits

- No sample preparation is needed with DART analysis
- Complex samples can be analyzed in less than a minute using DART
- DART is fully compatible with Agilent TOF and Q-TOF instruments
- Typical mass accuracies for MS and MS/MS data are within 3 ppm



The Approach

The spectra shown below were acquired in less than 30 seconds following exposure of the sample to the ionization source. For DART analysis, the sample was simply held with tweezers in the path of the DART beam. Data acquisition can be as short as 30 seconds.

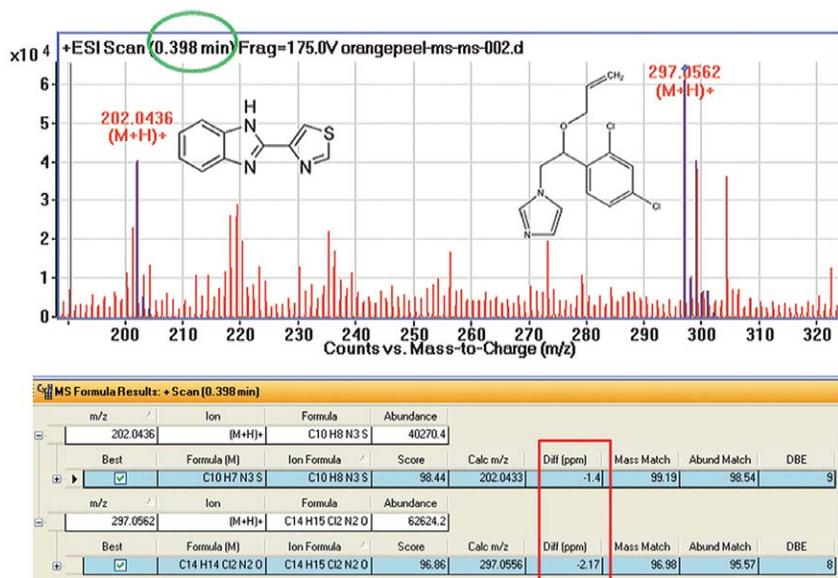


Figure 1. A small piece of orange peel analyzed using DART and an Agilent Q-TOF shows the presence of fungicides thiabendazole and imazalil. The time spent acquiring the data is circled in green in the top portion of the chromatogram. Mass accuracies are in the red box.

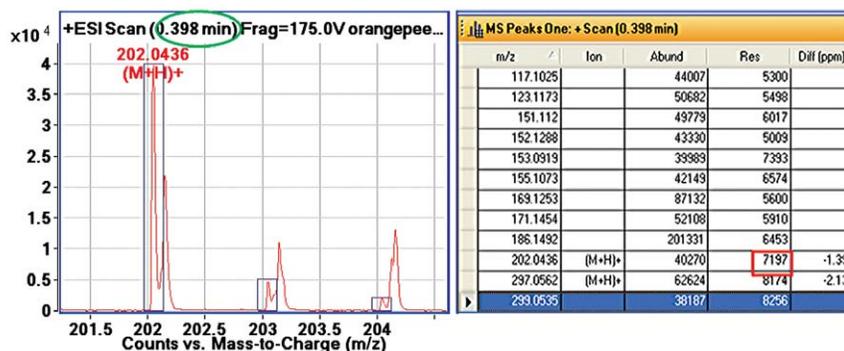


Figure 2. This figure shows the importance of high resolution for the analysis of a complex sample such as an orange peel with no sample preparation and no chromatographic separation. The boxes around the peaks at 203 m/z and 204 m/z are the theoretical isotopic abundances for the formula C₁₀H₈N₃S of thiabendazole. Note that with a resolution of 7100 at this m/z, the impurity peaks can be resolved from the analyte peaks with a good fit for the isotopic abundance. Resolution is shown in the side panel.

Summary

DART can be used to rapidly analyze complex samples such as orange peel directly without sample preparation. This ion source is fully compatible with Agilent TOF and Q-TOF instruments. Typical MS and MS/MS mass accuracies are within 3 ppm.

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© Agilent Technologies, Inc. 2010
Published in the U.S.A. October 25, 2010
5990-6638EN



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