The Waters Atmospheric Solids Analysis Probe (ASAP)* has proven to be a useful tool in the direct analysis of a wide range of samples. Volatile and semi-volatile solid and liquid samples can be analyzed under atmospheric pressure ionization (API) conditions. Direct analysis techniques such as ASAP, DESI, and DART are appealing in that samples require little or no preparation; these techniques also enable analysis of samples directly from source material, i.e. pharmaceutical tablets, untreated urine, and more complex samples, including crude oil.

The ASAP method uses heated \( \text{N}_2 \) to volatilize the sample from a disposable glass capillary tip; sample is then ionized with the \textit{in-situ} corona discharge pin. It is a sensitive method of ionizing low polarity compounds, which are typically not amenable to ESI, APCI, or APPI. Both low and high complexity samples can be analyzed without any sample preparation or chromatographic separation.

In seconds, Waters ASAP can replace the ESI or APCI probe in the source housing of Waters mass spectrometry products, increasing the range of analysis possible on a particular instrument. Given that ASAP is particularly suitable for low polarity or non-polar compounds it makes a great alternative to an EI/CI solids probe with the advantage of no vacuum lock.

ASAP is compatible with the full range of Waters MS products including ToF/ToF and triple quadrupole instruments including, SYNAPT\textsuperscript{\textregistered} G2 HDMS, Xevo\textsuperscript{\textregistered} G2 QTof, Xevo QTof, SQD, TQD, Xevo TQ, and XEVO TQ-S.

The simplicity of operation, enclosed source design, and very low sample consumption makes it ideal for environments such as chemical synthesis laboratories and university chemistry departments.

*Waters ASAP has been developed under licence to MGM Mass Spec Consulting LLC, Hockessin, Delaware. U.S. Patent pending.
IN LESS THAN 10 MINUTES
ASAP coupled with ACQUITY TQD or Xevo TQ-S can rapidly screen four samples for the presence of melamine at levels relevant to legislation in a range of sample matrices.

Figure 1.
Melamine (m/z 127 > 60) spiked at 2.5 mg/kg (purple trace) versus blank (green trace) in A) milk, B) infant formula, C) chocolate, and D) cookies.
See Technical Note “Rapid Screening for Melamine in Food Products” (document #720003274EN) on www.waters.com.

IN LESS THAN 5 MINUTES
ASAP coupled with the LCT Premier XE or Xevo G2 QToF can deliver rapid analysis of a fine chemicals without any sample preparation or chromatographic separation, enabling confirmation of the synthesized product and detection of trace level impurities.

Figure 2.
ASAP spectrum and elemental composition report for potential impurities above 0.5 % base peak and corresponding postulated structures.

IN LESS THAN 15 MINUTES
ASAP coupled with the SYNAPT G2 HDMS System provides HDMS data where components from a crude oil sample are separated by ion mobility as well as mass revealing clear patterns that indicate structurally related compounds within the sample.

Figure 3.
DriftScope™ image of crude oil sample analyzed by ASAP showing regular patterns separated by 14 Da (CH₂) units.
IN LESS THAN 10 MINUTES
ASAP coupled with ACQUITY® TQD or Xevo TQ-S can rapidly screen two cookies for the presence of natural or imitation vanilla.

![Figure 4](image1.png)

ASAP spectra derived from cookies showing that A contains imitation vanilla whereas B only naturally derived vanilla.

See Technical Note “Rapid Fingerprinting of Flavor Ingredients in Food Products” (document #720003264EN) on www.waters.com.

IN LESS THAN 10 MINUTES
ASAP coupled with the LCT Premier™ XE or Xevo G2 QTof can deliver direct analysis of three tablets to screen for counterfeit products.

![Figure 5](image2.png)

Sample profiles for counterfeit tablet samples. ASAP with TOF MS detection identified the vardenafil and tadalafil to be fraudulent counterfeit tablets.

See Poster “Rapid Detection and Identification of Synthetic Phosphodiesterase Type-5 Inhibitors in Counterfeit and Adulterated Products Using the Atmospheric Solids Analysis Probe” (document #720003222EN) on www.waters.com.

IN LESS THAN 10 MINUTES
ASAP coupled with the LCT Premier® XE or Xevo G2 QTof can deliver rapid analysis of neat urine allowing identification of drugs consumed by a patient.

![Figure 6](image3.png)

A) Paracetamol and the endogenous metabolite creatine. B) Dihydrocodeine its metabolite dihydromorphine.

For additional information, please refer to the following documents available at www.waters.com:

**Rapid Fingerprinting of Flavor Ingredients in Food Products**
Doc # 720003264EN
In this Technology Brief, we demonstrate how the Atmospheric Solids Analysis Probe (ASAP) is used to profile flavor ingredients of food products in less than three minutes.

**Rapid Detection and Identification of Synthetic Phosphodiesterase Type-5 Inhibitors in Counterfeit and Adulterated Products Using the Atmospheric Solids Analysis Probe**
Doc # 720003222EN
This poster investigates the Waters ASAP for the rapid determination of synthetic phosphodiesterase type-5 inhibitors in counterfeit tablet samples and adulterated herbal supplements.

**The Application of Waters Atmospheric Pressure Solids Analysis Probe (ASAP) to the Analysis of Pharmaceutical Formulations and Metabolites in Urine**
Doc # 720002742EN
This technical note introduces the Atmospheric Pressure Solids Analysis Probe (ASAP), which is fitted to an API source by the replacement of either the ESI or APCI probe and the fitting of the corona discharge pin.

**Rapid Screening for Melamine in Food Products**
Doc # 720003274EN
This Technology Brief describes how the Atmospheric Solids Analysis Probe (ASAP) and ACQUITY TQD can screen for the presence of melamine in less than 2.5 minutes.

**Rapid Characterization of Impurities in Synthesized Products for the Fine Chemicals Industry**
Doc # 720002807EN
This application note shows the potential of Waters Atmospheric Pressure Solids Analysis Probe (ASAP) for the rapid identification of impurities in synthesized products followed by further characterization using UPLC/TOF-MS.

**The Application of ASAP to the Analysis of Complex Mixtures**
Doc # 720002847EN
This poster demonstrates the benefits of ASAP (Atmospheric Solids Analysis Probe) for the rapid direct analysis of volatile and semi-volatile solid and liquid samples using atmospheric pressure ionization.

**ASAP with Mobility Separation for Rapid Characterization of Lubricating Oils**
Doc # 720003193EN
18th IMSC 2009, International Mass Spectroscopy Conference, August 30 - September 4 in Bremen, Germany

**References**