# Rapid Identification of Drug Seizures by ASAP-MS on a Low-Cost, Deployable, Single Quadrupole Instrument

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Here, we describe the development of a prototype atmospheric solids analysis probe ion source for a miniaturised MS – the Waters QDa – and its application to the characterisation of drug seizures.

The QDa is a small, low cost quadrupole MS originally designed as a simple-to-use instrument for chromatography. Its ion source was redesigned to incorporate a corona pin and to allow the insertion of a solid probe (glass capillary) The sample was desorbed from the rod using a flow of heated gas before being ionised via a corona discharge operating in fixed voltage mode. Samples were analysed in full scan mode, data was recorded in four channels using a different cone voltage in each in order to induce in-source fragmentation of the analytes to allow increased certainty of identification. Data was obtained for a large number of solvent standards covering a wide range of drugs of abuse (DoA) including amphetamines, opioids, stimulants, cathinones, cannabinoids, steroids, and legal highs; data was also obtained for a series of common cutting agents such as caffeine. This data was used to build an identification database in order to test street drug seizures.

The initial experiments were carried out using the instrument in so-called performance mode which uses a 0.2 mm inlet aperture and a free-standing rotary pump to maximise sensitivity. In order create a deployable version of the instrument it was reconfigured to 'standard' mode which uses a bolt-on diaphragm pump and a 0.09 mm diameter orifice. In addition, the nitrogen gas used for desorption in the initial experiments was changed to air with the flow generated using a small air pump eliminating the need for a dedicated gas supply. This new set-up was subsequently tested with a range of standards and seizures and shown to be an extremely powerful tool for the rapid identification of drugs of abuse.