PD 004

Pesticides Quantification in spices using Modified QuEchERS and Tandem Mass spectrometer

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From time immemorial India has been known as the land of spices. The world consumption of spices is growing steadily year by year. Expansion of India's export of spices to a higher level or even to retain its current share of the world market can be achieved through increased productivity and improved quality. Most of the countries across the world are bringing down the permissible levels of contaminants. Thus scientific and technological advancement brings forth new challenges in the international trade. The health and food laws which are increasingly becoming stringent reflect the concern of the respective governments for the safety and welfare of their people. Among the wide variety of spices, the major export commodities from India include pepper, chili and turmeric. Indian Government is implementing various food safety regulations and standards to regulate manufacture, storage, distribution, and control of spices. Consequently the European Rapid Alert System for Food and Feed (RASSF) alerts for Indian spices came down drastically in the recent years.

Selective analyte signal detection by quick sample preparation will ensure lab to lab result reproducibility and productivity of analysis. In this scenario three major export commodities of spices Pepper, turmeric and Chili were selected for method development and validation for pesticide residue analysis. Sample preparation was very tricky, but it was optimized using modified QuEchERS to minimize co-extractives mainly color pigments considering recovery limit 70- 120% for most of the compounds,

Using retention time locking and pesticides Multiple-Reaction Monitoring (MRM) database had saved the time to set up the GC/MS/MS instrumental parameters. Due to the availability of more than two MRM transitions for 1100 pesticides, PCBs, PAHs compounds, it was possible to choose matrix free MRM transitions in order to provide superior selectivity and sensitivity for routine operation.

In-house method validation was carried out as per the DG SANCO guideline in pepper, turmeric and chili matrices with the lowest level of LOD, LOQ and calibration linearity reported for more than 100 targeted compounds in each commodity. Optimized method provides satisfactory recovery for 10 ng/g, 15 ng/g and 25 ng/g and precision (< 20%) for each six replicate analysis