INVESTIGATIVE ANALYSIS OF CONTAMINANTS IN SOILS, SEEDS AND CROPS AT SGS M-SCAN

In November 2010 SGS acquired M-Scan Ltd a group of analytical laboratories in the United Kingdom, Switzerland, Germany and the United States.

M-Scan, now SGS M-Scan, specialises in Investigative Analysis particularly looking for unknown impurities or contaminants using chromatography and mass spectrometry. These two techniques, used independently or combined, provide powerful analytical tools for the analysis of organic compounds in a wide variety of agricultural samples.

The contamination of agricultural land presents significant problems for the farming community. Soil can be contaminated by ground water containing undesirable compounds brought into fields from neighbouring properties. Fuel leaking from the underground tanks of a petrol station or preservatives from a wood treatment factory washed into streams by rainwater and carried into nearby fields are just two examples of soil contamination studied by SGS M-Scan. In such cases it is necessary to firstly identify the source of the contamination by analysing extracts from the soil, groundwater and local streams. The second step is to identify how widespread the contamination has been. Groundwater and soil samples are collected from various locations around the field while the direction of the hydrological gradient is determined to plot where the contamination may spread to in future. Having stopped the source of the contamination, remediation of the site may be necessary including the removal and disposal of the soil, there will however be an ongoing requirement for monitoring the levels of soil and groundwater contamination on the site.

Monitoring pesticide and herbicide residues in crops, soil and field run-off also requires the chromatography and mass spectrometry based analytical techniques at SGS M-Scan. The linking of the two techniques enhances the accuracy, sensitivity and specificity of the analysis enabling low levels of residues to be unequivocally identified and quantified with a high degree of accuracy. SGS also works with importers of pesticide and herbicide monitoring the quality of products they are importing into the EU. The causes of taints and off-odours from crops are also identified at SGS M-Scan. Two techniques are available for the identification of off-odours. Traditionally Headspace Gas Chromatography has been used but while this technique is quite adequate for analysing strong odours, it does not offer the sub parts per million detection limits of Thermal Desorption GC-MS. In Thermal Desorption GC-MS the off-odours and other volatiles liberated from the crop are concentrated onto a porous polymer adsorbant prior to analysis by GC-MS. The results obtained are compared with SGS M-Scan’s proprietary list of Odour Threshold Values to enable the particularly odorous compounds to be identified. Taints from crops are extracted using steam distillation or a similar process followed by analysis again using a GC-MS based technique.

Off-odours and taints in crops can originate from the soil, chemicals used on the crop or contamination of the crop in transit to its processing plant. Extractable and leachable from food packaging can also be responsible for off-odours and taints in food on supermarket shelves. SGS M-Scan has method for the analysis of all of these.

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