

ADVANCES IN ANALYSIS OF PESTICIDE RESIDUES IN FOOD

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Brazil is the world's largest producer of fruits. Nevertheless only 1% of its fruit production is exported, representing a very small percentage of the international market. Brazil exports about 264,3 thousand tons of fresh fruits, with revenues of about US\$ 120 million. Of this, about 80 million come from the production of fruit in the Northeastern region, where the ITEP laboratory is located. In the last ten years the average price of the exported fruits has increased at a rate of 8,7% per year, reflecting the growing importance of higher valued fruit such as grapes, papayas and mangoes.

The ITEP pesticide residue analysis activities also include fruits and vegetables for sale to the domestic market and it is a national priority action undertaken by surveillance institutions such as Ministry of Agriculture – MAPA and Ministry of Health – ANVISA.

In order to reach demands from export producers Pesticide Residue Laboratories need, besides accreditation, constant improvement of the analytical methods and introduction of new molecules to keep high performances without losing analytical quality.

Since August 2006, the Pesticide Residue Laboratory (ITEP/ LabTox), which mainly works with export fruits, has introduced in its daily routine analysis the LC-MS/MS technique, and in 2009 the GC-MS/MS technique, as the alternative for the analysis of additional new molecules and follows the worldwide trend of lower Maximum Residue Levels (MRL). The combination LC-MS/MS and GC-MS/MS offers several important advantages over the GC -FPD / NPD, GC - ECD / ECD and LC - UV / VIS, such as structural confirmation of the presence of a compound at trace levels through monitoring of multiple ions or transitions and simplification of method development due to the reduced necessity for sample cleanup.

Due to the existing facilities at ITEP/ LabTox, the strategy followed was to study and validate a detection and confirmation system that could be used with multi-residue method and achieve quantification limits of compounds, in its great majority, of 10µg/kg. In order to analyze from 250 up to 400 compounds the MS/MS technique played a fundamental role and only for a few compounds specific methods are still running in the routine.

In this presentation, the molecules analyzed are listed and difficulties encountered during confirmation by LC-MS/MS or GC-MS/MS are discussed.

The scheme of equipments described here is not only analytically evaluated, but also discussed from the point of view of the export and import producers interest, such as the number of molecules analyzed for each crop, cost of analysis, time to release results and metrological confidentiality.